



**BAB**  
**CHAPTER 4**

## PENGAWASAN KUALITI UDARA

### AIR QUALITY MONITORING



Sebanyak 52 buah stesen pengawasan kualiti udara automatik ditempatkan di seluruh Negara bagi memantau secara berterusan status kualiti udara sesuatu tempat atau kawasan. Sebarang perubahan ketara ke atas kualiti udara dikesan melalui stesen-stesen ini yang mana mungkin memberi kesan kepada kesihatan awam dan alam sekitar.

Lokasi-lokasi yang strategik (**Peta 4.1 dan 4.2**) dipilih bagi penempatan stesen-stesen pengawasan kualiti udara ini sejajar dengan 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 bandar yang padat dengan trafik.

Malaysia's air quality monitoring network consists of 52 stations that are located throughout the country to continuously monitor and to detect any significant change in the air quality that can cause negative impact on human health and the environment.

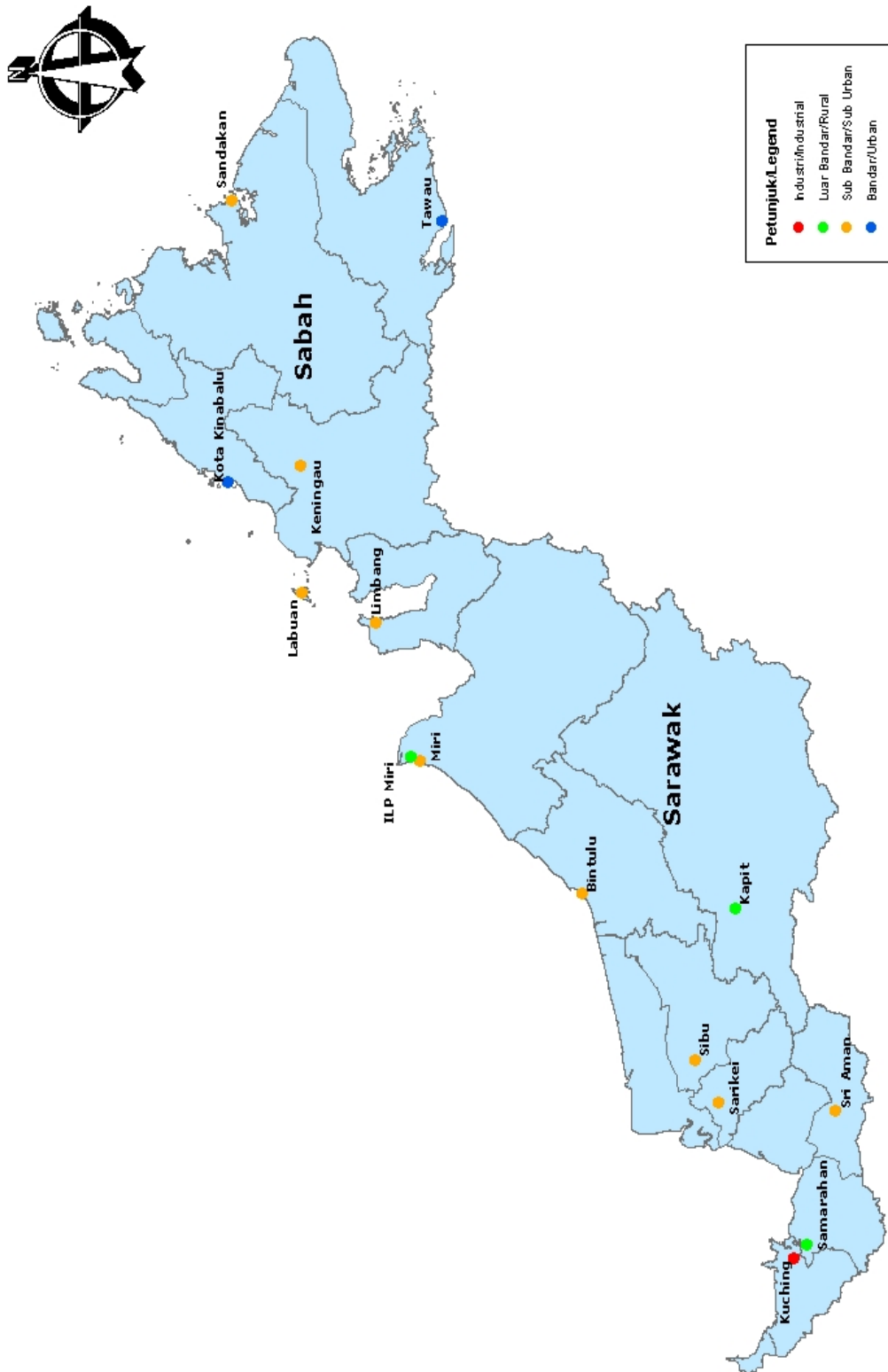
These monitoring stations are strategically located (**Map 4.1 and 4.2**) to meet specific monitoring objectives. Most stations are located in residential areas to ensure the air quality exposure level to the public is continuously monitored. The rest of the stations are located within industrial areas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

Tambahan kepada rangkaian stesen pengawasan kualiti udara automatik, stesen-stesen pengawasan kualiti udara secara manual juga ditempatkan di 14 buah lokasi yang berbeza. Pengawasan di stesen-stesen manual melibatkan pengukuran parameter-parameter seperti pepejal terampai, habuk halus bersaiz kurang dari 10 mikron ( $PM_{10}$ ) dan beberapa parameter logam berat termasuk plumbum. Bagi stesen manual ini, pengukuran dibuat setiap enam (6) hari dalam satu bulan dengan menggunakan alat "High Volume Sampler". Semasa episod jerebu pada bulan Jun 2013, pengawasan kualiti udara dengan menggunakan pengukuran habuk mudah alih juga dilaksanakan di kawasan-kawasan tertentu bagi memantau status kualiti udara di kawasan yang tidak diliputi oleh Rangkaian Stesen Pengawasan Kualiti Udara Kebangsaan seperti di **Peta 4.1 dan 4.2**.

The National air quality monitoring stations network is also complemented by manual air quality monitoring stations located at 14 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 a month using High Volume Samplers (HVS). During the haze episode in June 2013, portable particulate samplers were also installed in certain areas to monitor the air quality status in areas which were not covered in the National Air Quality Monitoring Network such as in **Map 4.1 and 4.2**.



**Peta 4.1 : Semenanjung Malaysia: Lokasi Stesen Pengawasan Kualiti Udara Automatik, 2013**  
**Map 4.1 : Peninsular Malaysia: Location of Continuous Air Quality Monitoring Station, 2013**



Peta 4.2 Sabah & Sarawak: Lokasi Stesen Pengawasan Kualiti Udara Automatik, 2013  
 Map 4.2 Sabah & Sarawak: Location of Continuous Air Quality Monitoring Station, 2013

## PENGAWASAN KUALITI AIR MARIN KEBANGSAAN

### MARINE WATER QUALITY MONITORING



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

Pada tahun 2013, terdapat 231 stesen pengawasan di seluruh Malaysia; Perlis (2 stesen), Kedah (10 stesen), Pulau Pinang (23 stesen), Perak (11 stesen), Selangor (14 stesen), Negeri Sembilan (14 stesen), Melaka (13 stesen), Johor (34 stesen), Pahang (20 stesen), Terengganu (20 stesen), Kelantan (10 stesen), Sabah (26 stesen), W.P Labuan (5 stesen) dan Sarawak (29 stesen) **(Jadual 4.1, (Peta 4.3(a) dan 4.3 (b)).**

Marine water quality monitoring was established in Peninsular Malaysia in 1978 and was extended to cover Sabah and Sarawak in 1985. The monitoring stations were created at estuaries and coastal areas to monitor marine water quality status with respect to their beneficial uses such as recreation, fishing and marine parks.

In 2013, a total of 231 monitoring stations were set up throughout Malaysia; Perlis (2 stations), Kedah (10 stations), Pulau Pinang (23 stations), Perak (11 stations), Selangor (14 stations), Negeri Sembilan (14 stations), Melaka (13 stations), Johor (34 stations), Pahang (20 stations), Terengganu (20 stations), Kelantan (10 stations), Sabah (26 stations), W.P Labuan (5 stations) and Sarawak (29 stations) **(Table 4.1, (Map 4.3(a) and 4.3(b)).**

Disamping itu, sebagai tambahan di bawah Program Pengawasan Selat Johor 'Malaysia-Singapore Joint Committee on the Environment' (MSJCE), 20 stesen turut dipantau pada tahun 2013 (**Jadual 4.2**).

Besides that, under the Malaysia-Singapore Joint Committee on the Environment (MSJCE) Monitoring Programme, 20 additional stations were also monitored in 2013 (**Table 4.2**).

**JADUAL 4.1 JAS : STESEN PENGAWASAN KUALITI AIR MARIN KEBANGSAAN, 2013**  
**TABLE 4.1 DOE: MARINE WATER QUALITY MONITORING STATIONS, 2013**

NEGERI/ STATE	BIL. STESEN/ NO. OF STATION	KAWASAN/ AREA	NAMA STESEN/ STATION NAME	NO. STESEN/ STATION NO.	LONGITUD / LONGITUDE	LATITUD/ LATITUDE
Perlis	2	Kuala/Estuary	Kuala Sungai Perlis	6201901	E 100° 07' 34.8"	N 06° 23' 59.0"
		Kuala/Estuary	Kuala Sungai Baru	6401903	E 100° 09' 20.0"	N 06° 19' 54.5"
Kedah	2	Kuala/Estuary	Kuala Sungai Kedah	6102908	E 100° 16' 32.0"	N 06° 06' 13.0"
		Kuala/Estuary	Kuala Jerlun	6302925	E 100° 14' 20.9"	N 06° 12' 36.0"
Kedah	8	Pantai/Coastal	Pantai Merdeka	5603905	E 100° 22' 40.0"	N 06° 40' 10.0"
		Pantai/Coastal	Langkawi Island Resort	6399914	E 099° 51' 38.3"	N 06° 17' 51.1"
		Pantai/Coastal	Pantai Kok	6397922	E 099° 40' 43.7"	N 06° 22' 12.0"
		Pantai/Coastal	Pantai Kuah	6398925	E 099° 51' 04.5"	N 06° 19' 04.1"
		Pantai/Coastal	Pantai Pasir Tengkorak	6499701	E 099° 43' 37.1"	N 06° 25' 46.3"
		Pantai/Coastal	Pantai Teluk Burau	6396923	E 099° 40' 13.7"	N 06° 21' 52.4"
		Pantai/Coastal	Pantai Teluk Nibong	6497915	E 099° 42' 08.1"	N 06° 21' 38.9"
		Pantai/Coastal	Pantai Tengah	6297903	E 099° 43' 46.8"	N 06° 18' 52.4"
Pulau Pinang	7	Kuala/Estuary	Kuala Sungai Jawi	5204901	E 100° 25' 00.0"	N 05° 16' 50.0"
		Kuala/Estuary	Kuala Sungai Juru	5303904	E 100° 24' 20.0"	N 05° 20' 20.0"
		Kuala/Estuary	Kuala Sungai Kerian	5104901	E 100° 25' 00.0"	N 05° 10' 00.0"

**JADUAL 4.1 JAS : STESEN PENGAWASAN KUALITI AIR MARIN KEBANGSAAN, 2013**  
**TABLE 4.1 DOE: MARINE WATER QUALITY MONITORING STATIONS, 2013**

NEGERI/ STATE	BIL. STESEN/ NO. OF STATION	KAWASAN/ AREA	NAMA STESEN/ STATION NAME	NO. STESEN/ STATION NO.	LONGITUD / LONGITUDE	LATITUD/ LATITUDE
		Kuala/Estuary	Kuala Sungai Pinang	5403934	E 100° 20' 05.0"	N 05° 24' 00.0"
		Kuala/Estuary	Kuala Sungai Perai	5303908	E 100° 22' 00.0"	N 05° 23' 00.0"
		Kuala/Estuary	Kuala Sungai Tengah	5204935	E 100° 25' 29.0"	N 05° 12' 41.0"
		Kuala/Estuary	Kuala Sungai Pinang (Balik Pulau)	5202929	E 100° 20' 05.0"	N 05° 24' 00.0"
Pulau Pinang	16	Pantai/Coastal	Gertak Sanggul	5201919	E 100° 12' 40.0"	N 05° 16' 50.0"
		Pantai/Coastal	Luar Pantai Teluk Bahang	5402930	E 100° 12' 45.0"	N 05° 27' 45.0"
		Pantai/Coastal	Kawasan Perindustrian Bayan Lepas I	5303932	E 100° 18' 45.0"	N 05° 20' 00.0"
		Pantai/Coastal	Kawasan Perindustrian Bayan Lepas II	5303933	E 100° 18' 30.0"	N 05° 19' 00.0"
		Pantai/Coastal	Kawasan Perindustrian Bayan Lepas III	5302939	E 100° 17' 45.0"	N 05° 18' 20.0"
		Pantai/Coastal	Pantai Bersih	5403906	E 100° 22' 40.0"	N 05° 26' 30.0"
		Pantai/Coastal	Pantai Miami	5502901	E 100° 16' 00.0"	N 05° 28' 30.0"
		Pantai/Coastal	Pantai Pasir Panjang	5201938	E 100° 11' 00.0"	N 05° 17' 50.0"
		Pantai/Coastal	Batu Feringgi (Casuarina)	5402904	E 100° 14' 30.0"	N 05° 28' 10.0"
		Pantai/Coastal	Persiaran Gurney	5403902	E 100° 19' 30.0"	N 05° 25' 30.0"
		Pantai/Coastal	Rumah Pam Baru Perai	5304927	E 100° 23' 15.0"	N 05° 21' 15.0"
		Pantai/Coastal	Rumah Pam Lama Perai	5303926	E 100° 18' 45.0"	N 05° 20' 00.0"
		Pantai/Coastal	Selat PP Selatan (Jelutong)	5303911	E 100° 19' 50.0"	N 05° 23' 30.0"
		Pantai/Coastal	Tanjung Bungah	5402937	E 100° 16' 50.0"	N 05° 28' 00.0"
		Pantai/Coastal	Teluk Tempoyak	5202923	E 100° 17' 30.0"	N 05° 28' 30.0"
		Pantai/Coastal	Batu Maung	5202901	E 100° 17' 25.0"	N 05° 17' 10.7"

**JADUAL 4.1 JAS : STESEN PENGAWASAN KUALITI AIR MARIN KEBANGSAAN, 2013**  
**TABLE 4.1 DOE: MARINE WATER QUALITY MONITORING STATIONS, 2013**

NEGERI/ STATE	BIL. STESEN/ NO. OF STATION	KAWASAN/ AREA	NAMA STESEN/ STATION NAME	NO. STESEN/ STATION NO.	LONGITUD / LONGITUDE	LATITUD/ LATITUDE
Perak	6	Kuala/Estuary	Kuala Sungai Manjung	4205930	E 100° 39' 57.0"	N 04° 14' 09.0"
		Kuala/Estuary	Kuala Sungai Gula	4906926	E 100° 28' 57.0"	N 04° 55' 07.0"
		Kuala/Estuary	Kuala Sungai Kurau	4994919	E 100° 25' 46.0"	N 04° 59' 13.0"
		Kuala/Estuary	Kuala Sungai Tanjung Piandang	5003921	E 100° 22' 34.0"	N 05° 04' 27.0"
		Kuala/Estuary	Kuala Sungai Sepetang	4806925	E 100° 37' 57.0"	N 04° 50' 07.0"
		Kuala/Estuary	Kuala Sungai Perak	4007901	E 100° 48' 58.0"	N 03° 59' 03.0"
Perak	5	Pantai/Coastal	Pantai Pasir Bogak	4205908	E 100° 37' 55.0"	N 04° 12' 58.0"
		Pantai/Coastal	Pantai Teluk Dalam	4205928	E 100° 33' 25.0"	N 04° 14' 53.0"
		Pantai/Coastal	Pantai Teluk Batik	4205932	E 100° 36' 33.0"	N 04° 11' 14.0"
		Pantai/Coastal	Pantai Tanjung Batu	4406927	E 100° 35' 35"	N 04° 25' 07"
		Pantai/Coastal	Pantai Pasir Panjang	4205924	E 100° 35' 35.0"	N 04° 25' 07.0"
Selangor	10	Kuala/Estuary	Kuala Sungai Sepang	2517922	E 101° 42' 56.0"	N 02° 35' 35.0"
		Kuala/Estuary	Kuala Sungai Sepang (Kecil)	2612928	E 101° 42' 15.0"	N 02° 36' 40.0"
		Kuala/Estuary	Kuala Sungai Sepang (Kawalan)	2616926	E 101° 41' 30.0"	N 02° 36' 20.0"
		Kuala/Estuary	Kuala Sungai Langat (Jugra)	2814925	E 101° 23' 24.0"	N 02° 00' 06.0"
		Kuala/Estuary	Kuala Sungai Klang	3013909	E 101° 24' 15.0"	N 02° 48' 25.0"
		Kuala/Estuary	Kuala Sungai Langat (Lumut)	2913903	E 101° 21' 15.0"	N 02° 55' 50.0"
		Kuala/Estuary	Kuala Sungai Buloh	3212930	E 101° 15' 50.0"	N 03° 15' 10.0"
		Kuala/Estuary	Kuala Sungai Selangor	3312915	E 101° 13' 30.0"	N 03° 20' 00.0"
		Kuala/Estuary	Kuala Sungai Tenggi	3311931	E 101° 10' 20.0"	N 03° 23' 00.0"
Kuala/Estuary	Kuala Sungai Bernam	3808924	E 101° 49' 00.0"	N 03° 51' 00.0"		

**JADUAL 4.1 JAS : STESEN PENGAWASAN KUALITI AIR MARIN KEBANGSAAN, 2013**  
**TABLE 4.1 DOE: MARINE WATER QUALITY MONITORING STATIONS, 2013**

NEGERI/ STATE	BIL. STESEN/ NO. OF STATION	KAWASAN/ AREA	NAMA STESEN/ STATION NAME	NO. STESEN/ STATION NO.	LONGITUD / LONGITUDE	LATITUD/ LATITUDE
Selangor	4	Pantai/Coastal	Pantai Bagan Lalang	2616927	E 101° 41' 30.0"	N 02° 36' 20.0"
		Pantai/Coastal	Pantai Morib	2712902	E 101° 26' 20.0"	N 02° 45' 00.0"
		Pantai/Coastal	Selat Pulau Babi	3012929	E 101° 15' 55.0"	N 02° 01' 10.0"
		Pantai/Coastal	Selat Klang Utara	3013908	E 101° 21' 00.0"	N 02° 04' 00.0"
Negeri Sembilan	2	Kuala/Estuary	Kuala Sungai Linggi	2319901	E 101° 58' 19.0"	N 02° 23' 20.0"
		Kuala/Estuary	Kuala Sungai Lukut	2517910	E 101° 47' 16.0"	N 02° 34' 45.0"
Negeri Sembilan	12	Pantai/Coastal	Bagan Pinang	2518915	E 101° 49' 44.0"	N 02° 30' 31.0"
		Pantai/Coastal	Telok Sinting	2419908	E 101° 56' 31.0"	N 02° 24' 57.0"
		Pantai/Coastal	Port Dickson Bandar	2517907	E 101° 47' 51.0"	N 02° 31' 16.0"
		Pantai/Coastal	Port Dickson Batu 4	2518937	E 101° 50' 12.2"	N 02° 29' 58.9"
		Pantai/Coastal	Port Dickson Batu 5	2418906	E 101° 50' 15.0"	N 02° 29' 46.0"
		Pantai/Coastal	Port Dickson Batu 6	2418916	E 101° 50' 46.0"	N 02° 29' 05.0"
		Pantai/Coastal	Port Dickson Batu 7	2418905	E 101° 51' 04.0"	N 02° 27' 43.0"
		Pantai/Coastal	Port Dickson Batu 8	2418912	E 101° 51' 20.0"	N 02° 27' 16.0"
		Pantai/Coastal	Port Dickson Batu 10	2418914	E 101° 51' 23.0"	N 02° 24' 58.0"
		Pantai/Coastal	Port Dickson Janakuasa TNB	2517909	E 101° 47' 42.0"	N 02° 32' 09.0"
		Pantai/Coastal	Telok Pelanduk	2419917	E 101° 53' 34.0"	N 02° 25' 03.0"
		Pantai/Coastal	Pantai Cermin	2416918	E 101° 51' 38.4"	N 02° 24' 53.9"
Melaka	5	Kuala/Estuary	Kuala Sungai Melaka	2123903	E 102° 14' 52.0"	N 02° 11' 06.0"
		Kuala/Estuary	Kuala Sungai Sri Melaka	2121914	E 102° 14' 39.2"	N 02° 11' 16.4"
		Kuala/Estuary	Kuala Sungai Merlimau	2124912	E 102° 25' 28.0"	N 02° 09' 25.0"

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**TABLE 4.1 DOE: MARINE WATER QUALITY MONITORING STATIONS, 2013**

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		Kuala/Estuary	Kuala Sungai Kesang	2186905	E 102° 29' 12.0"	N 02° 05' 43.0"
		Kuala/Estuary	Kuala Sungai Sebatu	2186904	E 102° 27' 35.0"	N 02° 06' 06.0"
Melaka	8	Pantai/Coastal	Pantai Rombang	2221916	E 102° 08' 57.0"	N 02° 13' 35.0"
		Pantai/Coastal	Pantai Kundur	2221908	E 102° 08' 29.0"	N 02° 14' 37.0"
		Pantai/Coastal	Pantai Tanjung Bidara	2320909	E 102° 05' 18"	N 02° 17' 30.0"
		Pantai/Coastal	Teluk Gong	2320902	E 102° 03' 30.0"	N 02° 20' 23.0"
		Pantai/Coastal	Pulau Melaka Point A(I)	2121915	E 102° 14.18.1'	N 02° 11.40.1'
		Pantai/Coastal	Pulau Melaka Point A(II)	2121915	E 102° 14.59.3'	N 02° 10.44.5'
		Pantai/Coastal	Pulau Melaka Point B(I)	2121916	E 102° 15.22.4'	N 02° 10.39.5'
		Pantai/Coastal	Pulau Melaka Point B(II)	2121916	E 102° 15.10.8'	N 02° 11.20.5'
Johor	9	Kuala/Estuary	Kuala Sungai Segget	1437919	E 103° 45' 58.0"	N 01° 27' 21.0"
		Kuala/Estuary	Kuala Sungai Skudai	1437922	E 103° 43' 12.0"	N 01° 28' 28.0"
		Kuala/Estuary	Kuala Sungai Melayu	1437946	E 103° 41' 56.0"	N 01° 27' 15.0"
		Kuala/Estuary	Kuala Sungai Tebrau	1438943	E 103° 47' 48.0"	N 01° 28' 56.0"
		Kuala/Estuary	Kuala Sungai Kim-Kim	1439965	E 103° 54' 03.0"	N 01° 25' 24.0"
		Kuala/Estuary	Kuala Sungai Johor	1440916	E 104° 01' 22.0"	N 01° 29' 04.0"
		Kuala/Estuary	Kuala Sungai Batu Pahat	1729930	E 102° 53' 22.0"	N 01° 47' 44.0"
		Kuala/Estuary	Kuala Sungai Muar	2024932	E 102° 33' 11.0"	N 02° 02' 54.0"
		Kuala/Estuary	Kuala Sungai Mersing	2438905	E 103° 50' 35.0"	N 02° 26' 10.0"
Johor	25	Pantai/Coastal	Tanjung Bin	1336975	E 103° 33' 25.8"	N 01° 19' 28.4"
		Pantai/Coastal	Pelabuhan Tanjung Pelepas	1438943	E 103° 32' 35.0"	N 01° 21' 13.0"

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NEGERI/ STATE	BIL. STESEN/ NO. OF STATION	KAWASAN/ AREA	NAMA STESEN/ STATION NAME	NO. STESEN/ STATION NO.	LONGITUD / LONGITUDE	LATITUD/ LATITUDE
Johor	25	Pantai/Coastal	Hadapan Jabatan Laut	1438918	E 103° 32' 07.6"	N 01° 22' 57.9"
		Pantai/Coastal	Pantai Stulang Laut	1437951	E 103° 46' 46.0"	N 01° 28' 02.0"
		Pantai/Coastal	Jeti Teluk Jawa	1438918	E 103° 50' 30.0"	N 01° 28' 17.0"
		Pantai/Coastal	Pelabuhan Pasir Gudang	1428939	E 103° 54' 03.0"	N 01° 25' 44.0"
		Pantai/Coastal	Hadapan Hsajb	1437920	E 103° 44' 44.0"	N 01° 27' 19.0"
		Pantai/Coastal	Pantai Lido	1437921	E 103° 43' 29.0"	N 01° 27' 56.0"
		Pantai/Coastal	Pantai Teluk Mahkota	1841911	E 104° 06' 15.0"	N 01° 53' 52.0"
		Pantai/Coastal	Pantai Tanjung Leman	2140694	E 104° 00' 24.0"	N 02° 08' 43.0"
		Pantai/Coastal	Pantai Sri Pantai	2339960	E 103° 53' 19.0"	N 02° 22' 45.0"
		Pantai/Coastal	Tanjung Merak	1441968	E 104° 06' 35.5"	N 01° 21' 45.9'
		Pantai/Coastal	Tanjung Pengelih	1441967	E 104° 05' 19.5"	N 01° 22' 14.7'
		Pantai/Coastal	Pantai Tanjong Stapa	1341961	E 104° 08' 09.0"	N 01° 20' 33.0"
		Pantai/Coastal	Pantai Teluk Gorek	2538958	E 103° 48' 18.0"	N 02° 34' 57.0"
		Pantai/Coastal	Pantai Air Papan	2538959	E 103° 50' 00.0"	N 02° 31' 05.0"
		Pantai/Coastal	Jeti Kukup	1334925	E 103° 26' 29.0"	N 01° 19' 30.0"
		Pantai/Coastal	Jeti Tanjong Belungkor	1440963	E 104° 04' 03.0"	N 01° 27' 14.0"
		Pantai/Coastal	Pasir Gogok	1441966	E 104° 05' 59.7'	N 01° 25' 02.8'
		Pantai/Coastal	Tanjung Buai	1340973	E 104° 02' 43.4"	N 01° 29' 48.1"
		Pantai/Coastal	Pantai Desaru	1542914	E 104° 15' 41.0"	N 01° 32' 48.0"
		Pantai/Coastal	Tanjung Sepang	1443969	E 104° 06' 44.8"	N 01° 23' 01.2"
Pantai/Coastal	Tanjung Penyusup	1444920	E 104° 16' 48.3"	N 01° 22' 12.9"		

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**TABLE 4.1 DOE: MARINE WATER QUALITY MONITORING STATIONS, 2013**

NEGERI/ STATE	BIL. STESEN/ NO. OF STATION	KAWASAN/ AREA	NAMA STESEN/ STATION NAME	NO. STESEN/ STATION NO.	LONGITUD / LONGITUDE	LATITUD/ LATITUDE
		Pantai/Coastal	Pantai Sungai Lurus	1730962	E 103° 01' 43.0 "	N 01° 43' 42.0 "
		Pantai/Coastal	Punggur	1531974	E 103° 05' 54.0 "	N 01° 41' 05.0 "
		Pantai/Coastal	Pantai Cherating (Club Med A)	4134901	E 103° 24' 31.0 "	N 04° 08' 41.0 "
		Pantai/Coastal	Pantai Cherating (Club Med B)	4134902	E 103° 24' 23 "	N 04° 07' 51.0 "
		Pantai/Coastal	Pantai Cherating (Legend A)	4133903	E 103° 23' 06 "	N 04° 06' 16.0 "
		Pantai/Coastal	Pantai Cherating (Legend B)	4133904	E 103° 23' 07 "	N 04° 06' 12.0 "
		Pantai/Coastal	Pantai Muhibbah Balok	3933905	E 103° 22' 21.1 "	N 03° 55' 28.0 "
		Pantai/Coastal	Pantai Muhibbah Balok	3933906	E 103° 22' 23.0 "	N 03° 55' 30.0 "
		Pantai/Coastal	Pantai Batu Hitam	3833907	E 103° 21' 58 "	N 03° 53' 06 "
		Pantai/Coastal	Pantai Batu Hitam	3833908	E 103° 21' 59 "	N 03° 53' 09 "
		Pantai/Coastal	Pantai Berserah	3833909	E 103° 22' 02.0 "	N 03° 54' 41.0 "
Pahang	20	Pantai/Coastal	Pantai Berserah	3833910	E 103° 22' 01.0 "	N 03° 54' 39.0 "
		Pantai/Coastal	Pantai Teluk Cempedak	3833911	E 103° 22' 19.0 "	N 03° 48' 51 "
		Pantai/Coastal	Pantai Teluk Cempedak	3833912	E 103° 22' 21.0 "	N 03° 48' 49.0 "
		Pantai/Coastal	Pantai Teluk Gelora	3833913	E 103° 20' 43.0 "	N 03° 48' 16.0 "
		Pantai/Coastal	Pantai Teluk Gelora	3833914	E 103° 20' 43.0 "	N 03° 48' 20.0 "
		Pantai/Coastal	Pantai Sepat (A)	3737915	E 103° 20' 16.0 "	N 03° 42' 02.0 "
		Pantai/Coastal	Pantai Sepat (B)	3633916	E 103° 20' 19.0 "	N 03° 41' 54.0 "
		Pantai/Coastal	Pantai Legenda (A)	3633917	E 103° 26' 53.7 "	N 03° 12' 16.7 "
		Pantai/Coastal	Pantai Legenda (B)	3633918	E 103° 26' 53.7 "	N 03° 12' 16.7 "
		Pantai/Coastal	Pantai Kuala Api-Api	3633919	E 103° 23' 45.0 "	N 03° 31' 20.0 "

**JADUAL 4.1 JAS : STESEN PENGAWASAN KUALITI AIR MARIN KEBANGSAAN, 2013**  
**TABLE 4.1 DOE: MARINE WATER QUALITY MONITORING STATIONS, 2013**

NEGERI/ STATE	BIL. STESEN/ NO. OF STATION	KAWASAN/ AREA	NAMA STESEN/ STATION NAME	NO. STESEN/ STATION NO.	LONGITUD / LONGITUDE	LATITUD/ LATITUDE
		Pantai/Coastal	Pantai Tanjung Batu	3633920	E 103° 23' 45.0"	N 03° 31' 10.0"
Terengganu	13	Kuala/Estuary	Kuala Sungai Besut	5825902	E 102° 33' 28.8"	N 05° 50' 02.8"
		Kuala/Estuary	Kuala Sungai Dungun	4734918	E 103° 25' 21.6"	N 04° 46' 48.9"
		Kuala/Estuary	Kuala Sungai Ibai	5231949	E 103° 10' 06.5"	N 05° 17' 06.1"
		Kuala/Estuary	Kuala Sungai Kerteh	4534922	E 103° 26' 52.6"	N 04° 30' 59.1"
		Kuala/Estuary	Kuala Sungai Marang	5232911	E 103° 12' 28.9"	N 05° 12' 24.7"
		Kuala/Estuary	Kuala Sungai Paka	4634920	E 103° 25' 57.7"	N 04° 39' 29.7"
		Kuala/Estuary	Kuala Sungai Setiu	5627953	E 102° 42' 26.9"	N 05° 40' 05.9"
		Kuala/Estuary	Kuala Sungai Terengganu	5331907	E 103° 08' 12.6"	N 05° 20' 22.1"
		Kuala/Estuary	Kuala Sungai Kemaman	4234929	E 102° 26' 48.8"	N 04° 14' 25.2"
		Kuala/Estuary	Tioxide Utara (Kg. Bukit Kuang, Kijal)	4234950	E 103° 28' 20.9"	N 04° 17' 06.3"
		Kuala/Estuary	Tioxide Tengah (Pupuk Semangat, Kijal)	4234951	E 103° 28' 12.7"	N 04° 16' 22.8"
		Kuala/Estuary	Tioxide Selatan (KSB, T. Kalong)	4234952	E 103° 27' 59.2"	N 04° 15' 04.1"
		Kuala/Estuary	Pulau Duyung	5231908	E 103° 7' 44.7"	N 05° 20' 5.6"
Terengganu	7	Pantai/Coastal	Pantai Batu Buruk	5331935	E 103° 09' 01.4"	N 05° 19' 29.1"
		Pantai/Coastal	Pantai Bukit Keluang	5825903	E 102° 36' 01.4"	N 05° 50' 02.8"
		Pantai/Coastal	Pantai Chendering	5231934	E 103° 10' 51.9"	N 05° 16' 11.8"
		Pantai/Coastal	Pantai Rantau Abang	4833917	E 103° 23' 17.4"	N 04° 52' 11.4"
		Pantai/Coastal	KIPC Utara	4634954	E 103° 26' 39.2"	N 04° 36' 37.9"
		Pantai/Coastal	KIPC Tengah	4534955	E 103° 27' 19.5"	N 04° 34' 54.9"
		Pantai/Coastal	KIPC Selatan	4534956	E 103° 26' 52.6"	N 04° 30' 09.5"

**JADUAL 4.1 JAS : STESEN PENGAWASAN KUALITI AIR MARIN KEBANGSAAN, 2013**  
**TABLE 4.1 DOE: MARINE WATER QUALITY MONITORING STATIONS, 2013**

NEGERI/ STATE	BIL. STESEN/ NO. OF STATION	KAWASAN/ AREA	NAMA STESEN/ STATION NAME	NO. STESEN/ STATION NO.	LONGITUD / LONGITUDE	LATITUD/ LATITUDE
Kelantan	5	Kuala/Estuary	Kuala Sungai Golok	6220911	E 102° 05' 35.0"	N 6° 14' 05.0"
		Kuala/Estuary	Kuala Sungai Kelantan	6222901	E 102° 13' 50.0"	N 6° 13' 12.0"
		Kuala/Estuary	Kuala Sungai Pengkalan Chepa	6223912	E 102° 18' 10.0"	N 6° 12' 20.0"
		Kuala/Estuary	Kuala Sungai Pengkalan Datu	6123913	E 102° 20' 40.0"	N 6° 10' 20.0"
		Kuala/Estuary	Kuala Sungai Kemasin	5824914	E 102° 29' 05.0"	N 5° 53' 50.0"
Kelantan	5	Pantai/Coastal	Pantai Seri Tujuh	6221910	E 102° 08' 00.0"	N 6° 13' 00.0"
		Pantai/Coastal	Pantai Cahaya Bulan	6122903	E 102° 16' 50.0"	N 6° 10' 45.0"
		Pantai/Coastal	Pantai Sabak	6123909	E 102° 20' 10.0"	N 6° 10' 25.0"
		Pantai/Coastal	Pantai Irama Bachok	6024908	E 102° 25' 15.0"	N 6° 03' 00.0"
		Pantai/Coastal	Pantai Bisikan Bayu	5825905	E 102° 31' 00.0"	N 5° 52' 00.0"
Sarawak	13	Kuala/Estuary	Kuala Sungai Semantan	1898901	E 102° 46' 29.0"	N 01° 48' 49.0"
		Kuala/Estuary	Kuala Sungai Sarawak	1604907	E 11° 29' 44.0"	N 01° 36' 44.0"
		Kuala/Estuary	Kuala Sungai Bako	1704905	E 110° 52' 08.0"	N 01° 40' 00.0"
		Kuala/Estuary	Kuala Sungai Santubong	1702903	E 11° 16' 46.0"	N 01° 46' 38.0"
		Kuala/Estuary	Kuala Batang Krian (Kabong)	1710922	E 111° 05' 58.0"	N 01° 47' 20.0"
		Kuala/Estuary	Kuala Batang Rejang	2111909	E 111° 11' 21.0"	N 02° 07' 22.0"
		Kuala/Estuary	Kuala Mukah	2920920	E 112° 05' 25.0"	N 02° 54' 41.0"
		Kuala/Estuary	Kuala Batang Kemena	3130911	E 113° 01' 40.0"	N 03° 10' 53.0"
		Kuala/Estuary	Kuala Tanjung Similajau	3431903	E 113° 10' 03.7"	N 03° 33' 05.9"
		Kuala/Estuary	Muara Sungai Panipah	3332904	E 113° 17' 07.6"	N 03° 29' 48.5"
Kuala/Estuary	Kuala Pantai Nyalau	3431903	E 113° 22' 30.2"	N 03° 38' 06.7"		

**JADUAL 4.1 JAS : STESEN PENGAWASAN KUALITI AIR MARIN KEBANGSAAN, 2013**  
**TABLE 4.1 DOE: MARINE WATER QUALITY MONITORING STATIONS, 2013**

NEGERI/ STATE	BIL. STESEN/ NO. OF STATION	KAWASAN/ AREA	NAMA STESEN/ STATION NAME	NO. STESEN/ STATION NO.	LONGITUD / LONGITUDE	LATITUD/ LATITUDE
		Kuala/Estuary	Kuala Sungai Baram	4539919	E 113° 58' 48.0"	N 03° 34' 50.9"
		Kuala/Estuary	Kuala Sg Miri	4349915	E 113° 58' 25.0"	N 04° 23' 59.0"
Sarawak	16	Pantai/Coastal	Pantai Sematan	1898902	E 109° 46' 29.0"	N 01° 49' 38.0"
		Pantai/Coastal	Pantai Pandan	1824918	E 109° 40' 11.0"	N 01° 50' 16.0"
		Pantai/Coastal	Pantai Pasir Putih	1604910	E 110° 30' 00.0"	N 01° 30' 14.0"
		Pantai/Coastal	Pantai Bako	1704906	E 110° 25' 40.0"	N 01° 42' 49.0"
		Pantai/Coastal	Pantai Damai	1702904	E 110° 17' 58.0"	N 01° 47' 55.0"
		Pantai/Coastal	Pantai Tanjung Kembang	1810923	E 111° 05' 44.0"	N 01° 49' 28.0"
		Pantai/Coastal	Pantai Harmoni Mukah	2920921	E 112° 03' 22.0"	N 02° 54' 35.0"
		Pantai/Coastal	Pantai Tanjung Batu	3132602	E 113° 02' 26.0"	N 03° 12' 38.0"
		Pantai/Coastal	Pantai Likau	3230915	E 113° 08' 57.0"	N 03° 20' 49.0"
		Pantai/Coastal	Pantai Emas	3331903	E 113° 13' 27.7"	N 03° 26' 27.8"
		Pantai/Coastal	Pantai Piasau	4539918	E 113° 59' 38.0"	N 04° 27' 27.0"
		Pantai/Coastal	Pantai Brighton	4449917	E 113° 57' 51.0"	N 04° 22' 25.0"
		Pantai/Coastal	Pantai Esplaned	4339920	E 113° 57' 31.0"	N 04° 19' 04.6"
		Pantai/Coastal	Pantai Beraya	4238921	E 113° 53' 30.6"	N 04° 12' 45.1"
		Pantai/Coastal	Pantai Bungai	4137922	E 113° 46' 50.3"	N 04° 03' 42.2"
		Pantai/Coastal	Pantai Belawai	2212913	E 111° 12' 51.0"	N 04° 14' 27.0"
Sabah	2	Kuala/Estuary	Muara Sungai Kuala Penyu	5453901	E 115° 35' 55.0"	N 05° 34' 13.0"
		Kuala/Estuary	Muara Sungai Menggatal Inanam	5050905	E 115° 07' 07.0"	N 05° 01' 05.0"
Sabah	24	Pantai/Coastal	Pantai Teluk Brunei Sipitang 1	5053901	E 115° 32' 53.0"	N 05° 09' 55.0"
		Pantai/Coastal	Pantai Teluk Brunei Sipitang 2	5053902	E 115° 32' 53.0"	N 05° 09' 55.0"

**JADUAL 4.1 JAS : STESEN PENGAWASAN KUALITI AIR MARIN KEBANGSAAN, 2013**  
**TABLE 4.1 DOE: MARINE WATER QUALITY MONITORING STATIONS, 2013**

NEGERI/ STATE	BIL. STESEN/ NO. OF STATION	KAWASAN/ AREA	NAMA STESEN/ STATION NAME	NO. STESEN/ STATION NO.	LONGITUD / LONGITUDE	LATITUD/ LATITUDE
Sabah	24	Pantai/Coastal	Pantai Teluk Brunei Sipitang 3	5053903	E 115° 32' 53.0"	N 05° 09' 55.0"
		Pantai/Coastal	Pantai Teluk Brunei Sipitang 4	5053904	E 115° 32' 53.0"	N 05° 09' 55.0"
		Pantai/Coastal	Pantai Teluk Brunei Sipitang 5	5053905	E 115° 32' 53.0"	N 05° 09' 55.0"
		Pantai/Coastal	Pantai Teluk Brunei Sipitang 6	5053906	E 115° 32' 53.0"	N 05° 09' 55.0"
		Pantai/Coastal	Borneo Golf Bongawan	5355901	E 115° 47' 01.0"	N 05° 33' 00.0"
		Pantai/Coastal	Pantai Manis Papar	5555901	E 115° 52' 04.0"	N 05° 45' 15.0"
		Pantai/Coastal	Pantai Melinsung Papar	5565902	E 115° 50' 45.0"	N 05° 50' 18.0"
		Pantai/Coastal	Pantai Tanjung Aru KK (Rest Lido)	5656901	E 115° 59' 03.0"	N 05° 55' 01.0"
		Pantai/Coastal	Pantai Tanjung Aru KK (Roller Skating)	5656902	E 115° 59' 03.0"	N 05° 55' 01.0"
		Pantai/Coastal	Pantai Tanjung Aru KK (No. 3)	5656903	E 115° 59' 03.0"	N 05° 55' 01.0"
		Pantai/Coastal	Pantai Lok Kawi KK	5656904	E 116° 02' 00.0"	N 05° 55' 00.0"
		Pantai/Coastal	Pantai Dalit Tuaran	6161901	E 116° 09' 45.0"	N 06° 11' 25.0"
		Pantai/Coastal	Mangrove Paradise Tuaran	6161902	E 116° 13' 50.0"	N 06° 15' 02.0"
		Pantai/Coastal	Sabandar Resort Tuaran	6161903	E 116° 13' 50.0"	N 06° 15' 02.2"
		Pantai/Coastal	Pantai Bak-Bak Kudat	6665901	E 116° 50' 23.0"	N 06° 56' 44.0"
		Pantai/Coastal	Pantai Pasir Putih Sandakan	5580901	E 118° 04' 58.0"	N 05° 49' 26.0"
		Pantai/Coastal	Pengkalan TLDM Sandakan	5580902	E 118° 08' 01.0"	N 05° 50' 00.0"
		Pantai/Coastal	Pantai Batu Sapi Sandakan	5580903	E 118° 02' 22.0"	N 05° 47' 42.0"
		Pantai/Coastal	Pantai Ulu Tungku Lahad Datu	5085901	E 118° 53' 09.0"	N 05° 01' 09.0"
		Pantai/Coastal	Pantai Sarina Kunak	4481901	E 118° 17' 01.0"	N 04° 39' 41.0"
		Pantai/Coastal	Pantai Kg. Lamak Lahad Datu	4581902	E 118° 11' 34.0"	N 04° 56' 39.8"
		Pantai/Coastal	Pantai Tinagat Tawau	4473901	E 117° 59' 04.0"	N 04° 13' 22.0"

**JADUAL 4.1 JAS : STESEN PENGAWASAN KUALITI AIR MARIN KEBANGSAAN, 2013**  
**TABLE 4.1 DOE: MARINE WATER QUALITY MONITORING STATIONS, 2013**

NEGERI/ STATE	BIL. STESEN/ NO. OF STATION	KAWASAN/ AREA	NAMA STESEN/ STATION NAME	NO. STESEN/ STATION NO.	LONGITUD / LONGITUDE	LATITUD/ LATITUDE
Labuan	5	Pantai/Coastal	Pulau Papan	5151905	E 115° 16' 03.0"	N 05° 15' 22.0"
		Pantai/Coastal	Kiamsam	5151906	E 115° 10' 28.0"	N 05° 15' 22.0"
		Pantai/Coastal	Sungai Pagar	5151907	E 115° 10' 19.0"	N 05° 16' 20.0"
		Pantai/Coastal	Layang-Layangan	5251902	E 115° 11' 37.0"	N 05° 20' 01.0"
		Pantai/Coastal	Tanjung Aru	5251903	E 115° 14' 39.0"	N 05° 21' 02.0"

***Kuala/ Estuarine : 76***

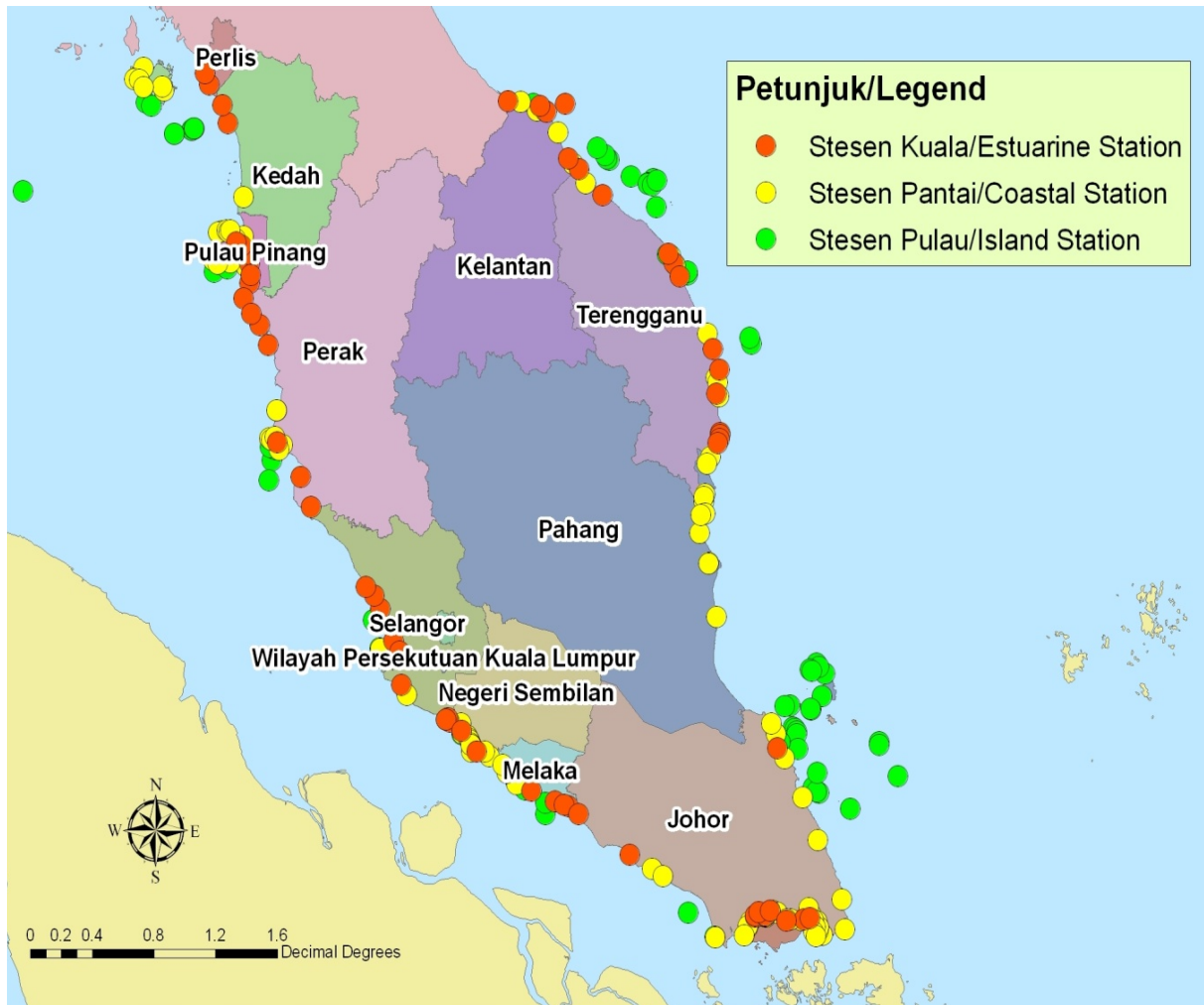
***Pantai/ Coastal : 155***

***Jumlah/ Total : 231***

**JADUAL 4.2 JAS : STESEN PEMANTAUAN JAWATANKUASA BERSAMA MALAYSIA – SINGAPURA MENGENAI ALAM SEKITAR’ – (MSJCE), 2013**

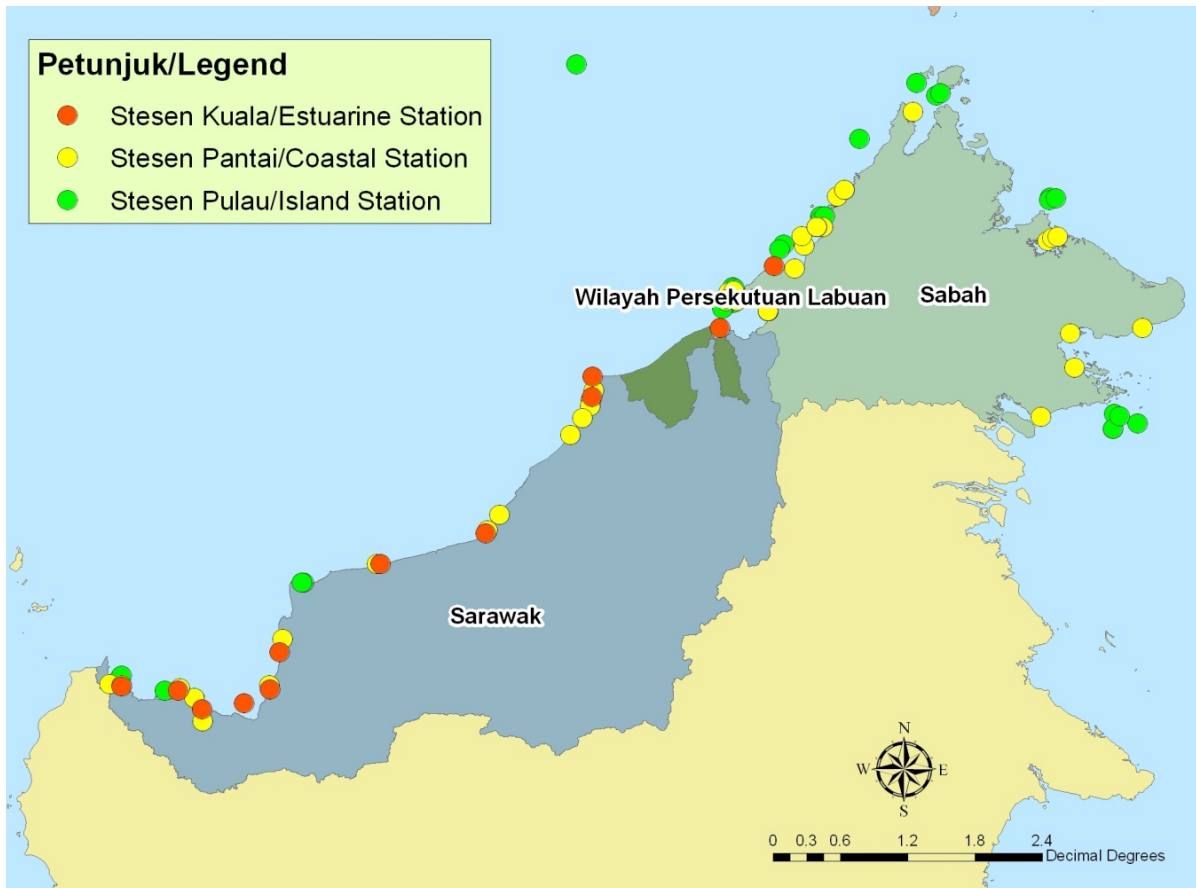
**TABLE 4.2 DOE: MONITORING STATIONS UNDER THE MALAYSIA-SINGAPORE JOINT COMMITTEE ON THE ENVIRONMENT (MSJCE), 2013**

BIL/NO	NEGERI/ STATE	KAWASAN/ AREA	NAMA STESEN/ STATION NAME	NO. STESEN/ STATION NO.	LONGITUD / LONGITUDE	LATITUD/ LATITUDE
1	Johor	Pantai/Coastal	Kg. Tanjung Kopok	SJ1	E 104° 00' 03.0"	N 01° 25' 31.0"
2	Johor	Pantai/Coastal	Kg. Pasir Putih	SJ2	E 103° 55' 40.0"	N 01° 25' 48.0"
3	Johor	Pantai/Coastal	J/K Sultan Iskandar	SJ3	E 103° 46' 09.0"	N 01° 26' 49.0"
4	Johor	Pantai/Coastal	Kg. Senibung	SJ4	E 103° 48' 47.0"	N 01° 29' 01.0"
5	Johor	Kuala/Estuarine	Kuala Sg. Tebrau	SJ4A	E 103° 47' 48.0"	N 01° 28' 56.0"
6	Johor	Pantai/Coastal	Tanjung Putri	SJ5	E 103° 46' 09.0"	N 01° 27' 20.0"
7	Johor	Pantai/Coastal	Hadapan MPJB	SJ6	E 103° 45' 43.0"	N 01° 27' 08.0"
8	Johor	Pantai/Coastal	Tanjung Danga	SJ7	E 103° 42' 52.0"	N 01° 27' 24.0"
9	Johor	Kuala/Estuarine	Kuala Sg. Skudai	SJ7A	E 103° 43' 22.0"	N 01° 27' 46.0"
10	Johor	Pantai/Coastal	Hadapan Pusat Islam	SJ7B	E 103° 44' 51.0"	N 01° 27' 19.0"
11	Johor	Pantai/Coastal	Tebing Runtuh	SJ8	E 103° 40' 06.0"	N 01° 25' 10.0"
12	Johor	Kuala/Estuarine	Kuala Sg. Melayu	SJ8A	E 103° 41' 53.0"	N 01° 26' 53.0"
13	Johor	Pantai/Coastal	Tanjung Bunga	SJ9	E 103° 39' 02.0"	N 01° 23' 07.0"
14	Johor	Pantai/Coastal	Tanjung Kupang	SJ10	E 103° 39' 11.0"	N 01° 23' 36.0"
15	Johor	Pantai/Coastal	Belungkor	EM4	E 104° 03' 11.0"	N 01° 26' 25.8"
16	Johor	Pantai/Coastal	Pulau Tekong	EM5	E 104° 04' 36.7"	N 01° 25' 42.3"
17	Johor	Pantai/Coastal	Pulau Tekong	EM6	E 104° 05' 20.4"	N 01° 23' 19.2"
18	Johor	Pantai/Coastal	Jeti Pularek	EM7	E 104° 04' 40.7"	N 01° 21' 26.8"
19	Johor	Pantai/Coastal	Tanjung Pengelih	WQ10	E 104° 05' 39.6"	N 01° 19' 52.6"
20	Johor	Pantai/Coastal	Pulau Merambong	WM1	E 103° 37' 36.3"	N 01° 20' 17.0"



**Peta 4.3 (a) : Semenanjung Malaysia : Taburan Stesen Pemantauan Kualiti Air Marin, 2013**

**Map 4.3 (a) : Peninsular Malaysia : Location of Marine Water Quality Stations, 2013**



**Peta 4.3 (b) : Sabah dan Sarawak : Taburan Stesen Pemantauan Kualiti Air Marin, 2013**

**Map 4.3 (b) : Sabah and Sarawak : Location of Marine Water Quality Stations, 2013**

## PENGAWASAN KUALITI AIR MARIN PULAU-PULAU

### MARINE WATER QUALITY MONITORING



Malaysia dikurniakan dengan banyak pulau yang kaya dengan sumber akuatik. Kualiti air marin pula merupakan aspek yang penting dalam pemuliharaan sumber semulajadi ini. Sehubungan dengan itu, Program Pengawasan Kualiti Air Marin Pulau-Pulau telah dimulakan pada Julai 1998. Pada tahun 2013, program ini telah dilaksanakan di sekitar 74 buah pulau terpilih dan melibatkan 90 stesen pengawasan. Pulau-pulau ini dikelaskan mengikut empat kategori iaitu Pulau Pembangunan (3); Pulau Peranginan (30); Pulau Taman Laut (29); dan Pulau Yang Dilindungi (12) (**Jadual 4.3**). Kekerapan persampelan bagi Pulau Pembangunan adalah sebanyak enam (6) kali setahun manakala bagi pulau yang lainnya adalah sebanyak empat (4) kali setahun.

Pengukuran parameter-parameter fizikal kualiti air marin dibuat secara in-situ seperti suhu, pH, konduktiviti, kemasinan, oksigen terlarut dan kekeruhan manakala 14

Malaysia is endowed with many islands with rich marine aquatic resources. The quality of marine water plays as an important aspect in the conservation of such resources. As a step towards this, The Island Marine Water Quality Monitoring Programme was established in July 1998. In 2013, the programme was conducted at 74 selected islands covering 90 monitoring stations. The islands are classified into four categories; Development Islands (3); Resort Islands (30); Marine Park Islands (29); and Protected islands (12) (**Table 4.3**). The sampling frequency for Development Island was six (6) times per year, while the frequency for the other island categories was four (4) times per year.

Marine water quality monitoring includes measurement of in-situ parameters such as temperature, pH, conductivity, salinity, dissolved oxygen and turbidity. Meanwhile

parameter yang dianalisis di makmal pula adalah seperti jumlah pepejal terampai, Escherichia coli (E.coli), nitrat, fosfat, jumlah karbon organik, minyak dan gris logam berat termasuklah Merkuri (Hg), Kadmium (Cd), Kromium (Cr), Kuprum (Cu), Plumbum (Pb), Arsenik (As) dan Tributyltin (TBT) serta Triphenyltin (TPT) (**Jadual 4.4**). Percontohan bebola tar di pantai juga dilaksanakan.

laboratory analysis involves 14 other parameters such as total suspended solids, Escherichia coli (E. coli), nitrate, phosphate, total organic carbon, oil and grease, heavy metals including Mercury (Hg), Cadmium (Cd), Chromium (Cr), Copper (Cu), Lead (Pb), Arsenic (As) and Tributyltin (TBT) as well as Triphenyltin (TPT) (**Table 4.4**). Tarball sampling on beaches were also conducted.

**JADUAL 4.3 JAS : STESEN-STESEN PEMANTAUAN AIR MARIN PULAU, 2013**  
**TABLE 4.3 DOE: ISLAND MARINE WATER QUALITY MONITORING STATIONS, 2013**

NEGERI/ STATE	BIL. PULAU / NO. OF ISLAND	BIL. STESEN/ NO. OF STATION	PULAU/ISLAND	NO. STESEN / NO. OF STATION	KATEGORI / CATEGORY	LONGITUD / LONGITUDE	LATITUD/ LATITUDE
Kedah	7	4	Langkawi (Pantai Kuah)	7KD07	D	E 099° 51' 00.3"	N 06° 18' 34.8"
			Langkawi (Teluk Ewa)	7KD08	D	E 099° 45' 49.0"	N 06° 25' 51.1"
			Langkawi (Pantai Chenang)	7KD09	D	E 099° 42' 30.1"	N 06° 18' 51.9"
			Langkawi (Tanjung Rhu)	7KD10	D	E 099° 49' 27.6"	N 06° 27' 24.6"
		1	Singa Besar	7KR01	R	E 099° 44' 42.9"	N 06° 13' 36.3"
		1	Dayang Bunting	7KR02	R	E 099° 46' 48.9"	N 06° 12' 26.2"
		1	Payar	7KM03	M	E 100° 02' 53.0"	N 06° 03' 78.7"
		1	Kaca	7KM04	M	E 100° 02' 96.9"	N 06° 04' 29.7"
		1	Lembu	7KM05	M	E 100° 03' 48.3"	N 06° 04' 44.0"
		1	Sigantang	7KM06	M	E 099° 55' 56.0"	N 06° 02' 60.9"
Pulau Pinang	6	3	Pulau Pinang (Batu Maung)	7PD01	D	E 100° 19' 03.6"	N 05° 20' 2.3"
			Pulau Pinang (Teluk Bahang)	7PD03	D	E 100° 16' 19.3"	N 05° 15' 01.9"
			Pulau Pinang (Padang Kota)	7PD04	D	E 100° 23' 30.6"	N 05° 16' 26.4"

**JADUAL 4.3 JAS : STESEN-STESEN PEMANTAUAN AIR MARIN PULAU, 2013**  
**TABLE 4.3 DOE: ISLAND MARINE WATER QUALITY MONITORING STATIONS, 2013**

NEGERI/ STATE	BIL. PULAU / NO. OF ISLAND	BIL. STESEN/ NO. OF STATION	PULAU/ISLAND	NO. STESEN / NO. OF STATION	KATEGORI / CATEGORY	LONGITUD / LONGITUDE	LATITUD/ LATITUDE
Pulau Pinang	6	1	Aman	7PR05	R	E 100° 23' 63.5"	N 05° 16' 01.0"
		1	Jerejak	7PR06	R	E 100° 11' 24.6"	N 05° 16' 51.2"
		1	Kendi	7PR07	R	E 100° 10' 804"	N 05° 13' 84.9"
		1	Rimau	7PR08	R	E 100° 16' 376"	N 05° 14' 72.2"
		1	Gedong	7PR09	R	E 100° 23' 357"	N 05° 16' 88.8"
Perak	4	2	Pangkor (Telok Gedong)	7AR01	R	E 100° 34' 51.8"	N 04° 11' 33.8"
			Pangkor (Pantai Puteri Dewi)	7AR02	R	E 100° 32' 39.3"	N 04° 15' 10.7"
		1	Pangkor Laut	7AR03	R	E 100° 32' 53.0"	N 04° 12' 14.1"
		1	Sembilan	7AR04	R	E 100° 32' 38.4"	N 04° 00' 30.7"
		1	Tukun Perak	7AP05	P	E 100° 33' 40.3"	N 04° 07' 32.4"
Selangor	3	1	Ketam	7BR01	R	E 101° 15' 46.4"	N 03° 01' 17.5"
		1	Angsa	7BR02	R	E 101° 13' 07.1"	N 03° 11' 08.0"
		1	Lumut	7BR03	R	E 101° 21' 42.6"	N 02° 59' 54.6"
Negeri Sembilan	1	1	Arang	7NP01	P	E 101° 47' 37.8"	N 02° 31' 03.5"
Melaka	3	2	Besar (A)	7MR01	R	E 102° 20' 10.6"	N 02° 06' 55.8"
			Besar (B)	7MR01	R	E 102° 19' 20.8"	N 02° 06' 24.2"
		2	Upeh (A)	7MR02	R	E 102° 12' 17.2"	N 02° 11' 39.5"
			Upeh (B)	7MR02	R	E 102° 12' 11.6"	N 02° 11' 23.1"
		2	Undan (A)	7MR03	R	E 102° 20' 07.2"	N 02° 02' 50.5"
			Undan (B)	7MR03	R	E 102° 20' 06.5"	N 02° 02' 50.2"

**JADUAL 4.3 JAS : STESEN-STESEN PEMANTAUAN AIR MARIN PULAU, 2013**  
**TABLE 4.3 DOE: ISLAND MARINE WATER QUALITY MONITORING STATIONS, 2013**

NEGERI/ STATE	BIL. PULAU / NO. OF ISLAND	BIL. STESEN/ NO. OF STATION	PULAU/ISLAND	NO. STESEN / NO. OF STATION	KATEGORI / CATEGORY	LONGITUD / LONGITUDE	LATITUD/ LATITUDE
Johor	8	1	Setindan	7JR01	R	E 103° 51' 28.7"	N 02° 28' 35.9"
		1	Babi Tengah	7JR02	R	E 103° 51' 41.9"	N 02° 28' 20.4"
		1	Dayang	7JM03	M	E 104° 30' 12.9"	N 02° 28' 12.8"
		1	Nanga Besar	7JM08	M	E 104° 37' 37.5"	N 02° 16' 18.0"
		1	Sibu Tengah	7JM11	M	E 104° 05' 45.4"	N 02° 10' 54.9"
		1	Pemanggil	7JM15	M	E 104° 18' 54.8"	N 02° 04' 52.1"
		1	Kukup	7JP17	P	E 103° 26' 12.0"	N 01° 19' 41.9"
		1	Pisang	7JP18	P	E 103° 15' 45.5"	N 01° 28' 05.8"
Pahang	8	2	Tioman (Kg. Nipah)	7CM01	M	E 104° 07' 53.4"	N 02° 44' 22.0"
			Tioman (Telok Salang)	7CM02	M	E 104° 09' 13.9"	N 02° 52' 35.5"
		1	Seri Buat	7CM03	M	E 103° 55' 24.6"	N 02° 41' 07.4"
		1	Cebah	7CM04	M	E 104° 05' 51.4"	N 02° 55' 53.6"
		1	Tulai	7CM05	M	E 104° 06' 51.9"	N 02° 54' 42.1"
		1	Sepui	7CM06	M	E 104° 44' 05.1"	N 02° 53' 09.6"
		1	Labas	7CM07	M	E 104° 03' 56.6"	N 02° 53' 23.7"
		1	Sembilang	7CM08	M	E 103° 53' 28.4"	N 02° 40' 53.8"
		1	Tokong Bahara	7CM09	M	E 104° 03' 43.9"	N 02° 39' 48.2"
Terengganu	9	2	Perhentian Besar (South)	7TM04	M	E 102° 45' 01.8"	N 05° 53' 21.5"
			Perhentian Besar (West)	7TM05	M	E 102° 45' 01.8"	N 05° 53' 21.5"
		1	Perhentian Kecil	7TM06	M	E 102° 43' 30.4"	N 05° 55' 04.5"
		2	Redang (North)	7TM07	M	E 103° 02' 17.0"	N 05° 46' 59.2"

**JADUAL 4.3 JAS : STESEN-STESEN PEMANTAUAN AIR MARIN PULAU, 2013**  
**TABLE 4.3 DOE: ISLAND MARINE WATER QUALITY MONITORING STATIONS, 2013**

NEGERI/ STATE	BIL. PULAU / NO. OF ISLAND	BIL. STESEN/ NO. OF STATION	PULAU/ISLAND	NO. STESEN / NO. OF STATION	KATEGORI / CATEGORY	LONGITUD / LONGITUDE	LATITUD/ LATITUDE
Terengganu	9		Redang (South)	7TM08	M	E 103° 02' 03.7"	N 05° 46' 34.0"
		1	Kapas	7TM09	M	E 103° 15' 64.1"	N 03° 13' 01.1"
		1	Lang Tengah	7TM11	M	E 102° 53' 27.1"	N 05° 47' 32.9"
		1	Pinang	7TM12	M	E 103° 00' 09.4"	N 05° 44' 52.7"
		1	Ekor Tebu	7TM13	M	E 103° 01' 45.4"	N 05° 44' 25.6"
		1	Lima	7TM14	M	E 103° 03' 32.6"	N 05° 46' 11.5"
		1	Gumia	7TR01	R	E 103° 15' 39.3"	N 05° 13' 51.8"
Kelantan	2	1	Panjang	7DP01	P	E 102° 18' 32.7"	N 06° 11' 15.8"
		1	Kundur	7DP02	P	E 102° 14' 87.1"	N 06° 13' 00.6"
Sarawak	3	1	Satang	7QP01	P	E 110° 09' 53.7"	N 01° 46' 39.0"
		1	Talang-Talang Kecil	7QP02	P	E 109° 45' 58.2"	N 01° 53' 42.9"
		1	Talang-Talang Besar	7QP03	P	E 109° 46' 36.0"	N 01° 54' 39.7"
Sabah	16	1	Gaya	7SR01	R	E 116° 03' 12.1"	N 06° 00' 58.7"
		1	Mabul	7SR03	R	E 118° 38' 02.4"	N 04° 15' 04.0"
		2	Sipadan (North)	7SR04	R	E 118° 37' 37.3"	N 04° 07' 05.2"
			Sipadan (West)	7SR05	R	E 118° 37' 32.9"	N 04° 06' 51.0"
		1	Sapi	7SM08	M	E 116° 00' 53.6"	N 06° 00' 59.9"
		1	Manukan	7SR09	R	E 116° 00' 44.7"	N 05° 58' 39.8"
		1	Tiga	7SR10	R	E 115° 39' 02.4"	N 05° 43' 17.4"
		1	Kalampunian Besar	7SM11	M	E 115° 40' 71.0"	N 05° 45' 51.0"
1	Kapalai	7SR12	R	E 118° 41' 08.2"	N 04° 13' 52.0"		
1	Molleangan Besar	7SR14	R	E 117° 02' 51.5"	N 07° 04' 90.6"		

**JADUAL 4.3 JAS : STESEN-STESEN PEMANTAUAN AIR MARIN PULAU, 2013**  
**TABLE 4.3 DOE: ISLAND MARINE WATER QUALITY MONITORING STATIONS, 2013**

NEGERI/ STATE	BIL. PULAU / NO. OF ISLAND	BIL. STESEN/ NO. OF STATION	PULAU/ISLAND	NO. STESEN / NO. OF STATION	KATEGORI / CATEGORY	LONGITUD / LONGITUDE	LATITUD/ LATITUDE
Sabah	16	1	Banggi (South)	7SR15	R	E 117° 05' 13.4"	N 07° 06' 53.0"
		1	Balambangan	7SR16	R	E 116° 52' 19.5"	N 07° 11' 76.9"
		1	Silingan	7SP17	P	E 118° 03' 50.0"	N 06° 10' 43.3"
		1	Gulisan	7SP18	P	E 118° 03' 33.3"	N 06° 08' 93.3"
		1	Bakungan Kecil	7SP19	P	E 118° 06' 49.8"	N 06° 09' 92.6"
		1	Banggi (East)	7SR20	R	E 117° 05' 87.6"	N 07° 08' 21.2"
		1	Mantanani Besar	7SR21	R	E 116° 21' 40.2"	N 06° 42' 29.0"
Labuan	4	4	Labuan (Pohon Batu)	7LD01	D	E 115° 13' 43.8"	N 05° 22' 49.9"
			Labuan (Water Front)	7LD02	D	E 115° 14' 55.5"	N 05° 16' 21.9"
			Labuan (Lubuk Temiang)	7LD03	D	E 115° 14' 48.0"	N 05° 22' 18.6"
			Labuan (Rancha-Rancha)	7LD04	D	E 115° 14' 23.3"	N 05° 14' 30.9"
		1	Kuraman	7LM05	M	E 115° 08' 25.5"	N 05° 13' 07.5"
		1	Rusukan Besar	7LM06	M	E 115° 08' 31.2"	N 05° 11' 24.0"
		1	Rusukan Kecil	7LM07	M	E 115° 08' 53.9"	N 05° 12' 06.4"

**JADUAL 4.4 JAS : PARAMETER KUALITI AIR MARIN, 2013**  
**TABLE 4.4 DOE: MARINE WATER QUALITY PARAMETERS, 2013**

BIL./ NO.	PARAMETER / PARAMETERS	KOD/ CODE	UNIT/ UNIT
<b>PENGUKURAN IN-SITU/ IN-SITU MEASUREMENTS</b>			
1	Oksigen Terlarut / Dissolved Oxygen	DO	mg/l
2	Kemasinan / Salinity	Sal	ppt
3	Suhu / Temperature	Temp	°C
4	Konduktiviti / Conductivity	Cond	mS/cm
5	Kekeruhan / Turbidity	Turb	NTU/FTU
6	pH	pH	-
<b>PENGUKURAN MAKMAL/ LABORATORY MEASUREMENT</b>			
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 <sub>3</sub>	mg/l
13	Fosfat / Phosphate	PO <sub>4</sub>	mg/l
14	Tributiltin / Tributyltin	TBT	µg/l
15	Trifeniltin / Triphenyltin	TPT	µg/l

## PROGRAM PENGAWASAN KUALITI AIR DARATAN (SUNGAI), 2013 SURFACE WATER (RIVER) QUALITY MONITORING PROGRAM



Jabatan Alam Sekitar (JAS) terus melaksanakan Program Pengawasan Kualiti Air Sungai yang telah dimulakan sejak tahun 1978 untuk menentukan status terkini kualiti air sungai-sungai dan mengesan perubahan dari semasa ke semasa.

Rangkaian stesen pengawasan kualiti air sungai pada tahun 2013 terdiri daripada 891 stesen manual yang ditempatkan di 477 batang sungai seluruh negara seperti dalam **Jadual 4.5**. Pada tahun 2013 juga, Jabatan Alam Sekitar telah menambah sebanyak 55 stesen ke dalam rangkaian stesen pengawasan kualiti air sungai. Stesen-stesen ini diwujudkan bagi memantau sungai-sungai yang mempunyai muka sauk loji rawatan bekalan air. Parameter-parameter kualiti air yang diukur terdiri daripada parameter fizikal, kimia dan biologikal seperti di **Jadual 4.6**.

The Department of Environment (DOE) has implemented the National River Water Monitoring Program since 1978 to determine the river water quality status and detect changes from time to time.

In 2013, a total of 891 stations were set throughout 477 Malaysia rivers for manual water quality monitoring (MWQM), representing national river water quality monitoring network as shown in **Table 4.5**. Out of these, a total of 55 new stations were established to monitor the water quality at the upstream of raw water supply intakes. Water samples from these stations were analyzed and tested for a range of physical, chemical and biological parameters as shown in **Table 4.6**.

Indeks Kualiti Air (IKA) dibentuk berdasarkan enam parameter utama seperti berikut :-

- Keperluan Oksigen Biokimia (BOD)
- Keperluan Oksigen Kimia (COD)
- Ammoniakal Nitrogen ( $\text{NH}_3\text{N}$ )
- pH
- Oksigen Terlarut (DO)
- Pepejal Terampai (SS)

Kualiti air sungai juga dipantau secara atas talian (on-line) melalui 10 stesen-stesen automatik yang ditempatkan di Sg. Perak (Perak), Sg. Selangor (Selangor), Sg. Kelang (Kuala Lumpur), Sg Linggi (Negeri Sembilan), Sg. Melaka (Melaka), Sg Skudai (Johor), Sg. Sarawak (Sarawak), Sg. Labu (N. Sembilan), Sg. Putat (Melaka) dan Sg Rajang (Sarawak). Parameter-parameter yang diukur di stesen-stesen automatik ini adalah terhadap kepada parameter pH, Oksigen Terlarut, Suhu, Kekeruhan dan Ammonium.

Jabatan Alam Sekitar turut memantau rapi kualiti air sungai dibawah Program River of Life (ROL) iaitu salah satu Program NKEA bagi Greater Kuala Lumpur / Klang Valley. Antara objektif utama ROL adalah untuk membersihkan dan memperbaiki kualiti air di sepanjang 110 km bahagian-bahagian Sungai Klang dan Sungai Gombak pada tahun 2020. Jabatan Alam Sekitar berperanan dalam melaporkan kualiti air sungai-sungai yang dipantau di dalam Lembangan Sungai Klang, iaitu Sungai Klang, Sungai Gombak,

Water Quality Index (WQI) was used to indicate river water quality status. The WQI were formulated based upon the concentration of six principal parameters listed below;

- Biochemical Oxygen Demand (BOD)
- Chemical Oxygen Demand (COD)
- Ammoniacal Nitrogen ( $\text{NH}_3\text{N}$ )
- pH
- Dissolved Oxygen (DO)
- Suspended Solids (SS)

Continuous river water quality monitoring were also made on-line through 10 continuous monitoring stations (CWQM). These station are selectively and strategically located at Sg. Perak (Perak), Sg. Selangor (Selangor), Sg Kelang (Kuala Lumpur), Sg. Linggi (Negeri Sembilan), Sg. Melaka (Melaka), Sg Skudai (Johor), Sg. Sarawak (Sarawak), Sg. Labu (N. Sembilan), Sg. Putat (Melaka) and Sg Rajang (Sarawak). The measured parameters from these automatic stations are limited to pH, Dissolved Oxygen, Temperature, Turbidity and Ammonium.

The River of Life (ROL) is an Entry Point Project (EPP) identified in the Greater Kuala Lumpur/ Klang Valley National Key Economic Area (NKEA) under the Economic Transformation Programme (ETP). RoL aims to transform the Klang River into a vibrant and liveable waterfront with high economic value, through the initiatives of cleaning and improving water quality along 110 km of the Klang and Gombak rivers, to achieve and sustain river water quality of Class IIB by 2020.

Sungai Batu dan Sungai Jinjang. Senarai 35 stesen pemantauan bagi Program River of Life (ROL) adalah seperti di **Jadual 4.7**.

### Permohonan Data Kualiti Air Sungai

Pengguna maklumat dan data kualiti air sungai terbahagi kepada tiga (3) kategori pengguna iaitu agensi/ jabatan kerajaan, penuntut institusi pengajian tinggi, dan perunding yang menjalankan projek-projek kerajaan. Pada tahun 2013, daripada 51 permohonan data yang diterima oleh JAS, permohonan terbanyak iaitu 69% adalah daripada penuntut institusi pengajian tinggi diikuti oleh agensi kerajaan (29%) dan perunding (2%) seperti yang ditunjukkan oleh **Rajah 4.1**.

Under the programme, The Department of Environment (DOE) Malaysia leads Key Initiative 11 expediting the task in promoting of green business, stringent enforcement visits of 68 industries that generate effluent as well as 572 sewage treatment plants and monitor the water quality in Klang River and its upstream tributaries which have a total of 35 monitoring stations (as shown in **Table 4.7**).

### Request for River Water Quality Data

River water quality data were utilized by three (3) categories of users such as government agencies, researchers from higher learning institutions, and government engaged consultants. In 2013, a total of 51 data request were received by DOE. The most frequent water quality data users were higher learning institutions (69%), followed by government agencies (29%) and consultants (2%) as shown in **Figure 4.1**.

**JADUAL 4.5 JAS : SENARAI LEMBANGAN SUNGAI DAN SUNGAI-SUNGAI YANG DIPANTAU. 2013**  
**TABLE 4.5 DOE : LIST OF THE RIVER CATCHMENT AND RIVER MONITORED, 2013**

Negeri/ State	Jumlah Lembangan / Total River Basin	Jumlah Sungai Diawasi/ Total River Monitored	Jumlah Stesen/ Total Stations	Kod WKA/ Code WQR	Lembangan Sungai/ River Basin	Bilangan Stesen/ No. Of Stations	Sungai Diawasi/ River Monitored	Bilangan Stesen/ No. Of Stations
Perlis	1	6	6	01	Perlis	1	Jarum	1
							Jernih	1
							Ngulang	1
							Pelarit	1
							Perlis	1
							Wang Kelian	1
Kedah	4	14	16	01PLA	Kisap	1	Kisap	1
				01PLC	Ulu Melaka	2	Petang	1
							Ulu Melaka	1
				03	Kedah	1	Janing	1
							Kedah	1
							Pdg Terap	3
							Pedu	1
							Pendang	1
							Tekai	1
				04	Merbok	1	Bongkok	1
							Merbok	1
							Petani	1
							Tok Pawang	1
							Tupah	1
Kedah/ P.Pinang	1	7	11	05	Muda	1	Chepir	1
							Jerung	1
							Karangan	1
							Ketil	2
							Muda	4
							Pegang	1
							Sedim	1
P.Pinang	6	22	37	06PP	Pinang	1	Air Itam	5
							Air Terjun	1
							Dondang	1
							Jelutong	1
							Pinang	1
				06J	Juru	1	Juru	2
							Kilang Ubi	4
							Pasir	1
							Rambai	1
				06K	Kluang	1	Ara	2
							Relau	1
				06P	Perai	1	Jarak	3
							Keladi	1
							Kereh	2

**JADUAL 4.5 JAS : SENARAI LEMBANGAN SUNGAI DAN SUNGAI-SUNGAI YANG DIPANTAU. 2013**  
**TABLE 4.5 DOE : LIST OF THE RIVER CATCHMENT AND RIVER MONITORED, 2013**

Negeri/ State	Jumlah Lembangan / Total River Basin	Jumlah Sungai Diawasi/ Total River Monitored	Jumlah Stesen/ Total Stations	Kod WKA/ Code WQR	Lembangan Sungai/ River Basin	Bilangan Stesen/ No. Of Stations	Sungai Diawasi/ River Monitored	Bilangan Stesen/ No. Of Stations				
							Kulim	2				
							Perai	2				
							Pertama	1				
								06T	Bayan Lepas	1	Bayan Lepas	1
								Tiram	2			
								07	Jawi	1	Jawi	1
								Junjong	1			
							Machang Bubok	1				
							Kechil	1				
							Kerian	4				
P.Pinang/ Perak	1	3	7	08	Kerian	1	Selama	2				
				12	Raja Hitam		Manjong	2				
							Nyior	1				
							Raja Hitam	2				
				12W	Wangi	1	Deralik	1				
							Wangi	1				
				09	Kurau	1	Ara	2				
							Kurau	4				
				10	Sepetang	2	Batu Tegoh	3				
							Jana	1				
							Limau	1				
							Sepetang	2				
							Temerloh	2				
				11	Bruas	1	Trong	1				
							Bruas	3				
							Dandang	1				
				13	Perak	2	Rotan	1				
							Batang Padang	3				
							Bidor	3				
							Chenderiang	1				
							Chepor	1				
Kampar	2											
Kangsar	1											
Kepayang	2											
Kerdah	1											
Kinjang	1											
Kinta	6											
Klah	1											
Kuang	1											
Nyamok	1											

**JADUAL 4.5 JAS : SENARAI LEMBANGAN SUNGAI DAN SUNGAI-SUNGAI YANG DIPANTAU. 2013**  
**TABLE 4.5 DOE : LIST OF THE RIVER CATCHMENT AND RIVER MONITORED, 2013**

Negeri/ State	Jumlah Lembangan / Total River Basin	Jumlah Sungai Diawasi/ Total River Monitored	Jumlah Stesen/ Total Stations	Kod WKA/ Code WQR	Lembangan Sungai/ River Basin	Bilangan Stesen/ No. Of Stations	Sungai Diawasi/ River Monitored	Bilangan Stesen/ No. Of Stations
							Pari	1
							Pelus	2
							Perak	8
							Pinji	2
							Raia	2
							Seluang	1
							Serokai	1
							Sungkai	2
							Tumboh	1
Perak/ Selangor	1	4	8	14	Bernam	1	Bernam	4
							Inki	1
							Slim	2
							Trolak	1
Selangor	5	17	33	17	Buloh	1	Buloh	4
				19	Langat	1	Anak Chuau	1
							Batang Nilai	1
							Chuau	2
							Jijan	1
							Langat	7
							Lui	1
							Pajam	1
				Semenyih	1			
				20	Sepang	1	Sepang	2
				15	Tengi	1	Tengi	3
				16	Selangor	1	Batang Kali	1
Kanching	1							
Kerling	1							
Selangor	4							
Sembah	1							
Serendah	1							
Selangor/ WPKL	1	18	38	18	Klang	38	Batu	4
							Gombak	3
							Jinjang	3
							Klang	8
							Semelah	1
							Air Busuk	1
							Ampang	2
							Belongkong	1
							Bunos	3
							Kerayong	2

**JADUAL 4.5 JAS : SENARAI LEMBANGAN SUNGAI DAN SUNGAI-SUNGAI YANG DIPANTAU. 2013**  
**TABLE 4.5 DOE : LIST OF THE RIVER CATCHMENT AND RIVER MONITORED, 2013**

Negeri/ State	Jumlah Lembangan / Total River Basin	Jumlah Sungai Diawasi/ Total River Monitored	Jumlah Stesen/ Total Stations	Kod WKA/ Code WQR	Lembangan Sungai/ River Basin	Bilangan Stesen/ No. Of Stations	Sungai Diawasi/ River Monitored	Bilangan Stesen/ No. Of Stations
							Keroh	2
							Toba	1
							Untut	1
							Anak Air Batu	1
							Damansara	2
							Kuyoh	1
							Rasau	1
							Penchala	1
N. Sembilan	1	9	14	21	Linggi	2	Batang Penar	1
							Chembong	1
							Kepayong	1
							Kundur Besar	1
							Linggi	5
							Pedas	1
							Rembau	2
							Simin	1
Siput	1							
Melaka	5	13	24	21SM	Seri Melaka	1	Seri Melaka	1
				22	Melaka	1	Btg.Melaka	2
							Durian Tunggal	1
							Kemunting	1
							Dusun/Keru	1
							Melaka	5
							Rembia	1
							Tampin	1
				24	Kesang	1	Chohong	2
							Kesang	3
24A	Merlimau	1	Merlimau	2				
23	Duyong	1	Duyong	3				
			Gapam	1				
Johor/ N.Sembilan	1	8	15	25	Muar	1	Air Panas	1
							Gemencheh	1
							Juasseh	1
							Labis	1
							Meda	1
							Muar	8
							Sarang Buaya	1
							Segamat	1
Johor	22	91	157	26	Batu Pahat	2	Amran	1
							Bantang	1

**JADUAL 4.5 JAS : SENARAI LEMBANGAN SUNGAI DAN SUNGAI-SUNGAI YANG DIPANTAU. 2013**  
**TABLE 4.5 DOE : LIST OF THE RIVER CATCHMENT AND RIVER MONITORED, 2013**

Negeri/ State	Jumlah Lembangan / Total River Basin	Jumlah Sungai Diawasi/ Total River Monitored	Jumlah Stesen/ Total Stations	Kod WKA/ Code WQR	Lembangan Sungai/ River Basin	Bilangan Stesen/ No. Of Stations	Sungai Diawasi/ River Monitored	Bilangan Stesen/ No. Of Stations
Johor	22	91	157				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	1	Air Baloi	3
				28	Segget	1	Segget	5
				28D	Tebrau	1	Bala	1
							Pandan	1
							Plentong	1
							Sebulung	1
							Sengkuang	1
							Tampoi	1
							Tebrau	4
							28F	Danga
				28G	Rambah	1	Rambah	2
				29B	Kaw. Pasir Gudang	1	Buluh	1
							Latoh	1
							Masai	1
							Perembi	1
							Tukang Batu	1
				27B	Benut	1	Benut	4
							Parit Hj. Yassin	1
							Pinggian	1
							Ulu Benut	1
28A	Pontian Besar	1	Air Hitam	1				
			Ayer Merah	1				
			Pontian Besar	5				
28B	Pontian Kecil	1	Pontian Kecil	2				
28C	Skudai	1	Melana	2				
			Skudai	9				
28E	Kempas	1	Kempas	2				
29C	Sanglang	1	Sanglang	1				
29D	Pulai	1	Pulai	2				
			Ulu Choh	1				

**JADUAL 4.5 JAS : SENARAI LEMBANGAN SUNGAI DAN SUNGAI-SUNGAI YANG DIPANTAU. 2013**  
**TABLE 4.5 DOE : LIST OF THE RIVER CATCHMENT AND RIVER MONITORED, 2013**

Negeri/ State	Jumlah Lembangan / Total River Basin	Jumlah Sungai Diawasi/ Total River Monitored	Jumlah Stesen/ Total Stations	Kod WKA/ Code WQR	Lembangan Sungai/ River Basin	Bilangan Stesen/ No. Of Stations	Sungai Diawasi/ River Monitored	Bilangan Stesen/ No. Of Stations
Johor	22	91	157	31C	Kim-Kim	1	Kim-Kim	2
				29	Johor	2	Anak Sg. Sayong	1
							Belitong	1
							Bukit Besar	1
							Chemangar	1
							Johor	4
							Layang	1
							Layau Kiri	1
							Lebam	1
							Linggiu	1
							Panti	1
							Papan	1
							Pelepah	2
							Penggeli	2
							Remis	1
							Santi	1
							Sayong	4
							Sebol	1
							Seluyut	1
							Semangar	1
							Semenchu	1
				Telor	1			
				Temoh	1			
				Tiram	4			
				Ambat	1			
				Dohol	1			
				30A	Sedili Besar	1	Pasir Panjang	1
							Sedili Besar	5
							Temubor Kanan	1
				30B	Sedili Kecil	1	Anak Sedili Kecil	1
							Bahan	2
							Sedili Kecil	2
30C	Paloi	1	Paloi	1				
31A	Mersing	1	Mersing	2				
31B	Jemaluang	1	Jemaluang	2				
32	Endau	2	Endau	3				
			Jasin	1				
			Jebong	1				
			Kahang	1				

**JADUAL 4.5 JAS : SENARAI LEMBANGAN SUNGAI DAN SUNGAI-SUNGAI YANG DIPANTAU. 2013**  
**TABLE 4.5 DOE : LIST OF THE RIVER CATCHMENT AND RIVER MONITORED, 2013**

Negeri/ State	Jumlah Lembangan / Total River Basin	Jumlah Sungai Diawasi/ Total River Monitored	Jumlah Stesen/ Total Stations	Kod WKA/ Code WQR	Lembangan Sungai/ River Basin	Bilangan Stesen/ No. Of Stations	Sungai Diawasi/ River Monitored	Bilangan Stesen/ No. Of Stations
				32	Endau	2	Lenggor	1
							Mamai	1
							Melatai	1
							Mengkibol	3
							Paloh	1
							Pamol	1
							Selai	1
							Semberong	5
							Singol	1
							Tamok	1
Pahang	9	63	99	32AE	Anak Endau	1	Anak Endau	2
				33	Rompin	1	Aur	1
							Keratong	2
							Pontian	1
							Pukin	1
							Rompin	4
				34M	Merchong	1	Merchong	1
				35P	Pahang	1	Bentong	1
							Benus	2
							Bera	2
							Berkapor	1
							Bertam	1
							Burung	1
							Chini	1
							Habu	1
							Jelai	2
							Jempol	2
							Jengka	2
							Kelau	1
							Kertam	1
							Koyan	1
							Kundang	1
							Lenggok	1
							Lepar	3
							Lipis	3
							Luit	1
							Maran	1
							Mentiga	1
							Pahang	8
							Perting	1
Ringlelet	1							
Semantan	4							
Serting	2							

**JADUAL 4.5 JAS : SENARAI LEMBANGAN SUNGAI DAN SUNGAI-SUNGAI YANG DIPANTAU. 2013**  
**TABLE 4.5 DOE : LIST OF THE RIVER CATCHMENT AND RIVER MONITORED, 2013**

Negeri/ State	Jumlah Lembangan / Total River Basin	Jumlah Sungai Diawasi/ Total River Monitored	Jumlah Stesen/ Total Stations	Kod WKA/ Code WQR	Lembangan Sungai/ River Basin	Bilangan Stesen/ No. Of Stations	Sungai Diawasi/ River Monitored	Bilangan Stesen/ No. Of Stations	
							T. Paya Bungor	1	
							Tahan	1	
							Tanglir	1	
							Tasik Bera	1	
							Tasik Chini	1	
							Tekal	1	
							Tekam	2	
							Telang	1	
							Telom	2	
							Tembeling	1	
							Teranum	1	
							Teras	1	
							Teris	3	
							Terla	1	
							Triang	2	
				Tringkap	1				
				34B	Bebar	1	Bebar	1	
							Merba	1	
							Serai	2	
				36	Kuantan	1	Belat	1	
							Charu	1	
							Kenau	1	
							Kuantan	5	
							Pandan	1	
							Riau	1	
							Talam	1	
				37	Balok	1	Balok	2	
			Panjang	1					
37A	Cherating	1	Cherating	1					
37B	Tonggok	1	Tonggok	1					
Terengganu	13	24	35	38	Kemaman	1	Cherul	1	
							Kemaman	2	
							Ransan	1	
				39K	Kertih	1	Kertih	1	
				40	Paka	1	Paka	1	
							Rasau	1	
				41	Dungun	1	Dungun	4	
				42M	Marang	1	Marang	1	
				43	Terengganu	1		Berang	1
								Nerus	1
Pueh	1								
Telemong	1								

**JADUAL 4.5 JAS : SENARAI LEMBANGAN SUNGAI DAN SUNGAI-SUNGAI YANG DIPANTAU. 2013**  
**TABLE 4.5 DOE : LIST OF THE RIVER CATCHMENT AND RIVER MONITORED, 2013**

Negeri/ State	Jumlah Lembangan / Total River Basin	Jumlah Sungai Diawasi/ Total River Monitored	Jumlah Stesen/ Total Stations	Kod WKA/ Code WQR	Lembangan Sungai/ River Basin	Bilangan Stesen/ No. Of Stations	Sungai Diawasi/ River Monitored	Bilangan Stesen/ No. Of Stations			
							Terengganu	3			
							44	Setiu	1	Chalok	2
										Setiu	2
							46	Besut	1	Besut	2
							47	Kluang	1	Kluang	1
							39C	Chukai	1	Bungkus	1
										Chukai	1
										Ibok	1
										Ruang	1
							42I	Ibai	1	Ibai	3
42L	Merchang	1	Merchang	1							
45	Merang	1	Merang	1							
Kelantan	5	24	52	47K	Kemasin	1	Kemasin	2			
							Semerak	2			
							48	Kelantan	2	Belatop	2
										Ber	1
										Berok	3
										Betis	1
										Galas	5
										Kelantan	3
										Kerilla	1
										Lebir	3
										Nal	2
										Nenggiri	3
										Pergau	6
										Relai	1
							Sokor	1			
							Tuang	1			
							49	Golok	1	Golok	5
										Lanas	1
							48C	Pengkalan Chepa	1	Alor B	1
										Alor Lintah	1
Keladi	1										
Pengkalan Chepa	2										
48D	Pengkalan Datu	1	Pengkalan Datu	3							
Sarawak	22	54	104	50	Kayan	1	Kayan	3			
							50S	Semunsam	1	Semunsam	1
							51	Sarawak	1	Kuap	1

**JADUAL 4.5 JAS : SENARAI LEMBANGAN SUNGAI DAN SUNGAI-SUNGAI YANG DIPANTAU. 2013**  
**TABLE 4.5 DOE : LIST OF THE RIVER CATCHMENT AND RIVER MONITORED, 2013**

Negeri/ State	Jumlah Lembangan / Total River Basin	Jumlah Sungai Diawasi/ Total River Monitored	Jumlah Stesen/ Total Stations	Kod WKA/ Code WQR	Lembangan Sungai/ River Basin	Bilangan Stesen/ No. Of Stations	Sungai Diawasi/ River Monitored	Bilangan Stesen/ No. Of Stations
Sarawak	22	54	104	51	Sarawak	1	Maong Kiri	1
							Samarahan	2
							Sarawak	6
							Sarawak Kanan	1
							Sarawak Kiri	1
							Semadang	1
							Semenggoh	1
				59	Balingian	1	Balingian	2
				62	Similajau	1	Similajau	2
				64	Niah	1	Niah	2
							Sekaloh	1
				68	Limbang	1	Limbang	5
				69	Trusan	1	Trusan	1
				70	Lawas	1	Lawas	3
				52	Sadong	1	Karangan	2
							Sadong	4
				53	Lupar	1	Ai	2
							Lupar	3
							Sekerang	1
							Seterap	1
							Undup	1
				54	Saribas	1	Layar	2
							Saribas	1
				55	Kerian	1	Kerian	2
							Seblak	1
				56	Rajang	1	Baloi	1
							Binatang	1
							Julau	1
							Kanowit	1
							Meradong	1
							Rajang	11
							Salim	1
57	Oya	1	Oya	3				
58	Mukah	1	Mukah	4				
60	Tatau	1	Tatau	1				
61	Kemena	1	Kemena	3				
			Sibiu	1				
63	Suai	1	Suai	1				
65	Sibuti	1	Kabuloh	2				

**JADUAL 4.5 JAS : SENARAI LEMBANGAN SUNGAI DAN SUNGAI-SUNGAI YANG DIPANTAU. 2013**  
**TABLE 4.5 DOE : LIST OF THE RIVER CATCHMENT AND RIVER MONITORED, 2013**

Negeri/ State	Jumlah Lembangan / Total River Basin	Jumlah Sungai Diawasi/ Total River Monitored	Jumlah Stesen/ Total Stations	Kod WKA/ Code WQR	Lembangan Sungai/ River Basin	Bilangan Stesen/ No. Of Stations	Sungai Diawasi/ River Monitored	Bilangan Stesen/ No. Of Stations
Sarawak	22	54	104	65	Sibuti	1	Kejapil	1
							Satap	1
							Sibuti	2
				66	Miri	1	Adong	1
							Dalam	1
							Lutong	1
							Miri	2
				67	Baram	1	Padang Liku	1
							Baram	4
							Tutuh	1
Sabah	36	62	108	71	Menggalong	1	Menggalong	2
				71A	Lakutan	1	Lakutan	1
				71B	Lingkungan	1	Bukau	1
							Lingkungan	1
				72	Padas	1	Bunsit	1
							Liawan	1
							Padas	3
							Pangatan	1
							Pegalan	3
				Tandulu	1			
				73	Membakut	1	Membakut	1
				74	Kimanis	1	Kimanis	1
				74A	Bongawan	1	Bongawan	1
				74	Papar	1	Papar	3
				76	Moyog	1	Moyog	4
				77	Tuaran	1	Damit	2
							Song Sai	1
							Tuaran	2
				78	Kedamaian	1	Kedamaian	1
							Tempasuk	2
Wariu	1							
78T	Tenghilan	1	Tenghilan	1				
79	Bingkongan	1	Bandau	1				
			Bingkongan	2				
			Menggaris	2				
			Tandek	1				
80	Bengkoka	1	Bengkoka	2				
82	Paitan	1	Paitan	1				
83	Sugut	1	Bongkud	1				
			Lohan	1				
			Merali	1				

**JADUAL 4.5 JAS : SENARAI LEMBANGAN SUNGAI DAN SUNGAI-SUNGAI YANG DIPANTAU. 2013**  
**TABLE 4.5 DOE : LIST OF THE RIVER CATCHMENT AND RIVER MONITORED, 2013**

Negeri/ State	Jumlah Lembangan / Total River Basin	Jumlah Sungai Diawasi/ Total River Monitored	Jumlah Stesen/ Total Stations	Kod WKA/ Code WQR	Lembangan Sungai/ River Basin	Bilangan Stesen/ No. Of Stations	Sungai Diawasi/ River Monitored	Bilangan Stesen/ No. Of Stations
				83	Sugut	1	Sugut	3
				84	Labok	1	Kinipir	2
			Labok				1	
			Liwagu				2	
			Maliau				1	
			Tungud				1	
			84A	Sapi	1	Sapi	3	
						Sualong	1	
			85	Mounad	1	Mounad	2	
			87	Segama	1	Segama	3	
			88	Tungku	1	Tungku	2	
			88A	Silabukan	1	Silabukan	2	
			89	Tingkayu	1	Tingkayu	2	
			91	Tawau	1	Tawau	4	
			91A	Apas	1	Apas	1	
			91B	Balung	1	Balung	1	
			92	Merotai	1	Merotai	3	
			93	Umas-Umas	1	Umas-Umas	1	
			94	Brantian	1	Brantian	1	
			95	Kalabakan	1	Kalabakan	3	
			76A	Sembulan	1	Sembulan	2	
			76B	Likas	1	Inanam	3	
						Likas	2	
						Menggatal	2	
			76C	Telipok	1	Telipok	2	
			85A	Segaliud	1	Segaliud	2	
			86	Kinabatangan	1	Karamuak	1	
						Kinabatangan	3	
						Koyah	1	
						Menanggul	1	
			90	Kalumpang	1	Kalumpang	3	
<b>Jumlah/ Total</b>	<b>140</b>						<b>477</b>	<b>836</b>

**JADUAL 4.5(A) JAS : SENARAI STESEN PEMANTAUAN MUKA SAUK LOJI RAWATAN AIR**  
**TABLE 4.5(A) DOE : LIST OF THE WATER INTAKE MONITORING STATION**

Negeri/ State	Lembangan Sungai/ River Basin	Kod Wka/ Code Wqr	Sungai Diawasi/ River Monitored	Lokasi Muka Sauk / Water Intake Location
Perlis	Perlis	01	Terusan Mada	Muka Sauk Loji Rawatan Air Arau Fasa Iv
				Muka Sauk Loji Rawatan Air TTPC, Sg. Baru
Kedah	Melaka	01PLC	Melaka	Ulu Melaka
			Saga	Padang Saga
	Kedah	03	Temin	Changloon
			Ahning	Padang Sanai
			Padang Terap	Kuala Nerang
	Muda	05	Muda	Jeneri
				Jeniang
				Bukit Selambau
Pinang Tunggal				
			Sedim	Bikan
			Nami	Nami
P.Pinang	Pinang	06PP	Satu	Batu Feringgi
Perak	Kurau	9	Air Hitam	Muka Sauk Loji Rawatan Air Jelai
	SePETANG	10	Batu Tegoh	Muka Sauk Loji Rawatan Air Bukit Larut
	Perak	13	Sauk	Muka Sauk Loji Rawatan Air Sauk
			Manong	Muka Sauk Loji Rawatan Air Manong
			Woh	Muka Sauk Loji Rawatan Air Kuala Woh
			Tesong	Muka Sauk Loji Rawatan Air Sg. Klah
Selangor	Bernam	14	Trolak	Muka Sauk Loji Rawatan Air Trolak Timur
			Gelinting	Muka Sauk Loji Rawatan Air Ulu Slim
	Klang	18	Gombak	Muka Sauk Loji Rawatan Air Gombak
	Langat	19	Semenyih	Muka Sauk Loji Rawatan Air Semenyih
			Batang Labu	Muka Sauk Loji Rawatan Air Salak Tinggi
Melaka	Kesang	24	Chin-Chin	Muka Sauk Loji Rawatan Air Chin-Chin
N.Sembilan/ Johor	Muar	25	Jelai	Muka Sauk Loji Rawatan Air Dangi
			Muar	Muka Sauk Loji Rawatan Air Gombang
			Jementah	Muka Sauk Loji Rawatan Air Jementah
	Batu Pahat	26	Semberong	Semberong Dam, Jalan Air Hitam-Kluang

**JADUAL 4.5(A) JAS : SENARAI STESEN PEMANTAUAN MUKA SAUK LOJI RAWATAN AIR**  
**TABLE 4.5(A) DOE : LIST OF THE WATER INTAKE MONITORING STATION**

Negeri/ State	Lembangan Sungai/ River Basin	Kod Wka/ Code Wqr	Sungai Diawasi/ River Monitored	Lokasi Muka Sauk / Water Intake Location	
N.Sembilan/ Johor	Benut	27B	Machap	Machap Dam, Pekan Machap	
	Pulai	29D	Pulai	Pulai Dam, Pekan Ulu Choh, Kangkar Pulai	
	Endau	32	Kahang	Jalan Felda Kahang Timur, Kluang	
Pahang	Pahang(Bertam)	35P	Terla	Muka Sauk Loji Rawatan Air Kuala Terla (WTSI)	
			Bertam	Muka Sauk Loji Rawatan Air Habu (WWB)	
			Ulong	Brinchang Dam (WTBH)	
	Pahang	Pahang		Triang	Muka Sauk Loji Rawatan Air Sg. Triang
				Gapoi	Muka Sauk Loji Rawatan Air Gapoi
				Jempol	Jmbtn Sg Jempol Jln Ladang Getah Lubuk Yu ~ Loji Air Sg Jerik
					Jmbtn Sg Jempol Jln Bkt Tajau ~ Jengka 3 (Loji Air Jengka 3)
				Mentiga	Jmbtn Sg Metiga Jln Muadzam ~ Felda Chini (Loji Air Chini)
Terengganu	Terengganu	43	Terengganu	Kg Serada Up Stream Muka Loji Air Serada	
Kelantan	Kelantan	48	Chiku	Muka Sauk Felda Ciku 2 (Syarikat Air Kelantan)	
			Pehi	Muka Sauk Loji Air Pahi (Syarikat Air Kelantan)	
			Kelantan	Muka Sauk Loji Air Kelar Pasir Mas (Syarika Air Kelantan)	
	Gelok	49	Jeduk	Jamb. Sg Jeduk Kg Bt Gajah Jln Tnh Merah ~ Jeli (Sykt Air Kelantan)	
Sarawak	Kerian	55	Selalang	Selalang Water Intake	
	Rajang	56	Pakan	Pakan Water Intake	
			Daro	Daro Water Intake	
			Jemoreng	Jemoreng Water Intake	
			Pila Parit	Igan Water Intake	
Mukah	58	Mukah	Mukah Water Intake		
Sabah	Padas	72	Padas	Water Intake Jabatan Air Beaufort	
	Papar	75	Papar	Jambatan Sekolah Kebangsaan Mandalipau Water Intake Kogopon, Jabatan Air Papar	
<b>Jumlah/Total</b>	<b>27</b>		<b>49</b>	<b>55</b>	

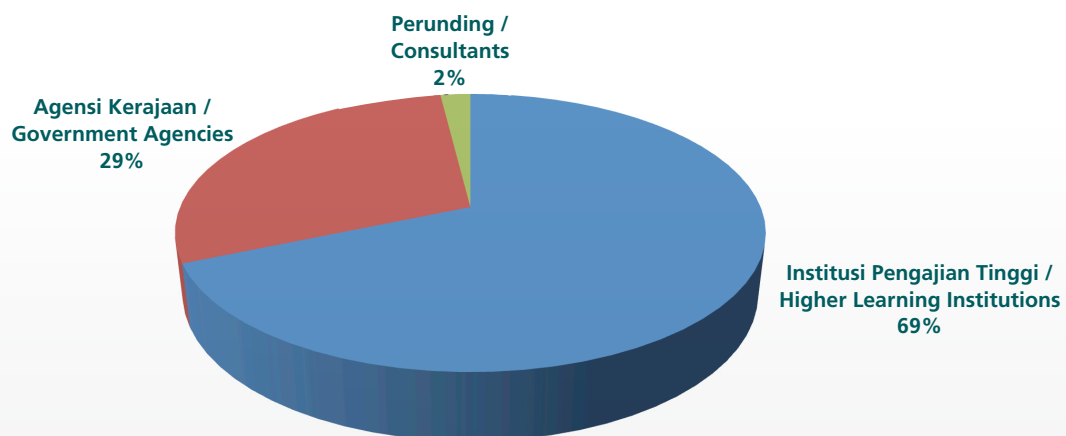
**JADUAL 4.6 JAS : PARAMETER - PARAMETER PENGUKURAN KUALITI AIR SUNGAI**  
**TABLE 4.6 DOE : RIVER WATER QUALITY PARAMETERS**

Parameter	Unit
Oksigen Terlarut / Dissolved Oxygen (DO)	mg/l, % saturated
Permintaan Oksigen Biokimia / Biological Oxygen Demand (BOD)	mg/l
Permintaan Oksigen Kimia / Chemical Oxygen Demand (COD)	mg/l
Pepejal Terampai / Suspended Solid (SS)	mg/l
pH	unit
Ammoniacal Nitrogen (NH <sub>3</sub> -N)	mg/l
Suhu / Temperature	C
Konduktiviti / Conductivity	µS
Kemasinan / Salinity	ppt
Kekeruhan / Turbidity	NTU
Pepejal terlarut / Dissolved solids	mg/l
Nitrat / Nitrate (NO <sub>3</sub> )	mg/l
Klorin / Chlorine (Cl)	mg/l
Fosfat / Phosphate (PO <sub>4</sub> )	mg/l
Arsenik / Arsenic (As)	mg/l
Mekuri / Mercury (Hg)	mg/l
Kadmium / Cadmium (Cd)	mg/l
Kromium / Chromium (Cr)	mg/l
Plumbum / Lead (Pb)	mg/l
Zink / Zinc (Zn)	mg/l
Kalsium / Calcium (Ca)	mg/l
Ferum / Ferum (Fe)	mg/l
Kalium / Potassium (K)	mg/l
Magnesium / Magnesium (Mg)	mg/l
Natrium / Sodium (Na)	mg/l
Minyak dan Gris / Oil and Grease (O&G)	mg/l
Methylene Blue Active Substances (MBAS)	mg/l
E-coli	cfu/100ml
Total Coliform	cfu/100ml



**JADUAL 4.7 JAS : SENARAI STESEN PEMANTAUAN PROJEK RIVER OF LIFE (ROL)**  
**TABLE 4.7 DOE : LIST OF THE RIVER OF LIFE (ROL) MONITORING STATION**

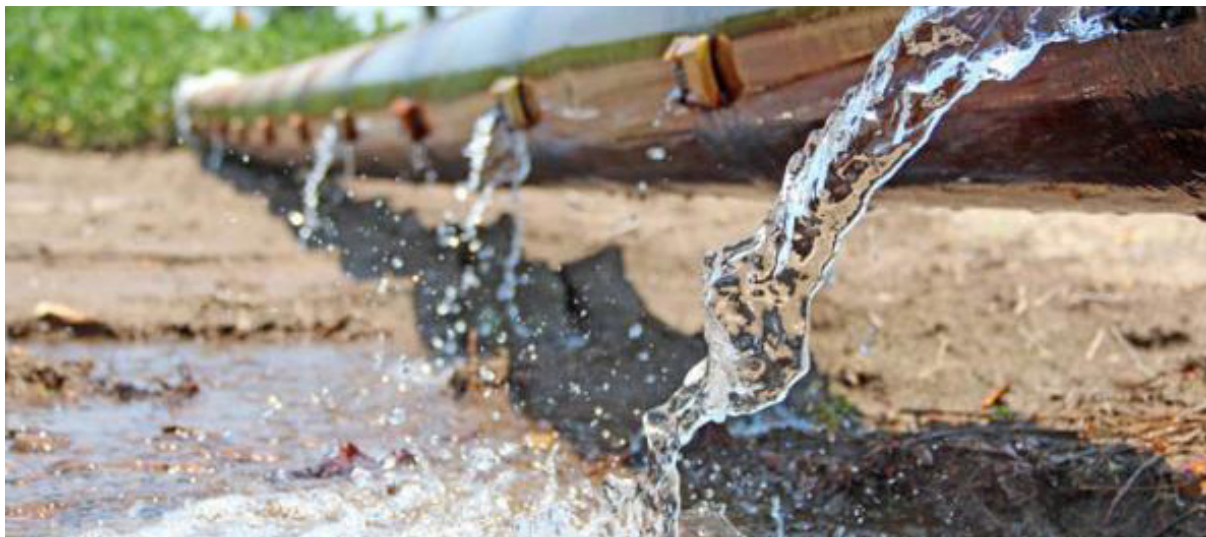
Negeri/ State	Jumlah Lembangan/ Total River Basin	Jumlah Sungai Diawasi/ Total River Monitored	Jumlah Stesen/ Total Stations	Kod WKA/ Code WQR	Lembangan Sungai/ River Basin	Bilangan Stesen/ No. of Stations	Sungai Diawasi/ River Monitored	Bilangan Stesen/ No. of Stations
SELANGOR/ WPKL	1	18	35	18	KLANG	35	BATU	4
							GOMBAK	3
							JINJANG	3
							KLANG	6
							SEMELAH	1
							AIR BUSUK	1
							AMPANG	2
							BELONGKONG	1
							BUNOS	3
							KERAYONG	2
							KEROH	2
							TOBA	1
							UNTUT	1
							ANAK AIR BATU	1
							KUYOH	1
							RASAU	1
							PAYONG	1
							PENCHALA	1
<b>JUMLAH/ TOTAL</b>							<b>18</b>	<b>35</b>



**Rajah 4.1: Pecahan Permohonan Data Air Sungai, 2013**  
**Figure 4.1: River Water Quality Data Application, 2013**

## PENGAWASAN KUALITI AIR TANAH

### GROUNDWATER QUALITY MONITORING



Program Pengawasan Kualiti Air Tanah Kebangsaan telah dimulakan pada tahun 1997 di Semenanjung Malaysia dan diperkembangkan ke Sabah dan Sarawak pada tahun 2003. Kedudukan stesen air tanah di Semenanjung Malaysia serta Sarawak dan Sabah adalah seperti dalam **Peta 4.4(a) dan 4.4(b)**.

Pengukuran parameter-parameter fizikal kualiti air tanah dijalankan secara in-situ untuk menentukan tahap ukuran bagi suhu, pH, konduktiviti, kekeruhan, kemasinan dan oksigen terlarut. Parameter-parameter yang dianalisis di makmal adalah bagi menentukan tahap kandungan sebatian organik meruap (VOC), hidrokarbon, racun perosak, logam berat, anion, koliform, sebatian berfenol, radioaktif, jumlah keliatan dan jumlah pepejal terlarut.

Groundwater water quality monitoring was established in 1997 for Peninsular Malaysia and extended to cover Sabah and Sarawak in 2003. The location map of groundwater stations in Peninsular Malaysia, Sarawak and Sabah are shown in **Map 4.4(a) dan 4.4(b)**.

In-situ measurements were taken to determine the temperature, pH, conductivity, turbidity, salinity and dissolved oxygen. Laboratory analysis were carried out to determine the total volatile organic compounds (VOCs), hydrocarbons, pesticides, heavy metals, anions, total coliform, phenolic compounds, radioactivity, total hardness and total dissolved solids.

Peralatan yang digunakan semasa persampelan air tanah termasuklah pam 'hydrolift', tiub hdpe, alat ukur kedalaman air, generator, botol persampelan/ larutan pengawetan-alat ujian, kotak kedap ais dan multiprob.

Pada tahun 2013, sebanyak 380 sampel daripada 105 buah telaga pengawasan kualiti air tanah di seluruh Malaysia telah di analisis. Telaga pengawasan ini telah dibina di kawasan-kawasan mengikut jenis guna tanah iaitu pertanian, perindustrian, padang golf, tapak pelupusan sampah, tapak pelupusan bangkai haiwan, kawasan bekalan air, bekas tapak perlombongan, perbandaran dan luar bandar di seluruh Malaysia **(Jadual 4.8)**

Di antara aktiviti-aktiviti lain yang dijalankan oleh Seksyen Pengawasan Air Tanah pada tahun 2013 adalah seperti berikut:

The equipments used in groundwater sampling were hydrolift pump, hdpe tubing, water depth sensor, generator, sampling bottle/ preservative kit, coolbox and multiprobe.

In 2013, a total of 380 groundwater samples were taken on a quarterly basis from 105 monitoring wells in Malaysia for analysis. The monitoring wells had been constructed in areas categorised according to land use type such as agriculture, industrial, golf course, solid waste landfill, animal burial, municipal water supply, ex- mining (gold mine) and urban/suburban. **(Table 4.8)**

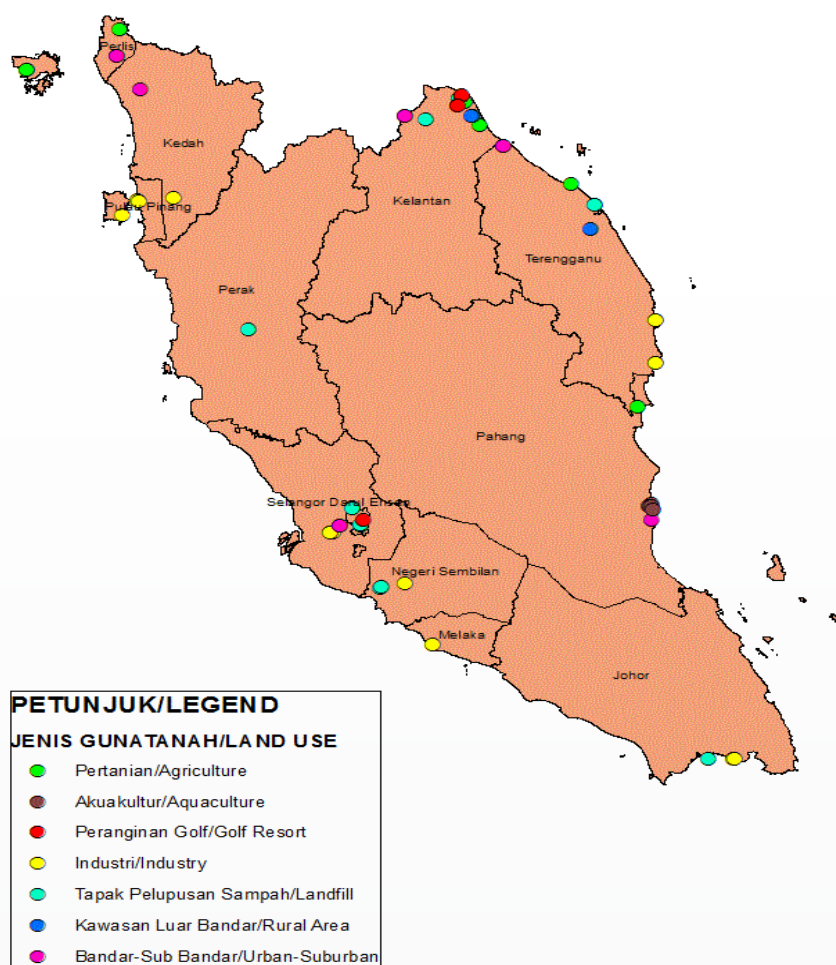
Among other activities carried out by the Groundwater Monitoring Section in 2013 were:

Tarikh/Date	Aktiviti/Activity	Kumpulan Sasar/ Target Group	Bil. Penyertaan/ No. of Participant
1) 12 Jun 2013	Mini lab penyediaan deraf SOP Pengawasan Air Tanah/Mini lab on draft preparing for SOP of Groundwater Monitoring	Pegawai-pegawai JAS/ DOE officers	17
2) 13 Nov 2013	Mini lab 2 penyediaan deraf SOP Pengawasan Air Tanah/Mini lab 2 on draft preparing for SOP of Groundwater Monitoring	Pegawai-pegawai JAS/ DOE officers	14
3) 08 -11 Dis 2013	Bengkel bagi penyediaan deraf SOP Pengawasan Air Tanah/ Workshop on draft preparing for SOP of Groundwater Monitoring	Pegawai-pegawai JAS dan agensi berkepentingan/ DOE officers and stakeholders	13
4) 03 Sept 2013	Mini lab bagi semakan semula parameter-parameter air tanah/Mini lab for Groundwater Parameters Revised	Pegawai-pegawai JAS dan agensi berkepentingan/ DOE officers and stakeholders	13
5) 03 Dis 2013	Mini lab 2 bagi semakan semula parameter-parameter air tanah/Mini lab 2 for Groundwater Parameters Revised	Pegawai-pegawai JAS dan agensi berkepentingan/ DOE officers and stakeholders	11

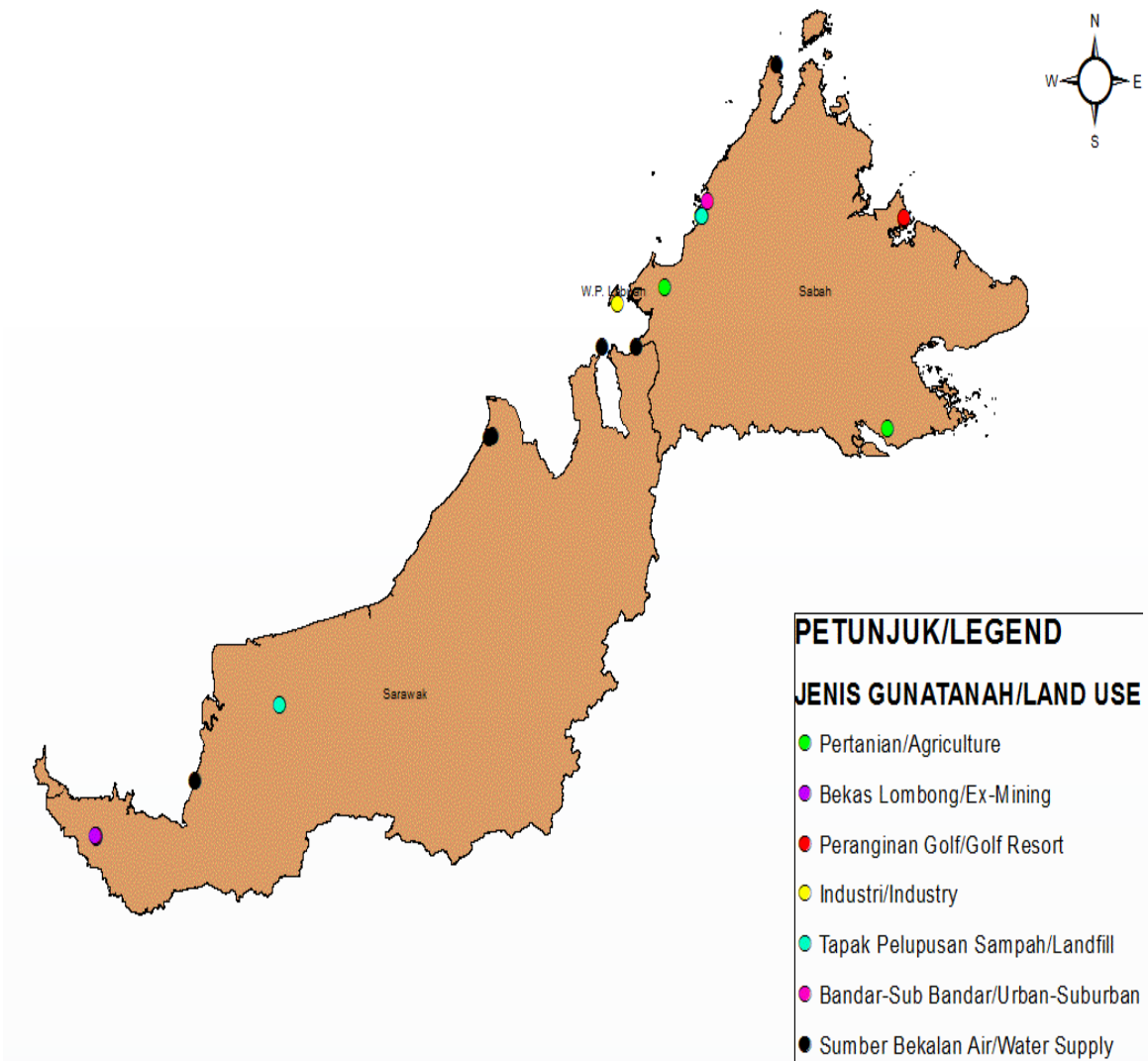
**JADUAL 4.8 JAS : TABURAN TELAGA PEMANTAUAN AIR TANAH MENGIKUT JENIS KATEGORI GUNATANAH, 2013**

**TABLE 4.8 DOE : LOCATION OF GROUNDWATER MONITORING WELLS BY LAND USE CATEGORY, 2013**

Kategori / Category	Bilangan Telaga/ Numbers of Wells
Kawasan Pertanian / Agricultural Areas	12
Bandar & Pinggir Bandar / Urban & Suburban Areas	11
Tapak Perindustrian / Industrial Sites	18
Tapak Pelupusan Sampah / Landfills	23
Padang Golf / Golf Courses	7
Luar Bandar / Rural Areas	3
Bekas lombong / Ex- Mining	3
Bekalan Air Tempatan / Municipal Water Supply	6
Tapak Pelupusan Bangkai Haiwan / Animal Burial	14
Kolam Akuakultur / Aquaculture Farms	6
Tapak Pelupusan Radioaktif / Radioactive Landfill	1
Peranginan / Resorts	1
<b>Jumlah / Total</b>	<b>105</b>



**Peta 4.4 (a) : Semenanjung Malaysia: Taburan Stesen Pemantauan Air Tanah, 2013**  
**Map 4.4 (a): Peninsular Malaysia: Location of Groundwater Monitoring Stations, 2013**



**Peta 4.4 (b) Sabah & Sarawak: Taburan Stesen Pemantauan Air Tanah, 2013**  
**Map 4.4 (b) Sabah & Sarawak: Location of Groundwater Monitoring Stations, 2013**

## PENGAWASAN BUNYI BISING AMBIEN

### AMBIENT NOISE MONITORING



#### Punca Pencemaran Bunyi Bising Dan Kesannya

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

#### Program Pengawasan Bunyi Bising Ambien

Pada tahun 2013, Jabatan Alam Sekitar telah melaksanakan Program Pengawasan Bunyi Bising Ambien untuk mewujudkan data garis dasar bagi tujuan perancangan dan merangka peraturan bunyi bising pada masa

#### Sources And Effect Of Noise Pollution

Activities such as industrial, development and transportation activities creates excessive noise. Noise pollution causes negative impact on health, psychology , reduces productivity, and also create public nuisance. 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.

#### Ambient Noise Monitoring Program

In 2013, the Department of Environment conducted Ambient Noise Monitoring Programme which aims to collect baseline data for planning purposes and also to develop regulations for noise limits in the

akan datang. Pengukuran paras bunyi bising ambien tertumpu kepada tiga (3) kategori utama gunatanah iaitu trafik/jalanraya (23 stesen), perindustrian (21 stesen) dan kawasan sensitif seperti hospital, sekolah dan tempat ibadat (27 stesen) **(Jadual 4.9)**. 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". Hasil pengukuran menunjukkan kebanyakan kawasan daripada ketiga-tiga kategori gunatanah tersebut mencatatkan bacaan bunyi bising melebihi had yang ditetapkan dalam garis panduan berkenaan.

future. The ambient noise monitoring programme focused on three (3) major landuse: road traffic (23 stations), industrial areas (21 stations) and noise sensitive areas such as hospitals, schools and places of worship (27 stations) **(Table 4.9)**. For cases related to complaints, periodic monitoring had also been carried out by the DOE State Office.

Compliance to the noise level is based on the limits recommended in "The Planning Guidelines for Environmental Noise Limits and Control". Generally, the results showed that most areas within the above three (3) major landuse had exceeded the guideline limits.

**JADUAL 4.9 JAS : PROGRAM PENGAWASAN BUNYI BISING AMBIEN, 2013**  
**TABLE 4.9 DOE : AMBIENT NOISE MONITORING PROGRAMME, 2013**

KATEGORI / CATEGORIES	NEGERI / STATES	LOKASI / LOCATION	BILANGAN PENGUKURAN/ NO. OF MEASUREMENT	PERATUS PEMATUHAN (%) / COMPLIANCE (%)	
				SIANG / DAY TIME	MALAM / NIGHT TIME
Trafik/ Traffic	Lebuhraya/ Highway	Terengganu Lebuhraya Pantai Timur (Bukit Payung) East Coast Highway (Bukit Payung)	3	0	0
		Perak Lebuhraya Utara-Selatan (Taman Tambun) North South Highway (Taman Tambun)	3	0	0
		Pahang Kawasan Rehat R&R Gambang, Lebuhraya Pantai Timur Gambang R&R Area, East Coast Highway	3	0	0
		Melaka Taman Asia Selatan Taman Asia Selatan	2	0	0
		Kelantan Jalan Utama Kota Bharu – Kuala Krai/ Gua Musang Kota Bharu – Kuala Krai/Gua Musang Main Road	2	0	0
		Perlis Lebuhraya Kuala Perlis – Changloon Kuala Perlis – Changloon Highway	1	0	0
		Sarawak Jalan Datuk Mohammad Musa, Kota Samarahan (INTAN) Datuk Mohammad Musa Road, Kota Samarahan (INTAN)	1	0	0
		Jalan Persekutuan / Federal Road	Terengganu Jalan Bukit Besar Bukit Besar Road	3	66.7
	Perak Jalan Kuala Kangsar Kuala Kangsar Road		3	0	0
	Pahang Jalan Tanah Putih, Kuantan Tanah Putih Road, Kuantan		2	0	0
	Melaka Taman Bertam Jaya Taman Bertam Jaya		2	0	0

**JADUAL 4.9 JAS : PROGRAM PENGAWASAN BUNYI BISING AMBIEN, 2013**  
**TABLE 4.9 DOE : AMBIENT NOISE MONITORING PROGRAMME, 2013**

KATEGORI / CATEGORIES		NEGERI / STATES	LOKASI / LOCATION	BILANGAN PENGUKURAN / NO. OF MEASUREMENT	PERATUS PEMATUHAN (%) / COMPLIANCE (%)	
					SIANG / DAY TIME	MALAM / NIGHT TIME
Trafik/ Traffic	Jalan Persekutuan / Federal Road	Negeri Sembilan	Jalan Lingkaran Tengah Seremban Seremban Middle Ring Road	1	0	0
		Perlis	Jalan Alor Star – Kangar (Sanglang) Alor Star – Kangar (Sanglang) Road	1	0	0
		Sarawak	Jalan Batu Kawa, Kuching Batu Kawa Road, Kuching	1	0	0
	Jalan Kampung / Suburban Road	Terengganu	Kampung Tanjung Bunut Kampung Tanjung Bunu	3	0	0
		Perak	Jalan Berlian, Kampung Dato' Ahmad Said, Ipoh Berlian Road, Kampung Dato' Ahmad Said, Ipoh	3	0	0
		Pahang	Jalan Bukit Goh Bukit Goh Road	3	0	0
		Melaka	Kampung Pengkalan Batu Kampung Pengkalan Batu	2	0	0
		Kelantan	Jalan Tok Bali – Pasir Puteh Tok Bali – Pasir Puteh Road	2	0	0
		Negeri Sembilan	Jalan Gadong Jaya, Labu Gadong Jaya Road, Labu	2	0	0
		Perlis	Jalan Jejawi - Tambun Tulang (Kampung Longboh) Jejawi – Tambun Tulang Road (Kampung Longboh)	1	0	-
		Sarawak	Jalan Matang, Kuching Matang Road, Kuching	2	0	0

**JADUAL 4.9 JAS : PROGRAM PENGAWASAN BUNYI BISING AMBIEN, 2013**  
**TABLE 4.9 DOE : AMBIENT NOISE MONITORING PROGRAMME, 2013**

KATEGORI / CATEGORIES	NEGERI / STATES	LOKASI / LOCATION	BILANGAN PENGUKURAN/ NO. OF MEASUREMENT	PERATUS PEMATUHAN (%) / COMPLIANCE (%)	
				SIANG / DAY TIME	MALAM / NIGHT TIME
Industri / Industries	Industri Berat / Heavy Industry	Terengganu Kampung Bukit Jong Kampung Bukit Jong	3	66.7	66.7
		Perak Kawasan Perindustrian Tasek Tasek Industrial Area	3	100.0	66.7
		Pahang Kawasan Perindustrian Gebeng Gebeng Industrial Area	3	100.0	33.3
		Melaka Kilang CSC Steel – Pangsapuri Pelangi CSC Steel – Pelangi Apartment	2	50.0	0
		Kelantan Kawasan Industri Pengkalan Chepa Pengkalan Chepa Industrial Area	2	100.0	0
		Negeri Sembilan Kawasan Perindustrian Arab Malaysian Arab Malaysian Industrial Park	1	100.0	100.0
	Industri Sederhana / Medium Industry	Terengganu Kawasan Perindustrian Chendering Chendering Industrial Area	3	100.0	100.0
		Perak Kawasan Perindustrian Gopeng, Kampung Tersusun Tekah Gopeng Industrial Area, Kampung Tersusun Tekah	3	100.0	100.0
		Pahang Kawasan Perindustrian Semambu Semambu Industrial Area	3	100.0	66.7
		Melaka Taman Rembia Sutera Taman Rembia Sutera	2	0	0
		Kelantan Kawasan Industri MIEL Lundang MIEL Industrial Area, Lundang	2	50.0	0

**JADUAL 4.9 JAS : PROGRAM PENGAWASAN BUNYI BISING AMBIEN, 2013**  
**TABLE 4.9 DOE : AMBIENT NOISE MONITORING PROGRAMME, 2013**

KATEGORI / CATEGORIES		NEGERI / STATES	LOKASI / LOCATION	BILANGAN PENGUKURAN / NO. OF MEASUREMENT	PERATUS PEMATUHAN (%) / COMPLIANCE (%)	
					SIANG / DAY TIME	MALAM / NIGHT TIME
Industri / Industries		Perlis	Kawasan Perindustrian Jejawi Jejawi Industrial Area	1	100.0	100.0
		Sarawak	Kawasan Perindustrian Samajaya, Kuching Samajaya Industrial Area, Kuching	1	100.0	0
	Industri Ringan / Small Industry	Terengganu	Kawasan Industrial Gong Badak Gong Badak Industrial Area	3	100.0	100.0
		Perak	Kawasan Perindustrian Ringan Kinta Jaya Kinta Jaya Small Industrial Area	3	100.0	0
		Pahang	Kawasan Perindustrian Indera Mahkota Indera Mahkota Industrial Area	3	100.0	66.7
		Melaka	Kawasan Perindustrian IKS Malim IKS Malim Industrial Area	2	0	0
		Kelantan	Kawasan Industri MARA, Kota Bharu MARA Industrial Area, Kota Bharu	2	50.0	0
		Negeri Sembilan	Kawasan Perindustrian Galla Galla Industrial Park	1	100.0	0
		Perlis	Kawasan Perindustrian Kuala Perlis Kuala Perlis Industrial Area	1	0	0
		Sarawak	Kawasan Perindustrian Ringan Batu Kitang Small Industrial Area Batu Kitang	1	100.0	0

**JADUAL 4.9 JAS : PROGRAM PENGAWASAN BUNYI BISING AMBIEN, 2013**  
**TABLE 4.9 DOE : AMBIENT NOISE MONITORING PROGRAMME, 2013**

KATEGORI / CATEGORIES		NEGERI / STATES	LOKASI / LOCATION	BILANGAN PENGUKURAN/ NO. OF MEASUREMENT	PERATUS PEMATUHAN (%) / COMPLIANCE (%)	
					SIANG / DAY TIME	MALAM / NIGHT TIME
Sensitif Bunyi/ Noise Sensitive	Sekolah / School	Terengganu	Sekolah Menengah Sultan Sulaiman	3	0	3
			Sekolah Menengah Sultan Sulaiman			
		Perak	Sekolah Menengah Convent, Ipoh	3	0	0
			Sekolah Menengah Convent, Ipoh			
		Pahang	Sekolah Kebangsaan Galing, Kuantan	3	0	0
			Sekolah Kebangsaan Galing, Kuantan			
		Melaka	Sekolah Kebangsaan Batu Berendam (2)	2	0	0
			Sekolah Kebangsaan Batu Berendam (2)			
		Kelantan	Sekolah Menengah Kebangsaan Pengkalan Chepa	2	0	0
			Sekolah Menengah Kebangsaan Pengkalan Chepa			
		Perlis	Sekolah Menengah Sains Tunku Syed Putra	1	0	0
			Sekolah Menengah Sains Tunku Syed Putra			
		Sarawak	Sekolah Menengah Kebangsaan St. Joseph, Kuching	1	0	0
			Sekolah Menengah Kebangsaan St. Joseph, Kuching			
Hospital / Hospital	Terengganu	Hospital Sultanah Nurzahirah	3	0	0	
		Sultanah Nurzahirah Hospital				
	Perak	Hospital Raja Permaisuri Bainun	3	0	0	
		Raja Permaisuri Bainun Hospital				
	Pahang	Hospital Tengku Ampuan Afzan	3	0	0	
		Tengku Ampuan Afzan Hospital				

**JADUAL 4.9 JAS : PROGRAM PENGAWASAN BUNYI BISING AMBIEN, 2013**  
**TABLE 4.9 DOE : AMBIENT NOISE MONITORING PROGRAMME, 2013**

KATEGORI / CATEGORIES	NEGERI / STATES	LOKASI / LOCATION	BILANGAN PENGUKURAN/ NO. OF MEASUREMENT	PERATUS PEMATUHAN (%) / COMPLIANCE (%)	
				SIANG / DAY TIME	MALAM / NIGHT TIME
Sensitif Bunyi/ Noise Sensitive	Hospital / Hospital	Melaka Hospital Besar Melaka Melaka General Hospital	2	0	0
		Kelantan Hospital Universiti Sains Malaysia, Kubang Kerian Universiti Sains Malaysia Hospital, Kubang Kerian	2	0	0
		Negeri Sembilan Hospital Tuanku Jaafar Tuanku Jaafar Hospita	1	0	0
		Perlis Hospital Tunku Fauziah Tunku Fauziah Hospital	1	0	0
		Sarawak Hospital Umum Sarawak Sarawak General Hospital	1	0	0
	Tempat Ibadat / Place of Worship	Terengganu Masjid Kampung Banggol Tuan Muda Masjid Kampung Banggol Tuan Muda	3	0	0
		Perak Masjid Muhibbuddin Shah, Ipoh Masjid Muhibbuddin Shah, Ipoh	3	0	0
		Pahang Masjid Negeri Sultan Ahmad Shah Masjid Negeri Sultan Ahmad Shah	3	0	0
		Melaka Masjid Al-Azim Masjid Al-Azim	2	0	0
		Kelantan Masjid Muhammadi, Kota Bharu Masjid Muhammadi, Kota Bharu	2	0	0
		Perlis Masjid Alwin Kangar Masjid Alwin Kangar	1	0	0
		Lapangan Terbang / Airport	Terengganu Lapangan Terbang Sultan Mahmud, Kuala Terengganu Sultan Mahmud Airport, Kuala Terengganu	3	0

**JADUAL 4.9 JAS : PROGRAM PENGAWASAN BUNYI BISING AMBIEN, 2013**  
**TABLE 4.9 DOE : AMBIENT NOISE MONITORING PROGRAMME, 2013**

KATEGORI / CATEGORIES	NEGERI / STATES	LOKASI / LOCATION	BILANGAN PENGUKURAN/ NO. OF MEASUREMENT	PERATUS PEMATUHAN (%) / COMPLIANCE (%)	
				SIANG / DAY TIME	MALAM / NIGHT TIME
Lapangan Terbang / Airport	Perak	Markas Udara TLDM	3	0	0
		Markas Udara TLDM			
	Pahang	Lapangan Terbang Sultan Ahmad Shah	3	0	0
		Sultan Ahmad Shah Airport			
	Melaka	Lapangan Terbang Taman Seri Bayan	2	0	0
		Taman Seri Bayan Airport			
Kelantan	Lapangan Terbang Sultan Ismail Petra, Kota Bharu	2	0	0	
	Sultan Ismail Petra Airport, Kota Bharu				
Sarawak	Lapangan Terbang Antarabangsa Kuching	1	0	0	
	Kuching International Airport				

## STANDARD KUALITI UDARA AMBIEN MALAYSIA 2013 MALAYSIA AMBIENT AIR QUALITY STANDARD 2013



### Pengenalan

Garis Panduan Kualiti Udara Ambien Malaysia telah disediakan dan digunapakai mulai pada tahun 1989 sehingga kini. Garispanduan ini telah menggariskan tahap kepekatan lima (5) bahan pencemar udara utama iaitu :-

- i. Zarahhan terampai bersaiz 10 mikrometer atau kurang ( $PM_{10}$ );
- ii. Sulfur Dioksida ( $SO_2$ );
- iii. Karbon Monoksida (CO);
- iv. Nitrogen Dioksida ( $NO_2$ ); dan
- v. Ozon Paras Permukaan Bumi ( $O_3$ )

Terdapat had kepekatan yang ditetapkan lebih rendah dan didapati kurang relevan digunapakai pada masa kini.

Jabatan Alam Sekitar (JAS) telah mengambil inisiatif untuk mengemaskini

### Introduction

Malaysia Ambient Air Quality Guidelines had been used since 1989. This guideline outlines five (5) major air pollutants which include :-

- i. Particulate matter with size of 10 micrometer or less ( $PM_{10}$ );
- ii. Sulfur Dioxide ( $SO_2$ );
- iii. Carbon Monoxide (CO);
- iv. Nitrogen Dioxide ( $NO_2$ ); and
- v. Ground-Level Ozone ( $O_3$ )

The concentration limits set for these parameters are outdated and less relevant.

Department of Environment (DOE) had taken initiative to review and strengthen the

dan menambahbaik garis panduan sedia ada kepada Standard Kualiti Udara Ambien. Oleh itu, JAS telah menubuhkan satu Jawatankuasa Kumpulan Pakar Pembentukan Standard Kualiti Udara Ambien pada 6 April 2012 yang terdiri daripada wakil agensi Kerajaan, pakar-pakar dari university tempatan dan juga pakar runding bebas tempatan untuk membantu dalam mengkaji semula (review) serta mengemaskini garis panduan kualiti udara ambien yang sedia ada.

Senarai ahli kumpulan pakar ini adalah seperti di **Jadual 4.10**.

### **Stakeholders Seminar On Revised Malaysia Ambient Air Quality Standard 2013**

Setelah beberapa sesi perbincangan bersama kumpulan pakar diadakan, satu seminar bersama pihak stakeholders telah diadakan di Dewan Baiduri, Jabatan Alam Sekitar pada 28 November 2013 bagi memuktamadkan Standard Kualiti Udara Ambien Malaysia 2013.

Objektif utama seminar ini adalah untuk :

- i. Membentangkan Standard Kualiti Udara Ambien Malaysia 2013 dan memberikan penjelasan secara terperinci mengenai pengemaskinian had kepekatan pencemar udara dalam garis panduan tersebut kepada pihak stakeholders; dan
- ii. Mendapatkan input serta pandangan pihak stakeholders mengenai standard baru tersebut.

current guidelines into Ambient Air Quality Standard. Thus, DOE had formed an Expert Group Committee for the Establishment of Ambient Air Quality Standard on 6 April 2012. The committee was represented by senior officials from government agencies, experts from local universities and local independent consultants. The committee is formed to assist DOE in reviewing and updating the existing ambient air quality guidelines.

Members of this expert group are as listed in **Table 4.10**.

### **Stakeholders Seminar On Revised Malaysia Ambient Air Quality Standard 2013**

Follow up of several discussion sessions with the expert group, a seminar with stakeholders had been organized at Baiduri Hall, Department of Environment on 28 November 2013 to finalize the Malaysia Ambient Air Quality Standard 2013.

The main objectives of the seminar are :

- i. To present Malaysia Ambient Air Quality Standard 2013 and explain thoroughly about the new updated concentration limit to the stakeholders; and
- ii. To gather input and opinion from stakeholders on the new proposed standard.

Seminar ini telah dirasmikan oleh YBhg. Datuk Dr. Abdul Rahim Bin Haji Nik, Timbalan Ketua Setiausaha (Alam Sekitar), Kementerian Sumber Asli dan Alam Sekitar Malaysia dan ucapan aluan telah disampaikan oleh Y Bhg. Dato' Halimah Hassan, Ketua Pengarah Alam Sekitar, Jabatan Alam Sekitar.

Seminar ini telah dihadiri oleh 98 orang peserta yang terdiri daripada wakil agensi kerajaan, pegawai-pegawai Jabatan Alam Sekitar dan badan bukan kerajaan (NGO).

### **Pengemaskinian Standard Kualiti Udara Ambien Malaysia 2013**

Antara pengemaskinian dalam Standard Kualiti Udara Ambien Malaysia 2013 adalah seperti berikut:-

- i. Penambahan parameter habuk halus bersaiz 2.5 mikrometer atau kurang ( $PM_{2.5}$ );
- ii. Penetapan had kepekatan baru bagi pencemar udara  $PM_{10}$ ,  $SO_2$ , CO,  $NO_2$  dan  $O_3$ . Penetapan had kepekatan ini akan dilaksanakan secara berperingkat berdasarkan kepada tiga (3) peringkat sasaran interim iaitu interim 1 (IT-1) pada tahun 2015, interim 2 (IT-2) pada tahun 2018 dan pemakaian standard sepenuhnya pada tahun 2020; dan
- iii. Penetapan standard baru ini adalah selaras dengan Garis Panduan World Health Organization (WHO) 2006.

The seminar was inaugurated by YBhg. Datuk Dr. Abdul Rahim Bin Haji Nik, Deputy Secretary General (Environment), Ministry of Natural Resources and Environment Malaysia and the opening remarks was delivered by YBhg. Dato' Halimah Hassan, Director General, Department of Environment.

The seminar was attended by 98 participants from various government agencies, Department of Environment officers and non-governmental organizations (NGO).

### **Malaysia Ambient Air Quality Standard 2013 Features**

The updated Malaysia Ambient Air Quality Standard 2013 include some of the following features:-

- i. Addition of new parameter for particulate matter with the size of 2.5 micrometer or less ( $PM_{2.5}$ );
- ii. Setting of new concentration limit for existence air pollutants which include  $PM_{10}$ ,  $SO_2$ , CO,  $NO_2$  and  $O_3$ . The new concentration limit will be implemented in stages based on three (3) interim targets which are interim 1 (IT-1) in 2015, interim 2 (IT-2) in 2018 and full implementation of the standard in 2020; and
- iii. The new standard is in line with the World Health Organization (WHO) 2006 Guidelines.

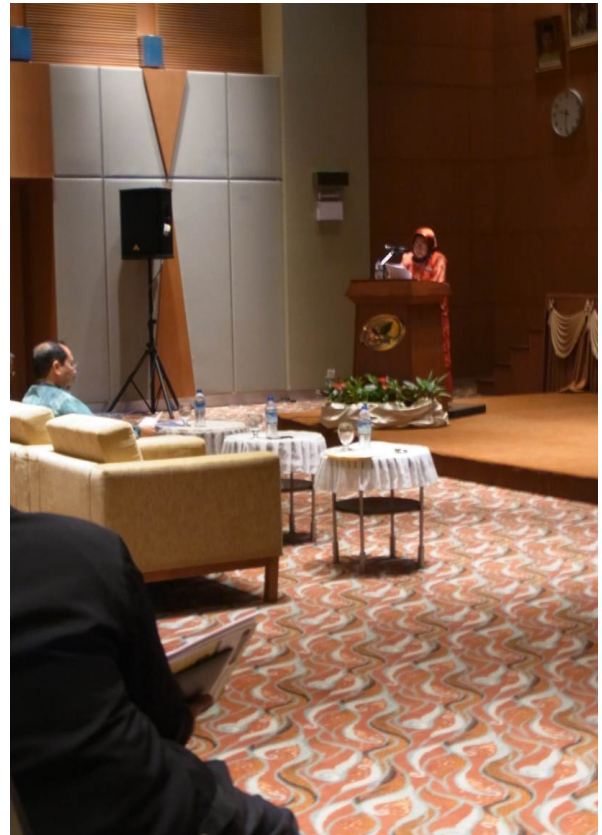
**JADUAL 4.10 JAS : SENARAI NAMA AHLI KUMPULAN PAKAR KUALITI UDARA  
YANG DI LANTIK OLEH KETUA PENGARAH JAS**  
**TABLE 4.10 DOE : THE LIST OF THE AIR QUALITY EXPERT GROUP MEMBERS APPOINTED  
BY DOE DIRECTOR GENERAL**

<b>BIL / NO.</b>	<b>NAMA / NAME</b>	<b>AGENSI / INSTITUT / AGENCY / INSTITUTE</b>	<b>KEAHLIAN / MEMBERSHIP</b>
1.	Prof. Dr. Zailina Hashim	Universiti Putra Malaysia	Ahli / Member
2.	Prof. Dr. Mohd Rashid Mohd Yusof	Universiti Teknologi Malaysia	Ahli / Member
3.	Prof. Dr. Norhayati Mohd. Tahir	Universiti Malaysia Terengganu	Ahli / Member
4.	Prof. Dr. Mastura Hj. Mahmud	Universiti Kebangsaan Malaysia	Ahli / Member
5.	Prof. Madya Dr. Mohd Talib Latif	Universiti Kebangsaan Malaysia	Ahli / Member
6.	Prof. Madya Dr. Marzuki Bin Hj. Ismail	Universiti Malaysia Terengganu	Ahli / Member
7.	Prof. Madya Dr. Ahmad Makmom Hj. Abdullah	Universiti Putra Malaysia	Ahli / Member
8.	Prof. Madya Dr. ShamzaniAffendi Mohd Din	Universiti Islam Antarabangsa Malaysia	Ahli / Member
9.	Dr. Mazrura Sahani	Universiti Kebangsaan Malaysia	Ahli / Member
10.	Dr. Yusri Yusup	Universiti Sains Malaysia	Ahli / Member
11.	Pn. Maznorizan Mohamad	Jabatan Meteorologi Malaysia	Ahli / Member
12.	Dr. Anis Salwa Kamaruddin	Kementerian Kesihatan Malaysia	Ahli / Member
13.	En. Azman Zainal Abidin	Pakar Runding Bebas	Ahli / Member
14.	En. Lim Sze Fook	Pakar Runding Bebas	Ahli / Member



**Ucapan perasmian oleh YBhg. Datuk Dr. Abdul Rahim Bin Haji Nik, Timbalan Ketua Setiausaha (Alam Sekitar), Kementerian Sumber Asli dan Alam Sekitar Malaysia.**

**Inaugural address by YBhg. Datuk Dr. Abdul Rahim Bin Haji Nik, Deputy Secretary General (Environment), Ministry of Natural Resources and Environment Malaysia.**



**Ucapan aluan oleh YBhg. Dato' Halimah Hassan, Ketua Pengarah Alam Sekitar, Jabatan Alam Sekitar.**

**Opening remarks by YBhg. Dato' Halimah Hassan, Director General Department of Environment.**



**Sesi soal jawab yang dipengerusikan oleh Pn. Hajah Kalsom Abd. Ghani, Pengarah Bahagian Udara, Jabatan Alam Sekitar.**

**Q&A session chaired by Pn. Hajah Kalsom Abd. Ghani, Director of Air Division, Department of Environment.**



**Ahli Jawatankuasa Kumpulan Pakar Pembentukan Standard Kualiti Udara Ambien 2013.**

**Expert Group Committee member for the Establishment of Ambient Air Quality Standards 2013.**

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

Skim Notifikasi dan Pendaftaran Bahan-Bahan Berbahaya Kepada Alam Sekeliling (EHSNR) telah diperkenalkan di Malaysia pada tahun 2009. Tujuan mengadakan skim ini adalah bagi membolehkan Jabatan Alam Sekitar (JAS) dan agensi-agensi lain yang terlibat dalam pengurusan kimia mengenalpasti benda-benda berbahaya dalam Negara dan membantu membuat keputusan untuk mengurus benda-benda berbahaya ini secara berkesan dan selamat.

Berdasarkan kepada maklumat yang dikemukakan oleh pihak industri, JAS akan menghasilkan satu senarai Pendaftaran Bahan Kimia di Malaysia. Senarai Pendaftaran Bahan Kimia ini akan mengandungi maklumat mengenai identiti benda-benda berbahaya yang telah dinotifikasi kepada JAS, kegunaannya di Malaysia, pengelasan tahap berbahaya dan jumlah keseluruhan yang terdapat di pasaran Malaysia. Di bawah skim EHSNR ini, semua pengimport dan pengilang bahan EHS dikehendaki untuk membuat notifikasi secara sukarela (voluntary) kepada JAS.

Sehingga 31 Disember 2013, sebanyak 2,455 notifikasi bahan EHS telah diterima daripada syarikat pengimport dan pengilang di Malaysia. Sebanyak 427 syarikat kimia telah mendaftar secara talian terus melalui

The Environmentally Hazardous Substances Notification and Registration Scheme (EHSNR) was introduced in Malaysia in 2009. The purpose of having the scheme is to enable the Department of Environment (DOE) and other agencies involved in chemicals management to identify substances of concern in the country and make decisions in managing these substances in a safe and sound manner.

Based on the information submitted by industry, the DOE will establish a Malaysian Chemicals Register List. This Malaysia Chemicals Register List will contain information about the identity of substances that have been notified to DOE, their uses in Malaysia, their hazard classification and the accumulated amounts placed on the market in Malaysia. Under the scheme EHSNR, all importers and manufacturers of EHS is required to make a voluntary notification to the DOE on EHS imported or manufactured.

Until 31 December 2013, 2,445 notifications of Environmental Hazardous Substances (EHS) have been received from manufacturers and importers in Malaysia.

laman web EHSNR. Daripada jumlah notifikasi tersebut, didapati bahawa 1,528 notifikasi EHS tersebut memerlukan notifikasi terperinci dan 921 notifikasi EHS adalah notifikasi asas dan telah mempunyai maklumat mengenai bahan EHS tersebut dalam Senarai Rujukan EHS. Selain itu, didapati 16 syarikat telah mendaftar sebagai pembekal luar Negara untuk bahan EHS.

Maklumat lanjut mengenai skim EHSNR ini boleh dilayari di laman sesawang <https://www.e-ehs.doe.gov.my> atau merujuk kepada garis panduan yang telah disediakan iaitu Guidance For The Industry On The Notification & Registration Scheme Of Environmentally Hazardous Substances (EHS) In Malaysia.

A total 427 chemical companies had done the registration online through our EHSNR website. From this registered notifications, about 1,528 notifications were required to do detailed notification and 921 notifications was basic notifications as the substances already listed in the EHS Reference List. Besides that, 16 companies had registered as overseas suppliers for the EHS substances.

Details of the EHSNR scheme can be found at this following website <https://www.e-ehs.doe.gov.my> or refer to the 'Guidance For Industry On The Notification & Registration Scheme Of Environmentally Hazardous Substances (EHS) In Malaysia'.

## SISTEM PENJEJAKAN BUANGAN TERJADUAL SECARA ELEKTRONIK DI MALAYSIA

### ELECTRONIC MANIFEST SYSTEM FOR SCHEDULED WASTE IN MALAYSIA



Pelupusan buangan terjadual secara haram merupakan salah satu cabaran yang dihadapi di Malaysia. Dengan pengenalan sistem penjejakan secara elektronik, langkah-langkah pencegahan pelupusan buangan terjadual secara haram dapat diperkasakan dan pergerakan setiap buangan daripada tempat dihasilkan sehinggalah ke tempat dilupuskan dapat dikesan secara atas talian melalui sistem aplikasi nota konsainan yang dikenali sebagai sistem e – Consignment Note (e -CN).

Pelaksanaan sistem e -CN telah dimulakan pada tahun 2007. Sistem pelaporan secara elektronik dapat membantu pengeluar buangan, pengangkut dan penerima

Illegal dumping of scheduled waste is one of the significant problems in Malaysia. With the introduction of electronic manifest system, measures against illegal dumping are being strengthened even further and the movement of every consignment of wastes from the generation (cradle) to the final disposal (grave) is tracked by means of an Internet-based electronic submission of consignment note system (known as the e-Consignment Note (e-CN)).

The implementation of e-CN system started in 2007. This online reporting system will help the waste generator, the transporter and the receiver of scheduled waste to

buangan terjadual untuk memberikan maklumat seperti yang diperuntukan dalam Jadual Keenam, Peraturan-Peraturan Kualiti Alam Sekeliling (Buangan Terjadual) 2005. Pada tahun 2012, e-CN versi 2.0 telah diperkenalkan untuk membolehkan pemberitahuan buangan terjadual dan pelaporan inventori buangan terjadual dilakukan secara atas talian melalui sistem e-CN. Pada tahun 2013, sejumlah 15,963 pengeluar buangan terjadual telah mendaftar sebagai pengguna sistem aplikasi e-CN seperti yang ditunjukkan dalam **Jadual 4.11**.

provide information in accordance with the sixth scheduled of Environmental Quality (Scheduled Wastes) Regulations, 2005. In 2012, e-CN version 2.0 was introduced to enable the notification of the generation of scheduled wastes and reporting of scheduled wastes inventory can be done through e-CN online system. In 2013, a total of 15,963 users have been registered as user of e-CN system as shown in **Table 4.11**.

**JADUAL 4.11 JAS : PERATUS PENGGUNAAN E-CONSIGNMENT NOTE OLEH PENGELUAR BUANGAN SEHINGGA 31 DISEMBER 2013**

**TABLE 4.11 DOE : PERCENTAGE OF E-CONSIGNMENT NOTE USED BY WASTE GENERATOR AS OF 31 DECEMBER 2013**

Bil / No.	Negeri / State	Bil. Premis / No. of Premise	Bil. Premis Daftar e-CN / No. of Premise Registered e-CN	Peratusan (%) / Percentage (%)
1	KEDAH	1061	1119	93.6
2	SABAH	699	1251	92.6
3	TERENGGANU	492	683	88.6
4	PULAU PINANG	1596	1663	88.1
5	SELANGOR	3593	3224	85.8
6	PERAK	2124	2330	84.5
7	KELANTAN	261	498	81.6
8	MELAKA	531	492	81.4
9	PAHANG	558	793	80.1
10	JOHOR	2907	2099	69.2
11	NEGERI SEMBILAN	553	422	69.1
12	W/P KUALA LUMPUR	713	687	67.9
13	PERLIS	120	135	53.3
14	SARAWAK	659	489	44.6
15	W/P LABUAN	171	78	40.9
JUMLAH		<b>16038</b>	<b>15963</b>	<b>79.6</b>

## PROGRAM PENCEGAHAN KEBAKARAN TANAH GAMBUT UNTUK MENGATASI JEREBU

### FIRE PREVENTION AND PEATLAND MANAGEMENT PROGRAMME



Pencegahan kebakaran dan pengurusan tanah gambut yang lestari adalah sangat penting bagi mencegah berlakunya pembakaran terbuka tanah gambut yang boleh menyebabkan jerebu setempat. Teknik sekatan saluran (check dam) dan telaga air tanah (tube well) telah dikenalpasti sebagai kaedah pengurusan air di tanah gambut yang berkesan untuk mencegah dan mengawal pembakaran terbuka.

Program ini dilaksanakan dengan semangat 1NRE yang melibatkan kerjasama erat pelbagai agensi yang bernaung di bawah Kementerian Sumber Asli dan Alam Sekitar (NRE) iaitu Jabatan Alam Sekitar (JAS), Jabatan Pengairan dan Saliran (JPS), Jabatan Mineral dan Geosains (JMG) serta Jabatan Perhutanan Semenanjung Malaysia (JPSM). Projek ini telah dilaksanakan di enam (6) buah negeri iaitu Johor, Pahang, Selangor, Kelantan, Sarawak dan Sabah.

Fire prevention and sustainable management of peatlands are critical in prevention of peatland fires which can cause localized haze. Construction of check dams and tube wells has been identified as an effective water management system in peatlands to prevent and control peatland fires.

This programme was implemented under the spirit of 1NRE enforcement that involves cooperation within key agencies under the Ministry of Natural Resource and Environment, which are Department of Environment (DOE), Department of Irrigation and Drainage (DID), Department of Minerals and Geoscience (MGD) and Forestry Department Peninsular Malaysia (FDPM). The project was implemented in six (6) states that have extensive fireprone

Projek ini merangkumi aktiviti-aktiviti seperti pembinaan sekatan saluran (check dam) berjumlah 137 buah iaitu Negeri Johor (54), Pahang (38), Sarawak (22), Selangor (8), Kelantan (11) dan Sabah (4). Di samping itu juga, sebanyak 39 buah telaga air tanah telah dibina iaitu Sarawak (10), Pahang (10), Johor (6), Kelantan (5), Sabah (5) dan Selangor(4). Manakala sebanyak 3 buah menara tinjau telah dibina setiap satu masing-masing di Selangor, Pahang dan Sarawak.

Program ini telah mendapat perhatian negara Brunei Darussalam apabila delegasi dari negara berkenaan yang diketuai oleh Menteri Pembangunan Brunei Darussalam, Yang Berhormat Pehin Orang Kaya Indera Pahlawan Dato Seri Setia Awang Haji Suyoi bin Haji Osman telah melakukan lawatan kerja ke tapak projek pada 18 Januari 2013 di Permyjaya, Miri, Sarawak. Lawatan kerja berkenaan adalah untuk berkongsi pengalaman dan kepakaran dalam memastikan kelestarian pengurusan tanah gambut terutamanya bagi mencegah kebakaran dan kejadian jerebu merentas sempadan.

Selain itu, Y.B. Menteri Sumber Asli dan Alam Sekitar telah mengadakan satu lawatan kerja di Pulau Kempas, Mukim Tanjung 12, Daerah Kuala Langat, Selangor pada 29 Jun 2013 yang merupakan salah satu kawasan projek yang telah menunjukkan keberkesannya dalam Program Pencegahan Kebakaran dan Pengurusan Tanah Gambut Mudah Terbakar di Malaysia.

peatland areas namely Johor, Pahang, Selangor, Kelantan, Sarawak and Sabah. The project involves activities such as the construction of 137 check dams i.e in Johor (54), Pahang (38), Sarawak (22), Selangor (8), Kelantan (11) and Sabah (4). In addition, a total of 39 tube wells were constructed i.e in Sarawak (10), Pahang (10), Johor (6), Kelantan (5), Sabah (5) and Selangor (4). Three (3) watch towers were constructed i.e each in the state of Selangor, Pahang and Sarawak.

This programme had been acknowledge by Brunei Darussalam whereby a delegation from Brunei Darussalam headed by The Honorable Minister of Development Brunei Darussalam, Yang Berhormat Pehin Orang Kaya Indera Pahlawan Dato Seri Setia Awang Haji Suyoi bin Haji Osman visited the project site in Permyjaya, Miri, Sarawak on 18 January 2013. The purpose of the visit was to share experience and expertise in sustainable peatlands management, particularly to prevent the occurrence of transboundary haze pollution.

The Honourable Minister of Natural Resources and Environment Malaysia also visited one of the project site namely in Pulau Kempas, Mukim Tanjung 12, Kuala Langat District, Selangor on 29 June 2013. This project site was acknowledged as one of the most successful project implementation in Fire Prevention and Peatland Management Programme.



**Sekatan saluran di Johan Setia, Klang, Selangor**  
Check dam in Johan Setia, Klang, Selangor



**Menara tinjau di Miri, Sarawak**  
Watch tower in Miri, Sarawak



**Telaga Air Tanah di Kuala Baram, Miri, Sarawak**  
Tube Well in Kuala Baram, Miri, Sarawak



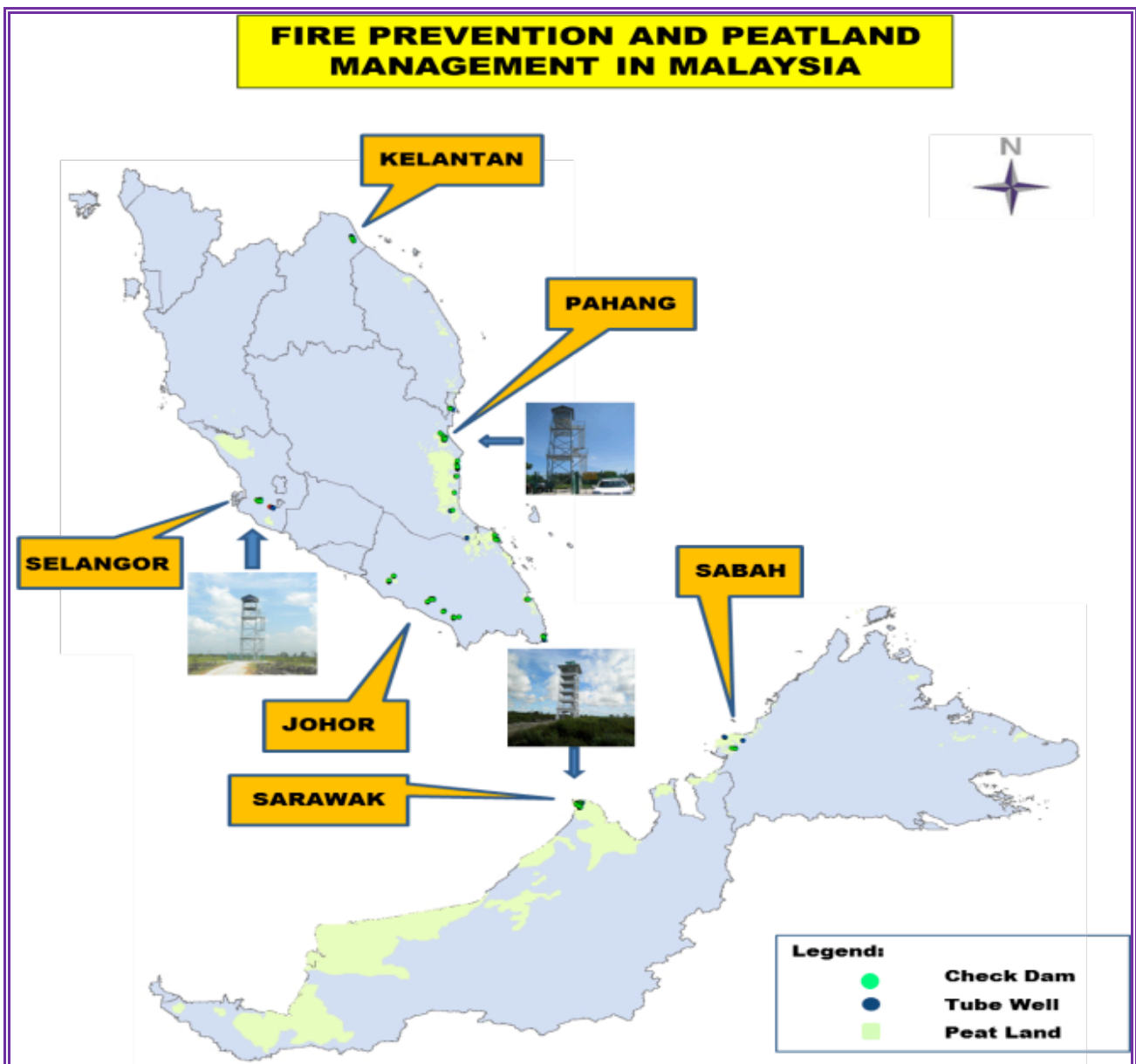
**Lawatan kerja Menteri Pembangunan Negara  
Brunei Darussalam ke Miri, Sarawak  
pada 8 Jan 2013**

**Working Visit by Minister of Development  
Brunei Darussalam in Miri, Sarawak on 8 Jan  
2013**



**Lawatan kerja Y.B Menteri Sumber Asli dan Alam  
Sekitar ke Tg. 12, Kuala Langat, Selangor pada  
29 Jun 2013**

**Working Visit by Minister of Natural Resources  
and Environment to Tg. 12, Kuala Langat,  
Selangor 29 Jun 2013**

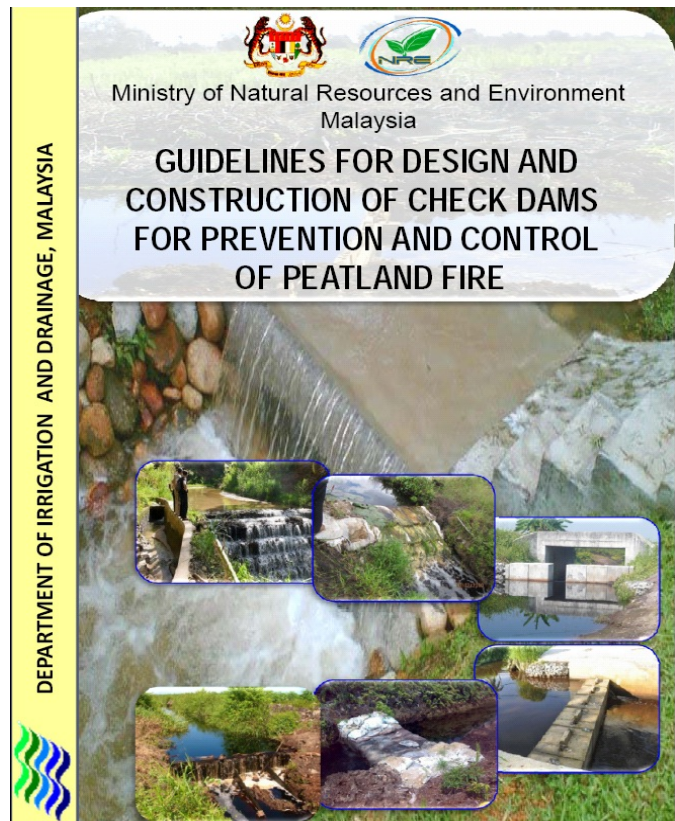


**Peta 4.5 Malaysia: Lokasi Pembinaan Infrastruktur di bawah Program Pencegahan Kebakaran dan Pengurusan Tanah Gambut Yang Sering Terbakar**

**Map 4.5 Malaysia: Location of Infrastructures constructed under the Peatland Fire Prevention and Management Programme**



**Prosedur Tetap Operasi (SOP) Bagi Melaksanakan Program Pencegahan Kebakaran di Tanah Gambut (kiri)**



**Garispanduan Bagi Reka Bentuk Sekatan Air untuk Mengawal dan Mengelakkan Kebakaran Tanah Gambut (kanan)**

**Standard Operating Procedure (SOP) for the implementation of Peatland Fire Prevention Program (left)**

**Guidelines For Design and Construction of Check Dams For Prevention and Control of Peatland Fire (Right)**

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



### Latarbelakang

Malaysia telah meratifikasi Konvensyen Vienna bagi Perlindungan Lapisan Ozon dan Protokol Montreal mengenai Bahan-bahan Pemusnah Lapisan Ozon pada 29 Ogos 1989. Sebagai negara Parti kepada Protokol Montreal, Malaysia telah memenuhi obligasi untuk menghentikan pengimportan klorofluorokarbon (CFC), halon dan karbon tetraklorida (CTC) mulai 1 Januari 2010. Manakala bahan pemusnah ozon seperti Metil Bromida akan dihapuskan pengimportan mulai 2015 dan penghapusan hidroklorofluorokarbon (HCFC) menjelang tahun 2030.

### Background

Malaysia ratified the Vienna Convention for the Protection of the Ozone Layer and the Montreal Protocol on Substances that Deplete the Ozone Layer on 29 August 1989. As a Party to the Montreal Protocol, Malaysia has complied with the obligation to stop importing chlorofluorocarbon (CFC), halon and carbon tetrachloride (CTC) as of 1 January 2010. Other ozone depleting substances such as methyl bromide will be phased out by 2015 while hydrochlorofluorocarbon (HCFC) by 2030.

## Pematuhan Terhadap Protokol Montreal

Bagi fasa seterusnya Malaysia perlu menghapuskan penggunaan HCFC secara berperingkat mulai 2013 sehingga dihapuskan sepenuhnya menjelang 2030 seperti yang telah ditetapkan di bawah Protokol Montreal. **Rajah 4.2** menunjukkan pengimportan HCFC pada tahun 2013 yang berjumlah 6,779 metrik tan. Bagi mencapai sasaran ini, Pelan Pengurusan Penghapusan HCFC (HPMP) telah digubal yang menggariskan polisi dan strategi jangka panjang untuk menghapuskan penggunaan HCFC mulai tahun 2012 hingga 2040. **Jadual 4.12** menunjukkan jadual strategi dan polisi dalam pelaksanaan HPMP. **Rajah 4.3** menunjukkan jadual penghapusan HCFC dalam mematuhi Protokol Montreal di mana HCFC akan dikurangkan sebanyak 10% menjelang 2015, 35% pada 2020, 67.5% pada 2025, 97.5% pada tahun 2030 (dengan 2.5% dihadkan kepada penggunaan untuk penyenggaraan sahaja) dan HCFC menjadi larangan mutlak pada tahun 2040.

Pada 1 Januari 2013, selaras dengan pengwartaan Perintah Kastam (Larangan Import) 2012 yang telah diwartakan pada 31 Disember 2012 dan berkuatkuasa pada 1 Januari 2013, Malaysia telah melaksanakan sistem kuota bagi mengimport HCFC oleh pengimport yang berdaftar dengan JAS. Permohonan permit kelulusan atau Approval Permit (AP) diproses melalui sistem atas talian, e-Permit mengikut agihan kuota HCFC yang diperuntukkan dengan garis dasar atau tahap pembekuan berjumlah

## Compliance to Montreal Protocol

Malaysia is obligated to phase out HCFC in stages by 2030 under the Montreal Protocol. **Figure 4.2** shows that the importation of HCFC in 2013 amounted to 6,779 metric tonnes. To meet the phase out target, the HCFC Phase-out Management Plan (HPMP) was formulated. The plan outlined policies and long term strategies for the phase-out of HCFC starting from 2012 until 2040. **Table 4.12** shows the policies and strategies of HPMP. **Figure 4.3** shows the HCFC phase out schedule for Malaysia whereby HCFC will be reduced by 10% in 2015, 35% in 2020, 67.5% in 2025, 97.5% by 2030 (2.5% is strictly for servicing sector) and subsequently total ban on HCFC will be imposed by 2040.

On 1 January 2013, Malaysia implemented the quota system for the importation of HCFC. Application for Approval Permit (AP) was processed by DOE through an online 'e-Permit' system within the quota given with the total amount of HCFC allocated according to baseline level or freeze limit of 515.8 ODPT (ozone depleting potential tonnes) or 7,900 metric tonnes

sebanyak 515.8 ODPT (Ozone Depleting Potential Tonnes) atau sebanyak 7,900 Metrik Tan.

Sistem atas talian, e-Permit telah diwujudkan untuk memproses dan seterusnya meluluskan permohonan import dan eksport HCFC. Sistem atas talian ini melibatkan jaringan di antara pengimport/pengesport berdaftar HCFC, Jabatan Alam Sekitar dan Sistem Maklumat Kastam (SMK), Jabatan Kastam DiRaja Malaysia. Sistem ini diwujudkan selaras dengan kehendak strategi HPMP iaitu pelaksanaan sistem Kelulusan Permit (AP) dan kuota bagi kawalan import HCFC. **Rajah 4.4** menunjukkan carta alir proses yang terlibat dalam permohonan kelulusan mengimport menggunakan e-Permit.

#### **Pelan Pengurusan Penghapusan HCFC (HPMP)**

Malaysia menerima bantuan kewangan sejumlah USD 9,587,470 dari Tabung Multilateral Protokol Montreal (MLF) bagi pelaksanaan polisi dan strategi yang digariskan dalam HPMP Peringkat 1 dan menjalankan projek penukaran teknologi bebas HCFC bagi 17 industri dari sektor pembuatan busa. Selain itu, projek-projek bantuan teknikal dalam sektor servis refrigeran juga dijalankan di bawah HPMP- Peringkat 1 termasuk latihan dan pembangunan modal insan bagi juruteknik dan pegawai penguatkuasaan. Sehingga 31 Disember 2013 sejumlah USD4,776,980.20 telah dibelanjakan untuk projek penukaran teknologi dalam sektor pembuatan busa. Sebuah syarikat panel berinsulasi busa di

This on-line system, e-Permit was developed to process and approve import and export of HCFC from registered importers and exporters. The on-line system is a linkage network between the HCFC importers/exporters, Department of Environment Malaysia and the Customs Information System of the Royal Customs of Malaysia. The establishment of this system is in line with the HPMP strategy on the implementation of Approved Permit (AP) and quota system for import of HCFC. **Figure 4.4** shows the process flowchart for the application of import permit using the e-Permit system.

#### **The HCFC Phase-out Management Plan (HPMP)**

Malaysia received funding assistance from the Multilateral Fund of the Montreal Protocol (MLF) amounting to USD9,587,470 to implement the policy and strategy outlined in the HPMP- Stage 1 including investment project to phase out HCFC in 17 industries in foam sector. In addition, technical assistance for refrigeration servicing sector including training and capacity building for technicians and enforcement officers was also carried out under the HPMP Stage 1. As of 31 December 2013, a total amount of USD 4,776,980.20 had been disbursed for projects in foam sector. A foam insulated panel company in Johor has commissioned the technology conversion using cyclopentane (hydrocarbon) as alternative to

Johor telah selesai menjalankan projek penukaran teknologi dari menggunakan HCFC 141b kepada cyclopentane (hidrokarbon) pada penghujung tahun 2013. Manakala 16 buah industri busa lain dijangka siap pelaksanaan projek penukaran teknologi bebas HCFC selewat-lewatnya pada akhir 2014.

Pelaksanaan keseluruhan projek di bawah HPMP Peringkat 1 dijangka selesai pada Disember 2016. Kejayaan pelaksanaan HPMP ini akan membolehkan pengurangan sebanyak 77.36 ODP tan penggunaan HCFC dan akan mengurangkan sebanyak 1.35 juta tan pelepasan langsung karbon dioksida (CO<sub>2</sub> equivalent) menjelang 2016.

### Pengurusan Halon

Halon tidak lagi digunakan bagi pemasangan baru sistem mengawal kebakaran dan alat-alat pemadam api di Malaysia. Sebaliknya, air, 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 Protokol Montreal. Pusat Bank Halon Kebangsaan yang dikelolakan oleh Jabatan Bomba dan Penyelamat telah berpindah dari Kuala Kubu Baru ke Bandar Baru Enstek, Negeri Sembilan. Sehingga tahun 2013 baki sebanyak 6,144 kg Halon 1211 dan 26,318.6 kg Halon 1301 disimpan di Pusat Bank Halon Kebangsaan. Penggunaan

HCFC 141b. Meanwhile, the other 16 foam industries are expected to commission their technology conversion projects by the end of 2014.

The overall projects under HPMP Stage 1 are expected to complete by December 2016. Upon successful completion of the HPMP Stage 1, there will be sustainable reduction of 77.36 ODP Tonnes of HCFC consumption which is equivalent to reduction of 1.35 million tonnes of CO<sub>2</sub>e, (carbon dioxide) direct emission annually from 2016.

### Halon Management

Halon is no longer used in Malaysia for new installation of fire protection systems 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. Halon Bank which is managed by the Fire and Rescue Department in Kuala Kubu Baru had been moved to Bandar Enstek, Sepang. A total of 6,144 kg Halon 1211 and 26,318.6 kg Halon 1301 were stored at the National Halon Bank Centre. Prior written approval from the Fire and Rescue Department of Malaysia is required for the use of alternatives to halon in any new fire fighting system.

sebarang sistem pencegahan kebakaran yang menggunakan alternatif kepada halon perlu mendapatkan kelulusan bertulis daripada Jabatan Bomba dan Penyelamat Malaysia terlebih dahulu sebelum sistem tersebut digunakan.

### **Persijilan Sektor Servis Refrigeran (RSS).**

Persijilan kepada juruteknik atau pengendali servis sektor refrigeran merupakan salah satu keperluan di dalam Peraturan – Peraturan Kualiti Alam Sekeliling (Pengurusan Refrigeran) 1999. Sektor servis refrigeran merupakan penyumbang utama kepada penggunaan HCFC dalam negara. Sehubungan itu, Jabatan Alam Sekitar melalui Pusat Latihan Bertauliah (ATC) yang terdiri dari institut latihan awam dan swasta menganjurkan siri latihan persijilan khusus kepada juruteknik sektor ini mengenai pematuhan terhadap Montreal Protocol. Penekanan terhadap tatacara dan kod etika yang betul di dalam pengendalian refrigeran diberikan dalam usaha untuk mengelakkan pelepasan refrigeran ke persekitaran kerana ianya menyumbang kepada penipisan lapisan ozon.

UNEP dengan kerjasama Jabatan Alam Sekitar Malaysia dan Jabatan Tenaga Rakyat Malaysia ini telah mengadakan satu bengkel bertajuk 'National Workshop for Master Trainers on Good Practices in the Refrigeration and Air Conditioning Servicing Sector telah diadakan pada 12-15 November

### **Certification on Refrigeration Service Sector**

Certification to technicians or to the person handling the refrigeration service sector is one of the requirements in the Environmental Quality Act (Refrigerant Management) 1999. The Department of Environment Malaysia together with the Authorized Training Centre (ATC) from the government and private training institutes have organized series of certification training for the technicians in this field. Emphasis on the methodologies and code of ethics in handling refrigerants were given in the training to avoid the service technicians from venting out the refrigerants into the atmosphere as these will deplete the ozone layer.

A National Workshop for Master Trainers on Good Practices in the Refrigeration and Air - Conditioning Servicing Sector was organized on 12-15 November 2013 at the Kepala Batas Industrial Training Institute (ILP), Pulau Pinang. The workshop was organized by UNEP in collaboration with Department of

2013 di Institut Latihan Perindustrian Kepala Batas, Pulau Pinang. Bengkel telah dihadiri oleh tiga puluh (36) peserta master trainer dari negara Bangladesh, Bhutan, Brunei, China, Cambodia, DPR Korea, India, Indonesia, Iran, Lao PDR, Maldives, Mongolia, Myanmar, Nepal, Pakistan, Filipina, Sri Lanka, Timor Leste, Thailand, Vietnam dan Malaysia.

Objektif bengkel ini diadakan adalah untuk bertukar pendapat dan pandangan tentang manual latihan sektor servis refrigeran kepada juruteknik yang telah disediakan oleh UNEP di mana manual ini akan diadaptasi dan digunapakai oleh setiap negara. Selain itu, peserta juga dapat berbincang tentang alternatif dan perkembangan pasaran sektor servis refrigeran.

### **Program dan Kempen Kesedaran**

Sambutan Hari Ozon Antarabangsa iaitu pada 16 September 2013 telah diadakan dengan tema "A Healthy Atmosphere, the Future We Want" atau 'Atmosfera Sihat, Masa Depan Yang Kita Mahu'. Perutusan khas YB. Menteri Sumber Asli dan Alam Sekitar telah diiklankan di akhbar Berita Minggu dan Sunday Times serta di laman web NRE dan Jabatan Alam Sekitar. Siri roadshow HPMP telah diadakan di 6 buah negeri dan majlis kemuncak sambutan diadakan di Hotel Everly, Putrajaya pada 30 September 2013. Majlis ini dirasmikan oleh YB Timbalan Menteri Sumber Asli dan Alam Sekitar, Dato' Sri James Dawos Mamit. Pada majlis sambutan tersebut tujuh (7) agensi Kerajaan dan tiga (3) badan bukan

Environment Malaysia and the Manpower Department Malaysia were attended by 36 participant from various countries such as Bangladesh, Bhutan, Brunei, China, Cambodia, DPR Korea, India, Indonesia, Iran, Lao PDR, Maldives, Mongolia, Myanmar, Nepal, Pakistan, Philippines, Sri Lanka, Timor Leste, Thailand, Vietnam and Malaysia.

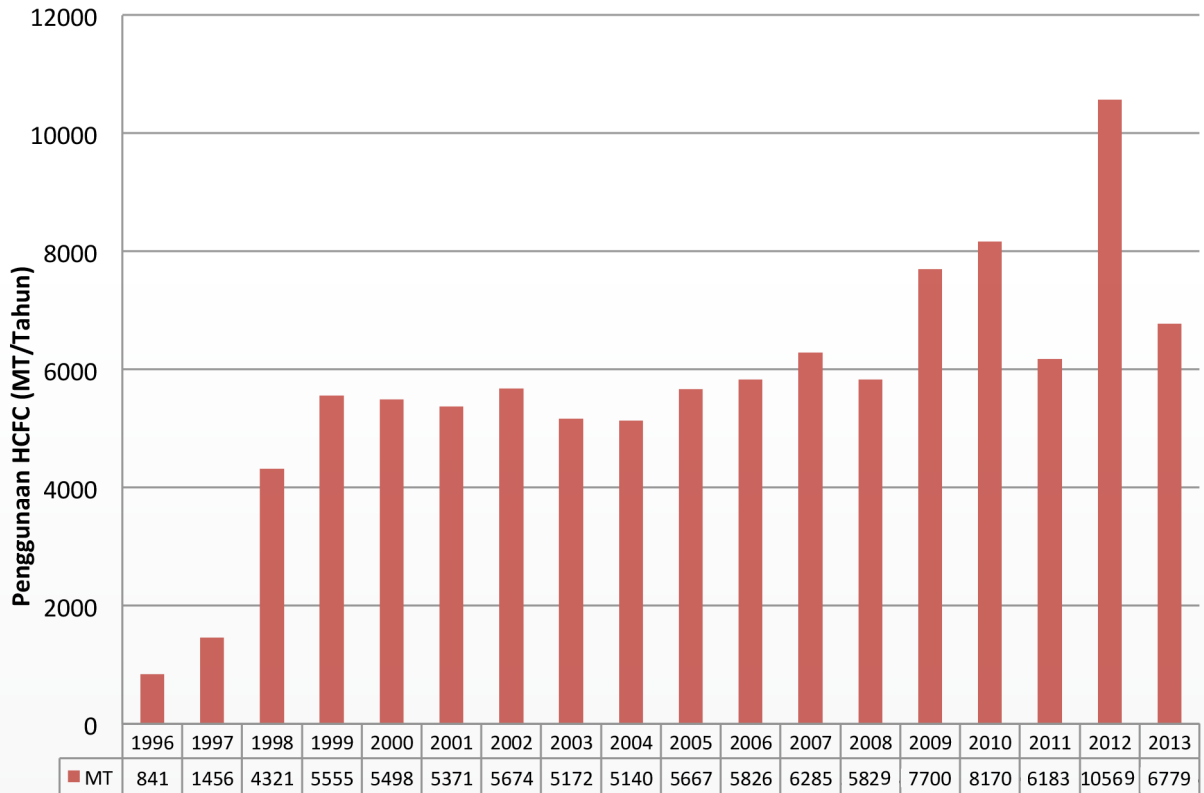
Objectives of the workshop were to exchange ideas and views on the technician's manual on the refrigeration service sector which was prepared by UNEP to be adopted and used by the participants countries. Participants also discussed on the available alternatives and market development relating to the refrigerant servicing sector.

### **Awareness Programme and Campaign**

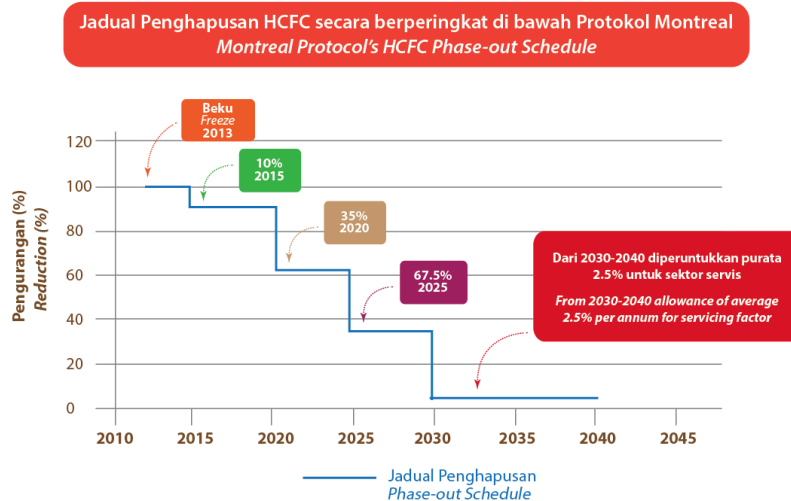
The International Ozone Day Celebration on 16 September 2013 was celebrated with the theme 'A Healthy Atmosphere, the Future We Want'. A message from the Minister of Natural Resources and Environment was published in the Sunday Times and Berita Harian as well as in the DOE websites. Series of Roadshows on HPMP were organized in 6 States. The Ozone Day Celebration was held at Everly Hotel, Putrajaya on 30 September graced by the Deputy Minister of Natural Resources and Environment, Dato' Sri James Dawos Mamit. Ozone Appreciations were conferred to 7 Government agencies and 3 NGOs who had contributed and rendered close cooperation in the successful implementation of Montreal Protocol

kerajaan telah diberi Penghargaan Ozon bagi menghargai sumbangan dan kerjasama mereka dalam mematuhi dan melaksanakan program di bawah Protokol Montreal di Malaysia. Antara penerima Penghargaan Ozon ialah Unit Perancang Ekonomi (EPU), JPM; Kementerian Perdagangan Antarabangsa dan Industri (MITI); Jabatan Kastam Di Raja; Jabatan Bomba dan Penyelamat; Jabatan Pertanian; Jabatan Perangkaan; Biro Farmasutikal Kebangsaan, Kementerian Kesihatan dan Akademi Kastam Diraja Malaysia (AKMAL) mewakili agensi Kerajaan. Manakala tiga (3) badan bukan kerajaan tersebut adalah Malaysia ASHRAE (MASHRAE), Persatuan Sistem Penyejukan dan Penyaman Udara Malaysia (Malaysian Air Conditioning and Refrigeration Association – MACRA) dan CETEC. Risalah-risalah mengenai perlindungan lapisan ozon, penghapusan bahan pemusnah lapisan ozon HCFC, HPMP dan sistem e-Permit serta Buletin Ozon diterbitkan untuk sebaran. Perincian program kesedaran yang dijalankan sepanjang tahun 2013, latihan dan mesyuarat antarabangsa serta serantau yang dihadiri JAS adalah seperti di **Jadual 4.13** dan **Jadual 4.14**.

in Malaysia. Pamphlets on ozone layer protection and HCFC phase-out, HPMP and e-Permit as well as the Ozone Bulletin were published and distributed. Details of awareness programmes carried out in 2013 are listed in **Table 4.13**. Meetings and trainings at regional and international levels attended by the DOE officers are listed in **Table 4.14**.

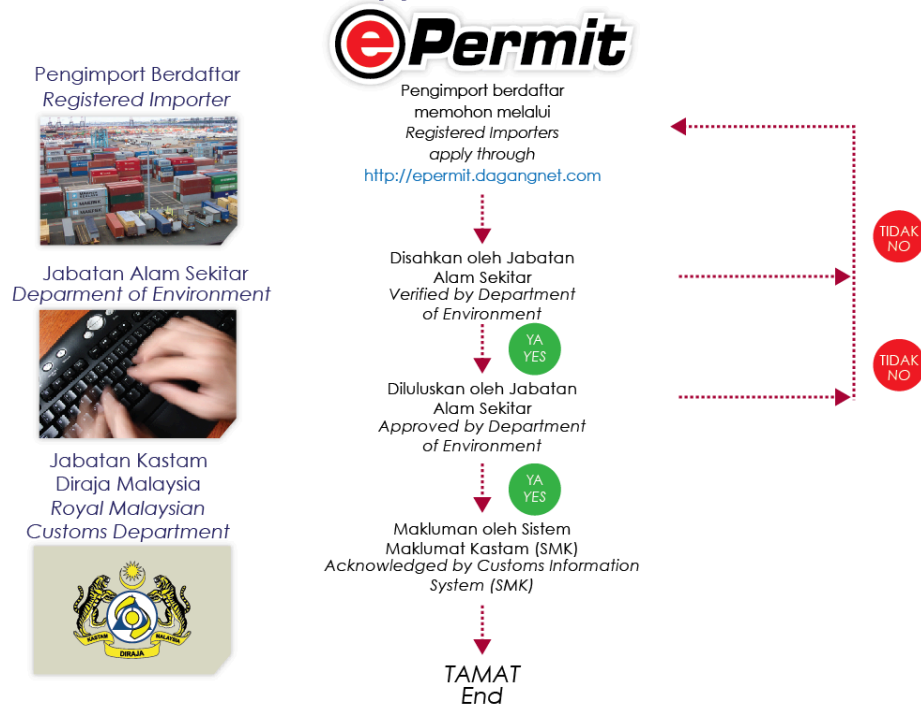


**Rajah 4.2 Malaysia :Tren Penggunaan HCFC, 1996-2013**  
**Figure 4.2 Malaysia : HCFC Consumption Trend, 1996-2013**



**Rajah 4.3 Malaysia: Jadual Penghapusan HCFC**  
**Figure 4.3 Malaysia: HCFC Phase Out Schedule Consumption in Malaysia**

## Proses permohonan e-Permit e-Permit Application Process



**Rajah 4.4 Malaysia : Carta alir sistem e-Permit bagi pengimportan HCFC**  
**Figure 4.4 Malaysia : Flowchart for e-Permit system on import of HCFC**

**JADUAL 4.12 JAS : POLISI DAN TINDAKAN PERUNDANGAN PELAN PENGURUSAN PENGHAPUSAN HCFC (HPMP) 2012-2040 /**

**TABLE 4.12 DOE : POLICIES AND REGULATORY ACTIONS OF HCFC PHASE OUT MANAGEMENT PLAN (HPMP) 2012-2040**

Tahun / Year	Polisi dan Tindakan Perundangan / Policies/ Regulatory Actions
2012	Mewujudkan sistem AP bagi pengagihan kuota import HCFC berdasarkan baseline atau purata import 2009/2010 /
	Establishment of AP for HCFC import quota based on National average consumption for 2009/2010
	Meminda perundangan sedia ada untuk mengawal penggunaan, import, pembuatan, pemasangan produk dan peralatan yang menggunakan HCFC /
	Amend existing legislation for control on the use, import, manufacture, assembly or installation of products and equipment using HCFCs
2013	Mewujudkan sistem perlesenan untuk mengeksport semula gas HCFC / Licence re-export of HCFC chemicals
	Pelaksanaan sistem AP pada 1 Januari 2013 mengikut Jadual Pembekuan Protokol Montreal /
	Implement Approved Permit (AP) system for HCFC import (by Jan 2013)
	Larangan menambah (expansion) atau membina fasiliti pembuatan baru menggunakan HCFC /
	Prohibit expansion of new manufacturing facilities using HCFCs
	Promosi menggunakan bahan alternatif melalui pemberian insentif /
	Promote the use of alternatives through incentives
Latihan dan Pensijilan bagi pekerja yang mengendalikan HCFC /	
	Undertake certification of skilled workers trained to handle HCFCs
2015	Larangan bagi membuat, memasang dan mengimport peralatan penyaman udara menggunakan HCFC yang berkuasa 2.5 hp dan ke bawah (untuk penggunaan dalam Malaysia) /
	Prohibit the manufacture, assembly and import of HCFC-based air-con equipment of 2.5hp and below (for use in Malaysia)
	Mewartakan HCFC sebagai bahan terkawal /
	Include HCFCs as restricted gas
	Larangan ke atas pengimportan polyol yang mengandungi HCFC /
	Prohibit import of pre-blended polyols with HCFCs
2020	Larangan membuat, memasang dan mengimport semua barangan dan peralatan yang menggunakan HCFC kecuali bagi penggunaan khas (essential use) /
	Prohibit the manufacture, assembly and import of all products and equipment using HCFCs (except for essential uses)
	Larangan menggunakan HCFC 141b sebagai agen pengembang /
	Prohibit the use of HCFC 141b as blowing agent
	Larangan pembuatan dan pemasangan baru sistem pemadam api yang menggunakan HCFC /
	Prohibit the use of HCFC in the manufacturing and installation of new fire extinguishing systems

**JADUAL 4.12 JAS : POLISI DAN TINDAKAN PERUNDANGAN PELAN PENGURUSAN PENGHAPUSAN HCFC (HPMP) 2012-2040 /**

**TABLE 4.12 DOE : POLICIES AND REGULATORY ACTIONS OF HCFC PHASE OUT MANAGEMENT PLAN (HPMP) 2012-2040**

Tahun / Year	Polisi dan Tindakan Perundangan / Policies/ Regulatory Actions
2025	Larangan pemasangan baru semua barangan dan peralatan yang menggunakan HCFC / No more new installation of products and equipment using HCFCs
2030	Pemberian AP terhad kepada 2.5% daripada jumlah baseline dan hanya untuk sektor servis sahaja / AP limited to 2.5% of baseline and for servicing use only
2040	Larangan mutlak pengimportan HCFC mulai 1 Januari 2040 / Total ban on the import and use of HCFCs.

**JADUAL 4.13 JAS: AKTIVITI-AKTIVITI KESEDARAN 2013**

**TABLE 4.13 DOE: AWARENESS ACTIVITIES 2013**

Tarikh / Date	Aktiviti & Program / Activities & Programmes	Tempat / Venue
19 Mac	Majlis Pelancaran e-Permit	Dewan Baiduri, NRE
2-6 Jun	Bengkel Latihan Kastam berkaitan Hidroklorofluorokarbon (HCFC) Anjuran Bersama Jabatan Alam Sekitar (JAS) dan Akademi Kastam DiRaja Malaysia (AKMAL)	AKMAL, Rantau Panjang
3 Sep	Roadshow HPMP Stage-1	Sutera Harbour Resort, Kota Kinabalu, Sabah
5 Sep	Roadshow HPMP Stage-1	Pullman Hotel, Kuching, Sarawak
18 Sep	Malaysia HCFC Phase-out Convention	Aloft Hotel, Kuala Lumpur
30 Sep	Majlis Sambutan Hari Ozon, Roadshow HPMP Stage-1 dan seminar 'Safety of Cylopentene' kepada industri penerima dana	Everly Hotel, Putrajaya
2 Oct	Roadshow HPMP Stage-1	Evergreen Laurel Hotel, Pulau Pinang
7 Oct	Roadshow HPMP Stage-1	TH Hotel, Kuala Terengganu
9 Oct	Roadshow HPMP Stage-1	Berjaya Waterfront Hotel, Johor
16-20 Dec	Bengkel Latihan Kastam berkaitan Hidroklorofluorokarbon (HCFC) Anjuran Bersama Jabatan Alam Sekitar (JAS) dan Akademi Kastam DiRaja Malaysia (AKMAL)	De Palma Hotel, Shah Alam

**JADUAL 4.14 JAS: MESYUARAT-MESYUARAT DAN LATIHAN PERINGKAT SERANTAU DAN ANTARABANGSA, 2013**

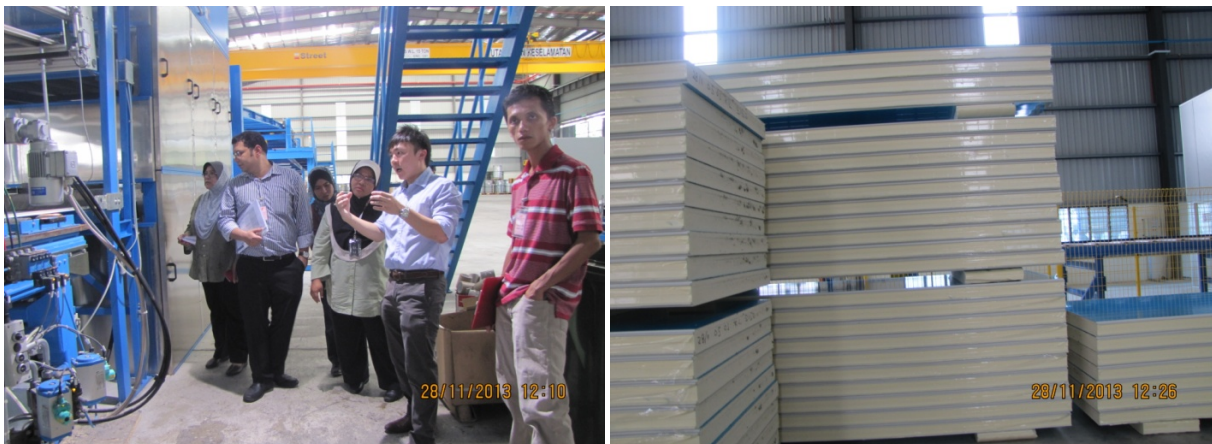
**TABLE 4.14 JAS: REGIONAL AND INTERNATIONAL MEETINGS AND TRAININGS, 2013**

Tarikh / Date	Aktiviti & Program / Activities & Programmes	Tempat / Venue
20 - 22 Feb	Regional Workshop on understanding links between ozone depletion and climate Change, AIBD, UNEP OzonAction	Kuala Lumpur, Malaysia
18 - 20 Feb	Study visit to ODS Destruction facility	Indonesia, Jakarta Indonesia
3 -14 Mac	Seminar On Ozone Layer Protection And Global Warming Countermeasures – Measure To Reduce The Controlled Substance Of The Montreal Protocol and Kyoto Protocol	Tokyo, Japan
15 - 19 Apr	The 69th Executive Committee of Multilateral Fund Meeting (ExCom)	Montreal, Canada
3 Mei	Jury for World TV Award 2013- Category Science/Environment on Creating Ozone Safety Generations	Kuala Lumpur, Malaysia
6-9 Mei	Joint Network meeting of ozone officers of Asia and the Pacific : Partnership on HCFC Phase-out in Asia and The Pacific	Gold Coast, Australia
24 - 28 Jun	The 33rd Open Ended Working Group Meeting (OEWG 33)	Bangkok, Thailand
29 - 30 Jun	Advance Ozone & Climate Protection Technologies : Next Step -Second International Conference	Bangkok, Thailand
1 - 5 Jul	The 70th Executive Committee of Multilateral Fund Meeting (ExCom)	Bangkok, Thailand
9 -12 Sep	Joint Meeting of South Asia (SA) and South East Asia Networks (SEAP) of Ozone Depleting Substance (ODS) Officer and Regional Workshop on Energy Efficiency and ODS Phase-out	Yinchuan,P.R China
21-25 Oct	The 25th Meeting of Parties to the Montreal Protocol	Bangkok, Thailand
6-9 Nov	4th Ozone Climate Technologies Roadshow and Industry Roundtable	Manila, Philippines
12-15 Nov	Regional Workshop for Master Trainers on Good Practices in the Refrigeration and Air-conditioning Servicing Sector	Kepala Batas, Penang
2-6 Dec	The 71st Executive Committee of Multilateral Fund Meeting (ExCom)	Montreal, Canada



Pada 18 Mac 2013, YBhg. Dato' Sri Ketua Setiausaha telah merasmikan sistem atas talian, 'e-Permit' HCFC semasa majlis perhimpunan Kementerian Sumber Asli dan Alam Sekitar.

The HCFC online 'e-Permit' system was officially launched during the Ministry of Natural Resources and Environment (NRE) assembly by The Hon. Secretary General of NRE on 18th of March 2013



Lawatan verifikasi dan pemantauan projek HPMP ke sebuah kilang pembuatan panel berinsulasi busa yang menerima dana bantuan Tabung Pelbagai Hala Protokol Montreal oleh pegawai Seksyen Perlindungan Ozon, JAS.

Site verification visit for monitoring of HPMP project by the officers from Ozone Protection Section, DOE to a foam insulated panel which is the recipient of Multilateral Fund of Montreal Protocol.



**Premis baru Bank Halon di Bandar Enstek, Negeri Sembilan yang dikendalikan oleh Jabatan Bomba dan Penyelamat Malaysia bagi menggantikan premis lama di Kuala Kubu Bharu**

**New premise of Halon Bank in Bandar Enstek, Negeri Sembilan run by the Fire Rescue Department of Malaysia to substitute the old premise in Kuala Kubu Bharu**



**Bengkel National Master Trainer on Good Environmental Practices for Refrigeration and Air Conditioning (RAC) Servicing Sector anjuran United Nation Environment Program (UNEP) dengan kerjasama Jabatan Alam Sekitar Malaysia dan Jabatan Tenaga Malaysia diadakan pada 12-15 November 2013 di Institut Latihan Perindustrian (ILP), Kepala Batas, Pulau Pinang yang dihadiri oleh 36 Master Trainer dari jaringan negara Asia Pasifik dan Negara-Negara Selatan**

**National Workshop for Master Trainer on Good Environmental Practices for Refrigeration and Air Conditioning (RAC) Servicing Sector organised by United Nation Environment Program (UNEP) in collaboration with Department of Environment, Malaysia and the Man Power Department, Malaysia was held from 12-15 November 2013 at Industrial Training Institute (ILP), Kepala Batas, Penang, attended by 36 master trainers/participants from the regional network of Asia Pacific and South-South**



**Sesi latihan 'hands on' semasa National Workshop for Master Trainer on Good Environmental Practices for Refrigeration and Air Conditioning (RAC) Servicing Sector**

**Hands-on session during the National Workshop for Master Trainer on Good Environmental Practices for Refrigeration and Air Conditioning (RAC) Servicing Sector**



**Majlis Sambutan Hari Ozon dan Penghargaan Ozon kepada Agensi dan Badan Bukan Kerajaan Terbabit pada 30 September 2013 di Hotel Everly, Putrajaya**  
**Ozone Day Celebration and Ozone Award to the Relevant Agencies and NGOs on 30th September 2013 at Everly Hotel, Putrajaya**



**Delegasi Malaysia di Mesyuarat Parti kepada Protokol Montreal ke -25 di Bangkok, Thailand**  
Malaysian Delegates at the 25th Meeting of Parties to the Montreal Protocol, Bangkok, Thailand

## PENGUATKUASAAN TERHADAP AKTIVITI PEMBAKARAN TERBUKA ENFORCEMENT AGAINST OPEN BURNING ACTIVITIES



Kes pembakaran terbuka dikesan melalui operasi rondaan mencegah pembakaran terbuka yang dilaksanakan oleh JAS Negeri di kawasan-kawasan yang dikenalpasti sebagai kawasan yang berisiko berlaku kebakaran dan sering menerima aduan daripada orang awam. Di samping itu maklumat hotspots juga diperolehi melalui satelit yang dipantau dan dilaporkan oleh ASEAN Specialised Meteorological Centre (ASMC). Pada tahun 2013 sebanyak 3,089 kes hotspots di seluruh negara telah dilaporkan melalui satelit (**Jadual 4.15**).

Sebanyak 4,611 kes pembakaran terbuka telah dikesan pada tahun 2013 (**Jadual 4.16 & Jadual 4.17**) dan dilaporkan oleh setiap JAS Negeri melalui Sistem e-KAS (Modul Pembakaran Terbuka dan Modul Aduan). Kejadian pembakaran terbuka yang utama sering berlaku adalah di kawasan yang dikategorikan sebagai lain-lain (1,307),

Open burning cases were detected during daily ground surveillance conducted by DOE State Offices especially at fire-prone areas, which have frequent public complaints and also through hotspots detected via satellites reported by the ASEAN Specialised Meteorological Centre (ASMC). Throughout the year 2013, a total of 3,089 hotspots were detected via satellites (**Table 4.15**).

A total 4,611 open burning cases detected in 2013 and these cases were reported in e-KAS reporting system (Open Burning Module and Complaint Module) by the DOE state offices (**Table 4.15 & Table 4.16**). Cases of open burning recorded are mainly from activities such as burning of garbage in residential area, garbage burning by

pertanian (858), hutan (739) dan belukar (640) terutamanya semasa cuaca panas dan kering iaitu pada bulan Jun (952), Julai (595), Ogos (491) dan September (265). Kes-kes pembakaran terbuka yang termasuk dalam kategori lain-lain antaranya adalah pembakaran sampah sarap di kawasan perumahan, pembakaran sampah sarap di tepi bahu jalan dan pembakaran untuk aktiviti keagamaan atau penyembahan. Daripada 4,611 kes pembakaran terbuka tersebut, 577 kes telah dikompaun dengan jumlah kompaun yang dikutip ialah sebanyak RM673,452.00.

### **Pengawasan Melalui Udara**

Program pengawasan melalui udara pada tahun 2013 diteruskan di bawah peruntukan khas yang diluluskan oleh Kabinet. Program ini bermula pada bulan Julai 2013 sehingga Disember 2013. Program Pengawasan Hutan Melalui Udara yang diluluskan pada tahun ini adalah memberi fokus kepada kes-kes penerokaan hutan secara haram, aktiviti pembakaran terbuka, pelepasan dari industri, pencemaran pantai dan laut. Maklumat mengenai kejadian pencemaran alam sekitar yang diperolehi melalui pengawasan dari udara ini disalurkan terus ke bilik operasi JAS untuk diambil tindakan penguatkuasaan oleh pegawai penguatkuasa di lapangan.

Sepanjang program ini, sebanyak 84 bilangan penerbangan yang melibatkan kos peruntukan sebanyak RM1,215,383.42 telah berjaya dilaksanakan.

roadside and the burning of any article as part of religious rites or worshipping activities (categorized as other activities) (1,307), agriculture areas (858), forests (739), and bushes (640) that normally occurred during the hot and dry period in the months of June (952), July (595), August (491) and September (265). Out of 4,611 open burning cases detected, 577 cases were issued compounds amounting to RM673,452.00.

### **Aerial Surveillance**

Aerial surveillance programme has been implemented in 2013 under special budget approved by the Cabinet. This programme started in July 2013 until December 2013. The surveillance mainly focus on illegal clearing of forest, open burning activities, emission from industries, coastal and marine pollution surveillance. Information on the environmental pollution activities detected from the aerial surveillance would be informed directly to the DOE operation room for immediate follow up actions by the ground surveillance staff.

A total of 84 flights has been carried out successfully with budget amounting to RM1,215,383.42.

JADUAL 4.15 JAS : BILANGAN KES HOTSPOTS MENGIKUT NEGERI, 2013

TABLE 4.15 DOE: NUMBER OF HOTSPOTS BY STATES, 2013

Negeri/ State	Bulan/ Month												Jumlah/ Total
	Jan / Jan	Feb/ Feb	Mac/ March	Apr/ Apr	Mei/ May	Jun/ June	Jul/ July	Ogos/ Aug	Sep/ Sept	Oct/ Oct	Nov/ Nov	Dis/ Dec	
Johor	6	6	56	9	4	26	25	5	9	12	7	0	165
Kedah	11	18	41	2	9	10	11	4	2	2	0	0	110
Kelantan	4	6	89	2	19	22	11	4	9	10	4	0	180
Melaka	0	0	3	1	1	4	0	0	2	1	0	0	12
Negeri Sembilan	0	7	18	4	5	6	4	3	4	5	5	1	62
Pahang	10	25	148	31	36	78	51	42	31	29	10	1	492
Perak	10	10	53	5	12	13	20	5	3	1	0	3	135
Perlis	2	5	7	0	0	1	2	1	0	0	0	0	18
Pulau Pinang	4	1	13	0	4	1	6	1	0	0	0	0	30
Sabah	5	24	62	10	13	22	30	56	26	13	9	21	291
Sarawak	65	54	166	49	114	379	119	215	101	79	21	16	1378
Selangor	0	13	32	9	12	18	5	6	3	7	0	0	105
Terengganu	0	1	63	7	8	12	1	4	7	4	3	0	110
W.P.K.L./Putrajaya	0	0	1	0	0	0	0	0	0	0	0	0	1
W.P. Labuan	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Jumlah/ Total</b>	<b>117</b>	<b>170</b>	<b>752</b>	<b>129</b>	<b>237</b>	<b>591</b>	<b>285</b>	<b>345</b>	<b>197</b>	<b>163</b>	<b>59</b>	<b>42</b>	<b>3,089</b>
Jumlah Keseluruhan/ Total 3,089													

JADUAL 4.16 JAS: BILANGAN KES PEMBAKARAN TERBUKA MENGIKUT NEGERI, 2013

TABLE 4.16 DOE: NUMBER OF OPEN BURNING CASES BY STATES, 2013

Negeri / State	Kategori/Category							
	Ladang/ Plantation	Pertanian / Agriculture	Belukar / Bushes	Hutan / forest	Tapak Pembinaan / Construction	Tapak Pelupusan / Disposal	Industri / Industry	Lain-lain / Others
Johor	55	33	33	40	18	9	15	81
Kedah	16	31	29	37	6	3	6	47
Kelantan	38	32	17	88	8	8	16	35
Melaka	17	6	11	3	14	3	0	73
Negeri Sembilan	28	6	17	25	7	9	1	129
Pahang	148	45	107	183	11	5	19	39
Perak	26	45	27	37	30	14	5	38
Perlis	7	12	6	1	8	2	0	10
Pulau Pinang	3	13	11	9	18	12	1	141
Sabah	55	158	20	8	11	4	0	49
Sarawak	151	412	232	230	1	1	6	20
Selangor	39	50	56	51	35	81	7	518
Terengganu	53	9	66	26	3	4	6	52
WP K. Lumpur	0	6	7	1	6	16	0	73
WP Labuan	0	0	1	0	1	1	0	2
<b>Jumlah/Total</b>	<b>636</b>	<b>858</b>	<b>640</b>	<b>739</b>	<b>177</b>	<b>172</b>	<b>82</b>	<b>1,307</b>
Jumlah Keseluruhan/ Total :4,611								

**JADUAL 4.17 JAS: BILANGAN KES PEMBAKARAN TERBUKA BULANAN, 2013****TABLE 4.17 DOE: NUMBER OF OPEN BURNING CASES BY MONTH, 2013**

Bulan / Month	Kategori/Category							
	Ladang/ Plantation	Pertanian / Agriculture	Belukar / Bushes	Hutan / Forest	Tapak Pembinaan / Construction Sites	Tapak Pelupusan / Disposal Sites	Industri / Industry	Lain-lain / Others
Januari/January	23	64	18	25	13	10	10	79
Februari/February	20	76	25	37	8	8	5	39
Mac/ March	175	165	101	181	31	24	17	123
April/April	39	27	39	37	16	19	16	98
Mei/May	58	54	55	67	11	7	8	94
Jun/June	143	148	173	135	23	31	12	287
Julai/July	59	93	89	89	27	23	3	212
Ogos/August	57	148	57	77	14	23	4	111
September/September	31	41	44	49	10	15	1	74
Oktober/October	17	31	23	25	7	10	3	81
November/November	13	5	6	13	10	2	3	47
Disember/December	1	6	10	4	7	0	0	62
<b>Jumlah/Total</b>	636	858	640	739	177	172	82	1,307
<b>Jumlah Keseluruhan/Total :4,611</b>								

## RANCANGAN KONTINGENSI KEBANGSAAN KAWALAN TUMPAHAN MINYAK NATIONAL OIL SPILL CONTINGENCY PLAN



Rancangan Kontingensi Kebangsaan Kawalan Tumpahan Minyak (RKKKTM) merupakan pelan kontingensi yang menyediakan garis panduan bagi menghadapi kejadian tumpahan minyak yang berlaku di perairan Malaysia. RKKKTM ditadbir oleh Jawatankuasa Kebangsaan Kawalan Tumpahan Minyak (JKKTM) yang dianggotai oleh lapan belas (18) Jabatan dan agensi, dan dipengerusikan oleh Ketua Pengarah Jabatan Alam Sekitar Malaysia. Kesiapsiagaan kawalan tumpahan minyak adalah melalui peralatan mengawal tumpahan minyak yang ditempatkan di lokasi-lokasi strategik seperti **Peta 4.6**. Jabatan Alam Sekitar (JAS) juga memberi penekanan terhadap latihan-latihan berstruktur dan berkala bagi semua kakitangan yang terlibat dalam tindakbalas Kontingensi Tumpahan Minyak (KTM). Latihan-latihan berkenaan adalah bagi memastikan semua kakitangan JAS dan

The National Oil Spill Contingency Plan (NOSCP) is a contingency plan which provides guidelines to address oil spill incident in Malaysian waters. NOSCP is administered by the National Oil Spill Control Committee (NOSCC) consisting of eighteen (18) member departments and agencies, chaired by the Director General of Department of Environment Malaysia (DOE). Oil spill control preparedness is executed by positioning the Oil Spill Response Equipment (OSRE) at strategic locations as shown in **Map 4.6**. 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 necessary knowledge and skills in equipment handling and crisis management. Resolution 7 of the International Convention on Oil Spill Preparedness and Response (OPRC) 1990 outlined with regards the

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 (OPRC) 1990 telah menggariskan komitmen di peringkat Antarabangsa dalam hal-ehwal berhubung dengan latihan. Keperluan latihan ini telah dimasukkan ke dalam mekanisma tindakbalas RKKKTM.

Di sepanjang tahun 2013, sebanyak 16 aktiviti berkaitan dengan tumpahan minyak telah dianjurkan/ dihadiri oleh pegawai-pegawai JAS bagi tujuan peningkatan kemahiran dan perkongsian kepakaran dalam usaha melawan tumpahan minyak di perairan Malaysia.

Antara aktiviti tersebut ialah:

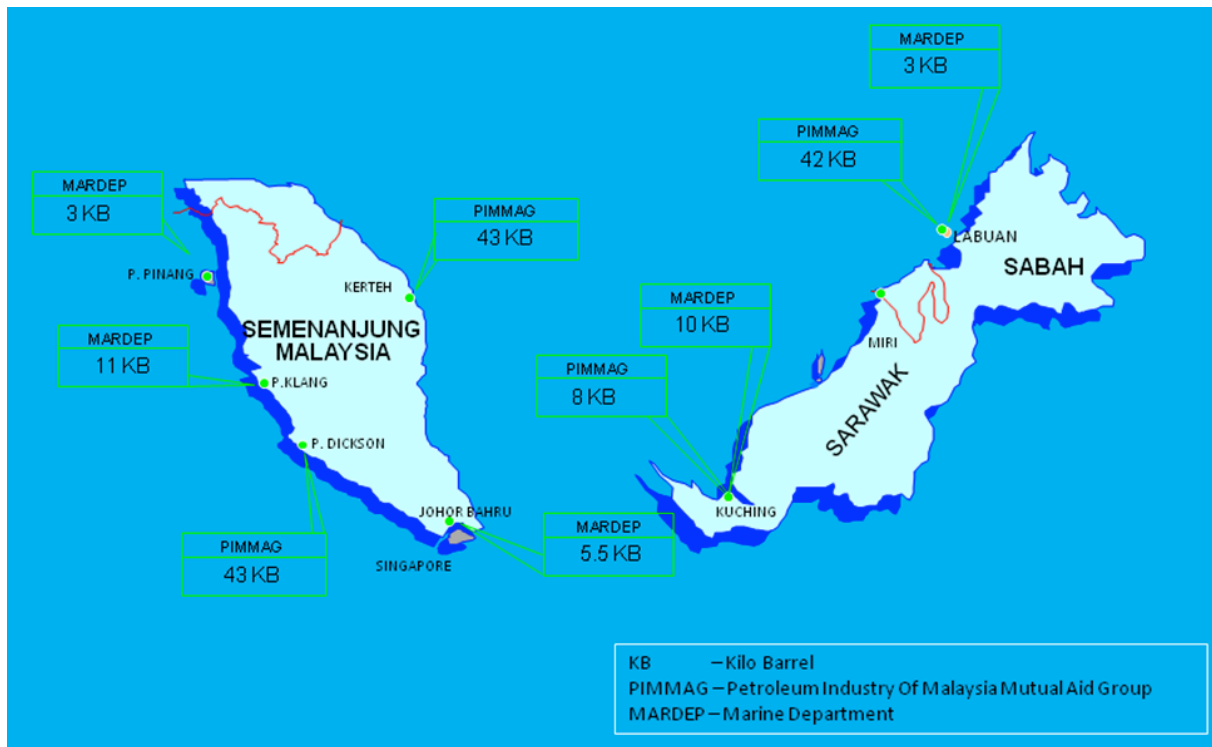
i.	Latihan Pembersihan Pantai di bawah 13 buah negeri.
ii.	Bengkel Latihan Analisis Teknik Pembersihan Pantai (SCAT) Akibat Pencemaran Minyak Untuk Pegawai-Pegawai Jabatan Alam Sekitar, 17-21 Jun 2013 di Lexis, Port Dickson.
iii.	Mesyuarat Jawatankuasa Kebangsaan Kawalan Tumpahan Minyak (JKKTM) yang melibatkan 18 agensi kerajaan dan swasta di bawah RKKKTM.
iv.	Mesyuarat Kerjasama Hubungan Dua-Hala Jabatan Alam Sekitar dan Jabatan Laut yang dipengerusikan bersama Ketua Pengarah Jabatan Alam Sekitar dan Ketua Pengarah Jabatan Laut.

International Commitment to training and site check preparedness. This preparedness and training requirement has been incorporated into our NOSCP response system.

Throughout 2013, a total of 16 activities related to oil spill were organized/ attended by DOE officers for capacity building and sharing of expertise in combating oil spills in Malaysian waters.

The activities are:

i.	Beach Clean-Up Exercise in 13 states.
ii.	Shoreline Clean-Up Assessment Technique (SCAT) Exercise Workshop for Department of Environment Officers, 17th – 21st June 2013 in Lexis, Port Dickson
iii.	National Oil Spill Control Committee (NOSCC) Meeting which involved 18 government and private agencies under the NOSCP.
iv.	Department of Environment and Marine Department Two-Way Partnership Cooperation Meeting chaired by Director General Department of Environment and Director General of Marine Department.



**Peta 4.6: Malaysia: Lokasi Peralatan Melawan Tumpahan Minyak Dan Keupayaan Di Malaysia, 2013.**

**Map 4.6: Malaysia: Location Of Oil Spill Equipment Stockpile And Capability In Malaysia, 2013.**



**Bengkel Latihan Analisis Teknik Pembersihan Pantai (SCAT) Akibat Pencemaran Minyak Untuk Pegawai-Pegawai Jabatan Alam Sekitar, 17-21 Jun 2013 di Lexis, Port Dickson.**

**Shoreline Clean-Up Assessment Technique (SCAT) Exercise Workshop for Department of Environment Officers, 17th – 21st June 2013 in Lexis, Port Dickson.**

## JAWATANKUASA TABUNG PUSINGAN BAGI SELAT MELAKA DAN SELAT SINGAPURA (RFC)

### STRAITS OF MALACCA AND SINGAPORE REVOLVING FUND COMMITTEE (RFC)

Tabung RFC ini telah ditubuhkan pada 11 Februari 1981 bagi tujuan menangani kejadian tumpahan minyak dari kapal-kapal yang melalui Selat Melaka dan Selat Singapura

Pengurusan Tabung ini adalah diurus secara bergilir-gilir dikalangan tiga (3) buah negara iaitu Malaysia, Singapura dan Indonesia bagi tempoh lima (5) tahun setiap giliran. Pada tahun 2011, pengurusan tabung ini ditadbir oleh Directorate General Sea Transportation di bawah Kementerian Pengangkutan negara Indonesia untuk tempoh lima (5) tahun.

Di antara aktiviti yang dilaksanakan oleh Jawatankuasa Tabung Pusingan pada tahun 2013 adalah seperti berikut:

- i. Mesyuarat Teknikal Jawatankuasa Tabung Pusingan telah berlangsung di Jakarta pada 6 hingga 7 Mac 2013.
- ii. Mesyuarat Pengurusan Jawatankuasa Tabung Pusingan ke-33 telah diadakan di Manado, Indonesia pada 26 hingga 28 Mei 2013.

RFC Fund was established on February 11, 1981 for the purpose of combating oil spills from ships passing through the Straits of Malacca and Singapore.

The Fund is administered on a rotation basis among the three (3) countries, namely Malaysia, Singapore and Indonesia for a period of five (5) years each. In 2011, the fund is administered by Directorate General Sea Transportation under Ministry of Transportation, Indonesia for duration of five (5) years.

Among the activities carried out by the RFC in the year 2013 are:

- i. RFC Technical Meeting convened in Jakarta on 6<sup>th</sup> to 7<sup>th</sup> March 2013.
- ii. 33rd Revolving Fund Committee Management Meeting was held in Jakarta, Indonesia from 26<sup>th</sup> to 28<sup>th</sup> May 2013.

iii. Tiga (3) orang peserta masing-masing dari Malaysia, Singapura dan Indonesia telah dibiayai ke “Regional Marine Pollution Exercise 2013 (Regional MARPOLEX 2013)” di Makassar, Indonesia pada 25 hingga 27 Jun 2013

iii. Three (3) participants from Malaysia, Singapore and Indonesia respectively were sponsored to the Regional Marine Pollution Exercise 2013 (Regional MARPOLEX 2013)” in Makassar, Indonesia from 25th to 27th June 2013.



**Mesuarat Pengurusan Jawatankuasa Tabung Pusingan Ke-33 di Manado, Indonesia pada 26 - 28 Mei 2013**

**33rd Revolving Fund Committee Management meeting in Manado, Indonesia from 26 - 28 May 2013**



**Mesyuarat Teknikal Jawatankuasa Tabung Pusingan di Jakarta pada 6-7 Mac 2013.**

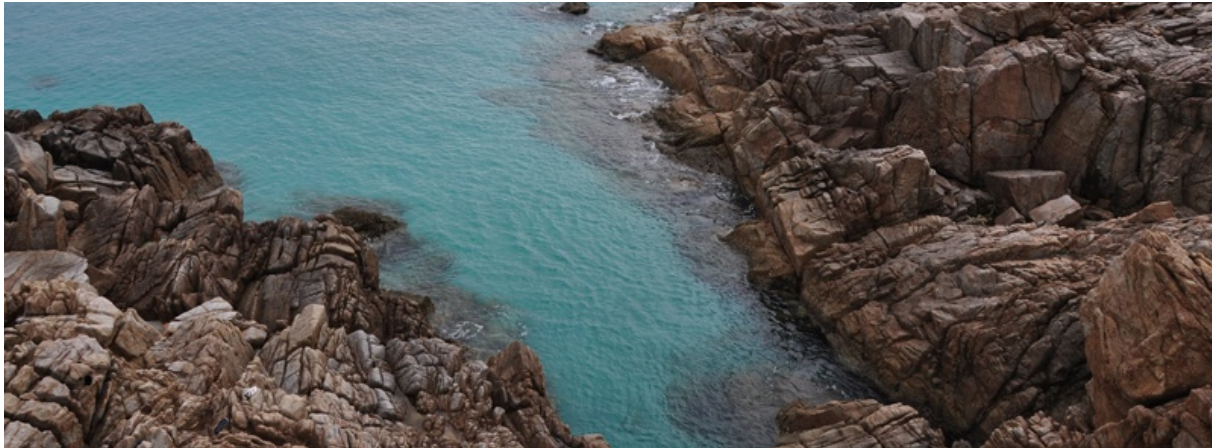
**RFC Technical Meeting convened in Jakarta on 6-7 March 2013.**

**JADUAL 4.17(A): MESYUARAT DAN LATIHAN PERINGKAT SERANTAU DAN ANTARABANGSA, 2013**

**TABLE 4.17(A): REGIONAL AND INTERNATIONAL MEETINGS AND TRAININGS, 2013**

<b>Tarikh Date</b>	<b>Aktiviti &amp; Program Activities &amp; Programmes</b>	<b>Tempat Venue</b>
27- 28 Feb 2013	BOBLME Technical Working Group	Phuket, Thailand
6-7 Mar 2013	Revolving Fund Committee Technical Meeting	Jakarta, Indonesia
20-21 Mar 2013	The 4th BOBLME Project Steering Committee Meeting	Chennai, India
26 Mar 2013	Intergovernmental Meeting (IGM) of The Coordinating Body on The Sea of East Asia (COBSEA)	Bangkok, Thailand
21-22 May 2013	The Fourteenth Meeting of the Asean Working Group On Coastal and Marine Environment (AWGCME)	Sihanoukville, Cambodia
26-28 May 2013	33rd Revolving Fund Committee Meeting	Manado, Indonesia
25-27 June 2013	Regional Marine Pollution Exercise (MARPOLEX)	Makassar, Indonesia
10-11 Dec 2013	Regional Concluding Workshop of the COBSEA Yeosu Project on Addressing the Challenge of Sea-Level Rise and Coastal Erosion in the East Asian Seas	Pattaya, Thailand

## PENCEMARAN MARIN MARINE POLLUTION



Sepanjang tahun 2013, sejumlah 13 kes aduan pencemaran tumpahan minyak yang diterima iaitu lima (5) kes berlaku di Laut China Selatan, empat (4) kes dikesan di Selat Melaka dan empat (4) kes di Selat Johor (**Jadual 4.18**). Semua kes aduan yang telah disiasat, bagaimanapun tidak memerlukan tindakan mahkamah.

Throughout 2013, there were 13 cases of marine pollution from oil spills were reported; five (5) cases in the South China Sea, four (4) in the Straits of Malacca and four (4) in the Johor Straits (**Table 4.18**). Investigation to all the cases shows that there is no legal action required.

**JADUAL 4.18 JAS : KEJADIAN PENCEMARAN MINYAK, 2013**  
**TABLE 4.18 DOE : OIL POLLUTION INCIDENTS, 2013**

Lokasi/ Location	Kawasan/ Area	Bil. Kes/ No. of Cases	Negeri/ State	
Laut China Selatan / South China Sea	Perairan Malaysia Malaysia Territory	Semenanjung / Peninsular	Johor; Terengganu	
		Malaysia Timur/ East Malaysia	Sabah; Sarawak; Labuan	
	Zon Ekonomi Eksklusif (EEZ) / Exclusive Economic Zone (EEZ)	0	-	
Laut Sulu / Sulu Sea	Perairan Malaysia Malaysia Territory	Sabah	0	-
Selat Melaka / Straits of Malacca	Perairan Malaysia / Malaysia Territory		4	Kedah; Melaka(2); Perak
	Zon Ekonomi Eksklusif (EEZ)/ Exclusive Economic Zone (EEZ)		0	-
Selat Johor / Straits of Johor	Perairan Malaysia / Malaysia Territory	Bahagian Barat/ West Part	1	Johor
		Bahagian Timur / East Part	3	Johor
<b>Jumlah/Total</b>			<b>13</b>	

## PENGURUSAN BUANGAN TERJADUAL SCHEDULED WASTE MANAGEMENT



### Kebenaran Bertulis dan Lesen Premis Yang Ditetapkan

Sebanyak 71 Kebenaran Bertulis telah dikeluarkan oleh Ketua Pengarah untuk pembinaan kemudahan pemerolehan kembali, pengolahan dan pelupusan buangan terjadual pada tahun 2013. Kebenaran Bertulis berkenaan telah dikeluarkan untuk 1 penunu buangan terjadual, 33 kemudahan pemerolehan kembali (bukan e-waste), 5 kemudahan pemerolehan kembali penuh (e-waste), 29 kemudahan pemerolehan kembali separa (e-waste), dan 3 kemudahan penstoran luar tapak (**Jadual 4.19**).

Di samping itu, sejumlah 419 lesen telah dikeluarkan kepada kemudahan baru dan

### Written Permission and Licences for Prescribed Premises

In 2013, a total of 71 Written Permissions were issued by the Director General for the construction of recovery, treatment and disposal facility for scheduled wastes, one (1) scheduled waste incinerator, 33 off-site recovery plants (non e-waste), 5 off-site full recovery plants (e-waste), 29 off-site partial recovery plants (e-waste), and 3 off-site storage facilities (**Table 4.19**).

In addition, a total number of 419 licenses were issued for both existing and new facilities in 2013 which consists of 176

sediada pada tahun 2013 yang terdiri daripada 176 kemudahan pemerolehan kembali luar tapak (bukan e-waste), 35 kemudahan pemerolehan kembali luar tapak (penuh e-waste), 118 kemudahan pemerolehan kembali luar tapak (separa e-waste), 39 kemudahan penunu buangan terjadual, 2 kemudahan pengolahan di tanah, 4 kemudahan pengolahan luar tapak, 6 kemudahan tapak pelupusan selamat, dan 39 kemudahan penstoran luar tapak. Sejumlah 360 lesen dikeluarkan untuk pembawa yang ditetapkan. (Jadual 4.20).

licenses for off-site recovery (non e-waste), 35 licenses for off-site full recovery plants (e-waste), 118 licenses for off-site partial recovery plants (e-waste), 39 licenses for scheduled wastes incinerators, 2 licenses for land treatment facilities, 4 licenses for off-site treatment, 6 licenses for secured landfills and 39 licenses for off-site storage facilities. A total of 360 licenses were issued for prescribed conveyance (Table 4.20).

**JADUAL 4.19 JAS: KEBENARAN BERTULIS (KB) YANG DIKELUARKAN OLEH JAS NEGERI BAGI KEMUDAHAN PEMEROLEHAN KEMBALI, PENGOLAHAN & PELUPUSAN BUANGAN TERJADUAL, 2013**

**TABLE 4.19 DOE: WRITTEN PERMISSION STATUS (KB) PRODUCED BY DOE FOR RECOVERY FACILITIES, TREATMENT & DISPOSAL OF WASTE, 2013**

BIL/ NO	KEMUDAHAN / FACILITIES	JUMLAH KEBENARAN BERTULIS MENGIKUT NEGERI/ TOTAL NO OF WRITTEN PERMISSION BY STATE														JUMLAH/ TOTAL	
		JHR	KDH	KLN	MLK	N.S	PHG	PRK	PRS	PP	SBH	SRK	SLG	TRG	WP (KL)		WP (LAB)
1	Penunu Buangan Terjadual / Scheduled Waste Incinerator												1				1
2	Kemudahan Pemerolehan Kembali Luar Tapak / Off Site Recovery Facilities																
	a. Pemerolehan Kembali Luar Tapak (bukan e-Waste) / Off Site Recovery (none e-waste)	4	6			1		1		2	1	1	15			2	33
	b. Pemerolehan Kembali Luar Tapak (penuh e-Waste) / Off Site Recovery (full e-Waste)				1	2		1		1							5
	c. Pemerolehan Kembali Luar Tapak (Separa e-Waste) / Off Site Recovery (Partial e-Waste)	2	3	1	1	1				6		2	13				29
3	Kemudahan Penstoran Luar Tapak / Off Site Storage Facilities	1			1											1	3
4	Kemudahan Pengolahan Luar Tapak / Off site Treatment Facilities																
	a. Loji rawatan Fizikal & Kimia / Chemical & Physical Treatment																0
	b. Loji Solidifikasi / Solidification Plant																0
	c. Loji Rawatan Air Resapan / Diffusion Water Treatment Plant																0
5	Kemudahan Pengolahan Di Tanah / Land Treatment Facility																0
6	Tapak Pelupusan Selamat / Secured Landfill																1
	Bil. KB Yang Dikeluarkan / No. of Written Permission	7	9	1	3	4		2		9	1	3	29			3	71

**JADUAL 4.20 JAS: LESEN-LESEN YANG DIKELUARKAN BAGI KEMUDAHAN PEMEROLEHAN KEMBALI, PENGOLAHAN & PELUPUSAN BUANGAN TERJADUAL YANG DILULUSKAN OLEH JABATAN ALAM SEKITAR, 2013**

**TABLE 4.20 DOE : LICENSES ISSUED FOR RECOVERY FACILITIES, PROCESSING WASTES DISPOSAL APPROVED BY THE DEPARTMENT OF ENVIRONMENT, 2013**

BIL/ NO	KEMUDAHAN / FACILITIES	JUMLAH LESEN DIKELUARKAN MENGIKUT NEGERI/ NO OF LICENCES ISSUED BY STATE														JUMLAH	
		JHR	KDH	KLN	MLK	N.S	PHG	PRK	PRS	PP	SBH	SRK	SLG	TRG	WP (KL)		WP (LAB)
1	Pembawa Yang Ditetapkan / Prescribed Conveyance	53	24	1	23	13	10	30	1	59	4	39	86	7	6	4	360
	Penstoran Luar Tapak / Off Site Storage	1	1			2	1	0			2	22	3	1		4	39
2	Pemerolehan Kembali Luar Tapak / Off Site Recovery																
	a. Pemerolehan Kembali Luar Tapak (bukan e-Waste) / Off Site Recovery (none e-waste)	39	9		3	8	8	26	1	19	2	8	46	6		1	176
	b. Pemerolehan Kembali Luar Tapak (penuh e-Waste) / Off Site Recovery (full eWaste)	6	2		5	3				10			3		6		35
	c. Pemerolehan Kembali Luar Tapak (separa e-Waste) / Off Site Recovery (partial eWaste)	15	13	1	14	4	1	3		30		9	28				118
3	Penunu Buangan Terjadual / Schedule Waste Incinerator	4	1		2	3	1	3		3	4	10	5	2		1	39
4	Pengolahan Di Tanah / Land Treatment Facilities											1				1	2
	Pengolahan Luar Tapak / Off Site Treatment Facilities					2						2					4
5	Tapak Pelupusan Selamat / Secured Landfill	1	1			2						1		1			6
	Bil. Lesen / No. of License	119	51	2	47	35	21	64	2	121	12	90	171	17	12	11	779
	Bil. Premis / No. of Premises	59	25	1	23	19	11	32	1	62	6	54	91	9	6	6	405

**NOTA:**

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

## HALATUJU PENGURUSAN BUANGAN TERJADUAL WAYFORWARD ON SCHEDULED WASTES MANAGEMENT

Pengurusan buangan terjadual telah melalui satu evolusi baru yang telah mengalih strategi pengurusan buangan terjadual dari berteraskan prinsip dari buaian ke liang lahad kepada dari buaian ke buaian ('cradle to grave' to 'cradle to cradle'). Peraturan-Peraturan Kualiti Alam Sekeliling (Buangan Terjadual) 2005 telah mengambil kira kehendak konsep 'cradle to cradle' yang diperuntukan oleh Peraturan 7 iaitu berkaitan dengan permohonan pengurusan khas buangan terjadual.

Sehingga Disember 2013, sebanyak 419 kemudahan telah dilesenkan oleh Jabatan untuk memperoleh kembali buangan terjadual, dan pada tahun 2013, sebanyak 566,506.51 tan metrik (19.10%) buangan terjadual telah diproses dan diperoleh kembali oleh kemudahan-kemudahan yang dilesenkan ini. Disamping itu sebanyak 1,574,041.95 tan metrik (53.08%) buangan terjadual yang dijana telah dibenarkan untuk diuruskan secara pengurusan khas yang juga sebahagiannya melibatkan guna semula secara terus (direct reused) bahan buangan.

Scheduled wastes management has gone through the evolution of new management strategies to shift from the 'cradle to grave' principle to 'cradle-to-cradle' principle. The 'cradle to cradle' concept was inline with new requirements to reflect the special waste management application under the Regulation 7 of the Environmental Quality (Scheduled Wastes) Regulations 2005.

In 2013, a total of 566,506.51 metric tonnes (19:10%) of wastes were being recovered by the licensed facilities. In addition, a total of 1,574,041.95 metric tonnes (53.08%) of waste generated conditional approved to be managed under the special waste management which also involved direct reuse of waste.

## PASUKAN PEMANTAU PENCEMARAN (3P) POLLUTION MONITORING TEAM



Pada tahun 2013, Pasukan Pemantau Pencemaran (3P) telah diperkenalkan di setiap kawasan parlimen sebagai salah satu program di bawah Rakan Alam Sekitar (RAS) yang bertindak sebagai mata dan telinga bagi membantu, memantau dan melaporkan masalah pencemaran setempat kepada JAS. Pendekatan ini membolehkan JAS mengambil tindakan cepat dan cekap ke atas kes aduan terutamanya aduan berulang.

Keahlian bagi 3P boleh terdiri daripada ahli JKKK, Ketua Kampung, Penghulu, Komuniti Agama, (Persatuan Taman Perumahan), Rukun Tetangga dan juga Ahli Politik.

Sepanjang tahun 2013, sejumlah 455 ahli 3P telah berdaftar di seluruh negara yang melibatkan 49 kawasan parlimen.

In 2013, Pollution Monitoring Team (3P) was introduced for each parliamentary constituencies as one of the programmes under Friends of Environment (RAS) who will be the eyes and ears to help, monitor and report local pollution issues to DOE. This approach enables DOE to take fast and efficient actions on cases of environmental pollution particularly repeated complaints .

The Memberships of 3P includes members of JKKK, Village Leaders, Penghulu, Religious Community, (Community Housing Association or Residents Association), Rukun Tetangga and also Politician.

Throughout 2013, a total of 455 members has been registered as 3P volunteers for the whole country which involves 49 parliamentary constituencies.

## KAWALAN TERHADAP PREMIS YANG DITETAPKAN CONTROL OF PRESCRIBED PREMISES



Kilang Getah Asli Mentah dan Kilang Kelapa Sawit Mentah dikategorikan sebagai premis yang ditetapkan masing-masing 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 pemilik premis ini perlu mempunyai lesen daripada Jabatan Alam Sekitar bagi menduduki dan menggunakan premis.

### Kilang Getah Asli Mentah

Pada tahun 2013, sejumlah 73 buah kilang getah asli mentah telah dilesenkan di bawah Peraturan-Peraturan Kualiti Alam Sekeliling (Premis Yang Ditetapkan)(Getah Asli Mentah), 1978. Daripada jumlah ini, 58 buah kilang telah dilesenkan bagi

Raw natural rubber factories and crude palm oil 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 respectively. The operation of these premises are subjected to the requirement of Section 18 of the Environmental Quality Act, 1974 whereby the owners of the premises are required to obtain a licence from the Department of Environment to occupy and/or use of the said premises.

### Raw Natural Rubber

In 2013, there were 73 raw natural rubber factories licensed under the Environmental Quality (Prescribed Premises) (Raw Natural Rubber) Regulations, 1978. Out of these, 58 factories were licensed to discharge treated effluent into inland watercourse, one (1)

melepaskan efluen yang telah diolah ke alur air, sebuah kilang telah dilesenkan untuk melepaskan effluen ke atas tanah, manakala 14 buah kilang dibenarkan untuk mengitar semula efluen. Tempoh lesen yang diberikan adalah berbeza bagi setiap premis dari satu hingga tiga tahun dan bergantung kepada prestasi pematuhan kilang-kilang tersebut terhadap syarat-syarat lesen. **Rajah 4.5** menunjukkan bilangan kilang getah asli mentah mengikut negeri.

Dalam tahun 2013, pegawai-pegawai penguatkuasa JAS Negeri telah menjalankan sejumlah 250 pemeriksaan ke atas 73 buah kilang getah asli mentah yang telah dilesenkan. Kilang-kilang yang mempunyai rekod pematuhan yang rendah sebelum ini telah diberi keutamaan pemeriksaan. Tindakan susulan pemeriksaan penguatkuasaan yang diambil adalah seperti yang ditunjukkan dalam **Rajah 4.5**.

Sejumlah 12 surat arahan dan 39 notis arahan telah dikeluarkan kepada premis-premis tersebut supaya mengambil tindakan pembaikan bagi mematuhi keperluan perundangan. Sebanyak 21 kompaun telah dikeluarkan bagi kesalahan-kesalahan yang telah dilakukan, manakala empat (4) tindakan mahkamah telah diambil bagi kegagalan mematuhi syarat-syarat lesen dengan denda sebanyak RM 63,000 telah dikenakan (**Rajah 4.5**).

was permitted to practise land disposal, while the remaining 14 were allowed to recycle their effluent. The licensing periods of these premises vary from one to three years depending on the level of compliance to the conditions of the licences. **Figure 4.5** shows the distribution of raw natural rubber factories according to states.

In 2013, state DOE enforcement officers has conducted 250 inspections on 73 licensed raw natural rubber factories. Those factories with low compliance record previously were given high priority for inspections. Follow up actions taken as a result of these inspections are as shown in **Figure 4.5**.

A total of 12 directive letters and 39 notices were issued to the concerned premises to take corrective actions in order to comply with the legal requirements and also 21 compounds were issued for the offences committed, while (4) four court actions were taken with a total fines of RM 63,000 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 2013, pencapaian pematuhan keseluruhan kilang getah asli mentah yang tertakluk di bawah Peraturan-Peraturan Kualiti Alam Sekeliling (Premis Yang Ditetapkan)(Getah Asli Mentah) 1978 adalah 100%.

### **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 2013, pencapaian pematuhan keseluruhan oleh kilang getah asli mentah adalah 100%.

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

Pada tahun 2013, pencapaian pematuhan keseluruhan oleh kilang getah asli mentah bagi Peraturan-Peraturan Kualiti Alam Sekeliling (Buangan Terjadual) 2005 adalah 99%.

### **Kilang Kelapa Sawit Mentah**

Sejumlah 434 buah kilang kelapa sawit mentah telah dilesenkan di bawah Peraturan-Peraturan Kualiti Alam Sekeliling (Premis Yang Ditetapkan)(Kelapa Sawit Mentah), 1977 pada tahun 2013. Dari 434

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

In 2013, the overall compliance performance by the raw natural rubber factories that were subjected to the Environmental Quality (Prescribed Premises) (Raw Natural Rubber) Regulations, 1978 was 100%.

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

Raw natural rubber factories are also subjected to the Environmental Quality (Clean Air) Regulations, 1978. In 2013, overall compliance performance by these factories was 100%.

### **Status Of Compliance With The Environmental Quality (Scheduled Wastes) Regulations, 2005**

In 2013, overall compliance performance by the raw natural rubber factories for the Environmental Quality (Scheduled Wastes) Regulations, 2005 was 99%.

### **Crude Palm Oil**

There were 434 palm oil mills licensed under the Environmental Quality (Prescribed Premises) (Crude Palm Oil Mill) Regulations, 1977 in the year 2013. Of these, 434 were licensed prescribed premises, 292 were

buah kilang yang dilesenkan, 292 buah kilang telah dilesenkan bagi melepaskan efluen yang diolah ke dalam alur air, 92 buah kilang melupuskan efluen ke atas tanah, 32 buah kilang melupuskan efluen dengan menggunakan gabungan kaedah alur air dan atas tanah. Manakala, 13 buah kilang menggunakan kaedah kompos dan 5 buah kilang menggunakan gabungan kaedah alur air dan kompos. **Rajah 4.6** menunjukkan taburan bilangan kilang kelapa sawit mentah di Malaysia mengikut negeri.

Sepanjang tahun 2013, sejumlah 1,188 pemeriksaan ke atas 434 kilang kelapa sawit yang dilesenkan telah dilaksanakan oleh pegawai-pegawai penguatkuasa JAS Negeri. Tindakan susulan hasil pemeriksaan tersebut seperti yang ditunjukkan dalam **Rajah 4.6**.

Sejumlah 57 surat arahan dan 233 notis arahan telah dikeluarkan kepada premis-premis tersebut supaya mematuhi keperluan perundangan. Sebanyak 100 kompaun dikeluarkan bagi kesalahan yang dilakukan. Manakala, 53 tindakan mahkamah telah diambil bagi kegagalan mematuhi syarat-syarat lesen dan denda sebanyak RM 384,000 telah dikenakan.

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

Pada tahun 2013, pencapaian pematuhan keseluruhan kilang kelapa sawit mentah

granted permission to discharge treated effluent into inland watercourse, 92 to practice land disposal, 32 to discharge effluent by combination into inland watercourse and land disposal. While, 13 to practice composting and 5 to discharge treated effluent using a combination of inland watercourse and composting. **Figure 4.6** shows the distribution of palm oil mills in Malaysia by states.

Throughout 2013, a total of 1,188 inspections on 434 licensed palm oil mills were conducted by State DOE enforcement officers. Follow up actions taken as a result from these inspections are shown in **Figure 4.6**.

A total of 57 directive letters and 233 notices were issued to the mills to comply with the legal requirements and also one hundred compounds were issued for offences committed. While, 53 court actions were taken with a total fine of RM 384,000 for failure to comply with conditions of the licences.

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

In 2013, the overall compliance performance by the crude palm oil mills that were

yang tertakluk kepada Peraturan-Peraturan Kualiti Alam Sekeliling (Premis Yang Ditetapkan) (Minyak Kelapa Sawit Mentah) 1977 adalah 98%.

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

Kilang minyak kelapa sawit mentah juga tertakluk kepada kawalan di bawah Peraturan-Peraturan Kualiti Alam Sekeliling (Udara Bersih) 1978. Pada tahun 2013, pencapaian pematuhan keseluruhan oleh kilang minyak kelapa sawit mentah adalah 100%.

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

Pada tahun 2013, pencapaian pematuhan keseluruhan kilang minyak kelapa sawit di bawah Peraturan-Peraturan Kualiti Alam Sekeliling (Buangan Terjadual) 2005 adalah 99%.

subjected under the Environmental Quality (Prescribed Premises) (Crude Palm Oil) Regulations, 1977 was 98%.

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

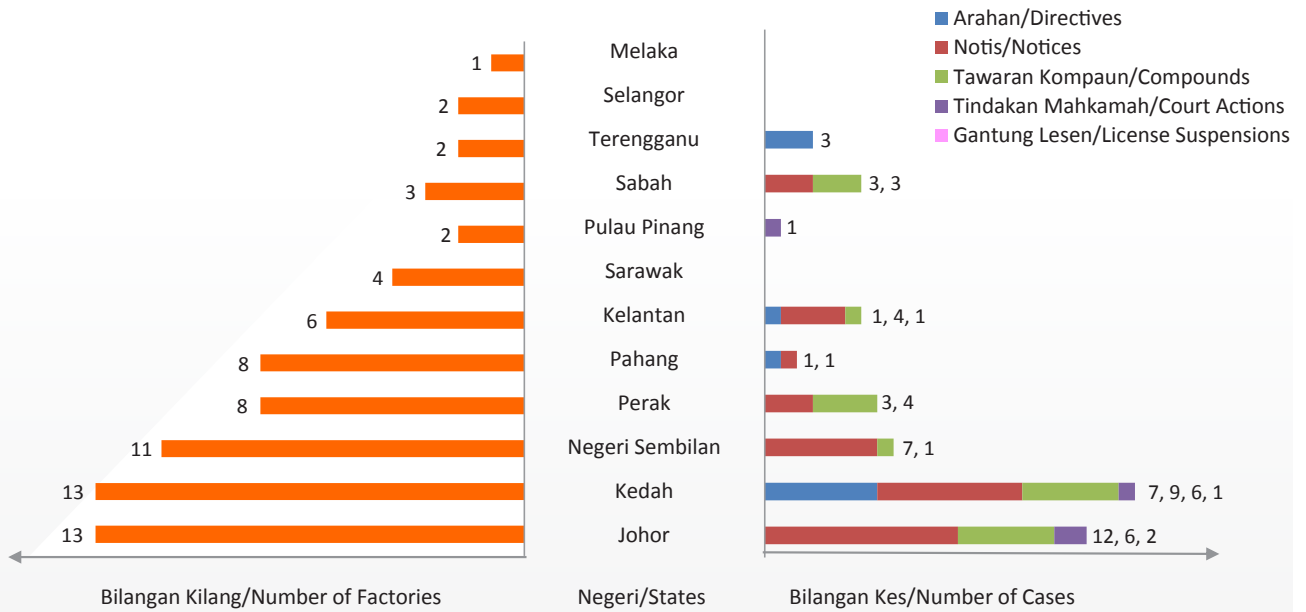
Palm oil mills are also subjected under the Environmental Quality (Clean Air) Regulations, 1978. In 2013, the overall compliance performance by palm oil mills was 100%.

### **Status Of Compliance With The Environmental Quality (Scheduled Wastes) Regulations, 2005**

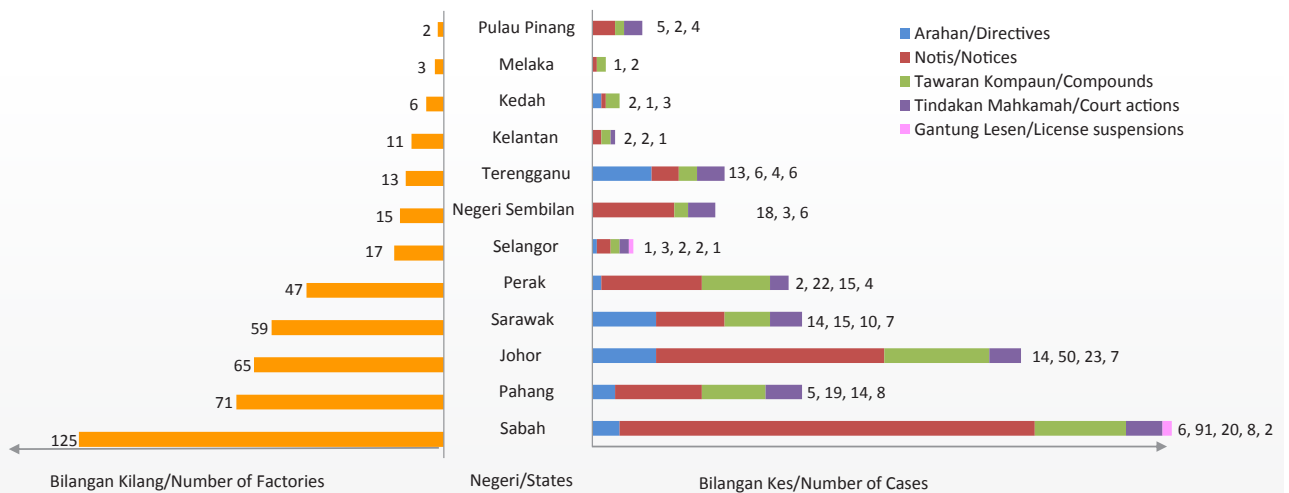
In 2013, the overall compliance performance by the palm oil mills under the Environmental Quality (Scheduled Wastes) Regulations, 2005 was 99%.



**Kajian Rintis Had Parameter Warna Untuk Sampel Efluen Kilang Kelapa Sawit Sept-Okt 2013**  
**Pilot Study on Limit of Colours Parameter For Palm Oil Mill Effluent Samples Sept-October 2013**



**Rajah 4.5 JAS : Tindakan Undang-Undang Terhadap Kilang Getah Asli Mentah, 2013**  
**Figure 4.5 DOE : Legal Actions Against Raw Natural Rubber Factories, 2013**



**Rajah 4.6 JAS : Tindakan Undang-Undang Terhadap Kilang Minyak Kelapa Sawit Mentah, 2013**  
**Figure 4.6 DOE : Legal Actions Against Crude Palm Oil Mills, 2013**

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



### Status Pematuhan Terhadap Peraturan-Peraturan Kualiti Alam Sekeliling (Efluen Perindustrian) 2009

Premis-premis yang bukan ditetapkan yang melepaskan efluen adalah tertakluk kepada kawalan di bawah Peraturan-Peraturan Kualiti Alam Sekeliling (Efluen Perindustrian) 2009. Pada tahun 2013, JAS telah menjalankan 7,201 pemeriksaan ke atas 38 kategori industri pembuatan dan lain-lain premis yang bukan ditetapkan yang tertakluk kepada Peraturan-Peraturan Kualiti Alam Sekeliling (Efluen Perindustrian) 2009. Pencapaian pematuhan keseluruhan oleh premis yang bukan ditetapkan adalah 99%. Terdapat 24 kategori industri mencapai pematuhan 100%, pada tahun 2013 (**Rajah 4.7**).

### Status of Compliance with the Environmental Quality (Industrial Effluents) Regulations 2009

The non-prescribed premises that discharge effluents are subjected under the Environmental Quality (Industrial Effluents) Regulations 2009. In 2013, DOE conducted 7,201 inspections on 38 categories of industrial premises and other non-prescribed premises that were subjected to the Environmental Quality (Industrial Effluents) Regulations 2009. The overall compliance achievement by the non-prescribed premises was 99%. There were 24 categories of industries achieved 100% compliance in 2013 (**Figure 4.7**).

### 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 2013, JAS telah menjalankan 8,475 pemeriksaan kepada 40 kategori industri pembuatan dan lain-lain premis yang bukan ditetapkan yang tertakluk kepada Peraturan-Peraturan Kualiti Alam Sekeliling (Udara Bersih) 1978. Pencapaian pematuhan keseluruhan oleh premis yang bukan ditetapkan adalah 99%.

Pada tahun 2012, 20 kategori industri mencapai pematuhan 100 %.(**Rajah 4.8**).

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

Premis-premis yang bukan ditetapkan adalah juga tertakluk kepada kawalan di bawah Peraturan-Peraturan Kualiti Alam Sekeliling (Buangan Terjadual) 2005. Pada tahun 2013, JAS telah menjalankan 8,475 pemeriksaan ke atas 40 kategori industri pembuatan dan lain-lain premis yang bukan ditetapkan. Pencapaian pematuhan keseluruhan oleh premis yang bukan ditetapkan adalah 99%. Antara kegagalan pematuhan yang direkodkan adalah termasuk gagal mengemukakan pemberitahuan mengenai pengeluaran buangan terjadual kepada JAS, buangan

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

The non-prescribed premises are also subjected to the Environmental Quality (Clean Air) Regulations 1978. In 2013, DOE conducted 8,475 inspections on 40 categories of industrial premises and other non-prescribed premises that were subjected to the Environmental Quality (Clean Air) Regulations 1978. The overall compliance by the non-prescribed premises was 99%.

In 2012, 20 categories of industries that were subjected to the regulation achieved 100 % compliance. (**Figure 4.8**).

### Status of Compliance with the Environmental Quality (Scheduled Wastes) Regulations 2005

The non-prescribed premises are also subjected to the Environmental Quality (Scheduled Wastes) Regulations 2005. In 2012, the DOE conducted 8,475 inspections on 40 categories of industrial premises and other non-prescribed premises. The overall compliance achieved by the non-prescribed premises was 99%. Among the non-compliances recorded including failure to submit notifications of scheduled wastes generation to DOE, improper storage and improper labelling of scheduled wastes and failure to keep accurate and up-to-date inventory records of scheduled wastes

terjadual tidak distor dan tidak dilabel dengan sempurna selain gagal menyimpan rekod inventori buangan terjadual dengan tepat dan terkini (Peraturan-Peraturan 3, 8, 9, 10 dan 11).

Pada tahun 2013, terdapat 19 kategori industri mencapai pematuhan 100% terhadap Peraturan-Peraturan Kualiti Alam Sekeliling (Buangan Terjadual) 2005 (**Rajah 4.9**).

### Tindakan Penguatkuasaan

Sejumlah 322 kes premis yang tidak patuh telah dituduh di mahkamah dengan RM 7,413,350 denda telah dipungut. Tindakan-tindakan penguatkuasaan lain yang diambil adalah pengeluaran 614 surat arahan dan 2,240 notis arahan kepada industri supaya mengambil tindakan yang sewajarnya bagi mematuhi Akta Kualiti Alam Sekeliling, 1974 dan Peraturan-Peraturan Kualiti Alam Sekeliling (Efluen Perindustrian) 2009, Peraturan-Peraturan Kualiti Alam Sekeliling (Udara Bersih) 1978 dan Peraturan-Peraturan Kualiti Alam Sekeliling (Buangan Terjadual) 2005.

Bagi meningkatkan pematuhan kepada peraturan, JAS telah mengeluarkan arahan-arahan kepada industri supaya memasang alat kawalan pencemaran yang sesuai dan efisien, meningkatkan keupayaan kemudahan kawalan pencemaran yang sedia ada dan juga menyediakan jadual perancangan dan pelaksanaan sistem pengurusan alam sekitar yang baik. Sebagai tambahan, pelbagai aktiviti kesedaran dilaksanakan sepanjang tahun untuk

(Regulations 3, 8, 9, 10 and 11).

In 2013, 19 categories of industries that were subjected under the Environmental Quality (Scheduled Wastes) Regulations 2005 achieved 100% compliance (**Figure 4.9**).

### Enforcement Actions

A total of 322 cases of non-compliances were charged in courts with a fine of RM 7,413,350 collected. Other enforcement actions taken against the non-complying industries were issuance of 614 written directives and 2,240 notices to industries for them to take appropriate actions in order to comply with the Environmental Quality Act 1974 and the Environmental Quality (Industrial Effluents) Regulations 2009, Environmental Quality (Clean Air) Regulations 1978 and Environmental Quality (Scheduled Wastes) Regulations 2005.

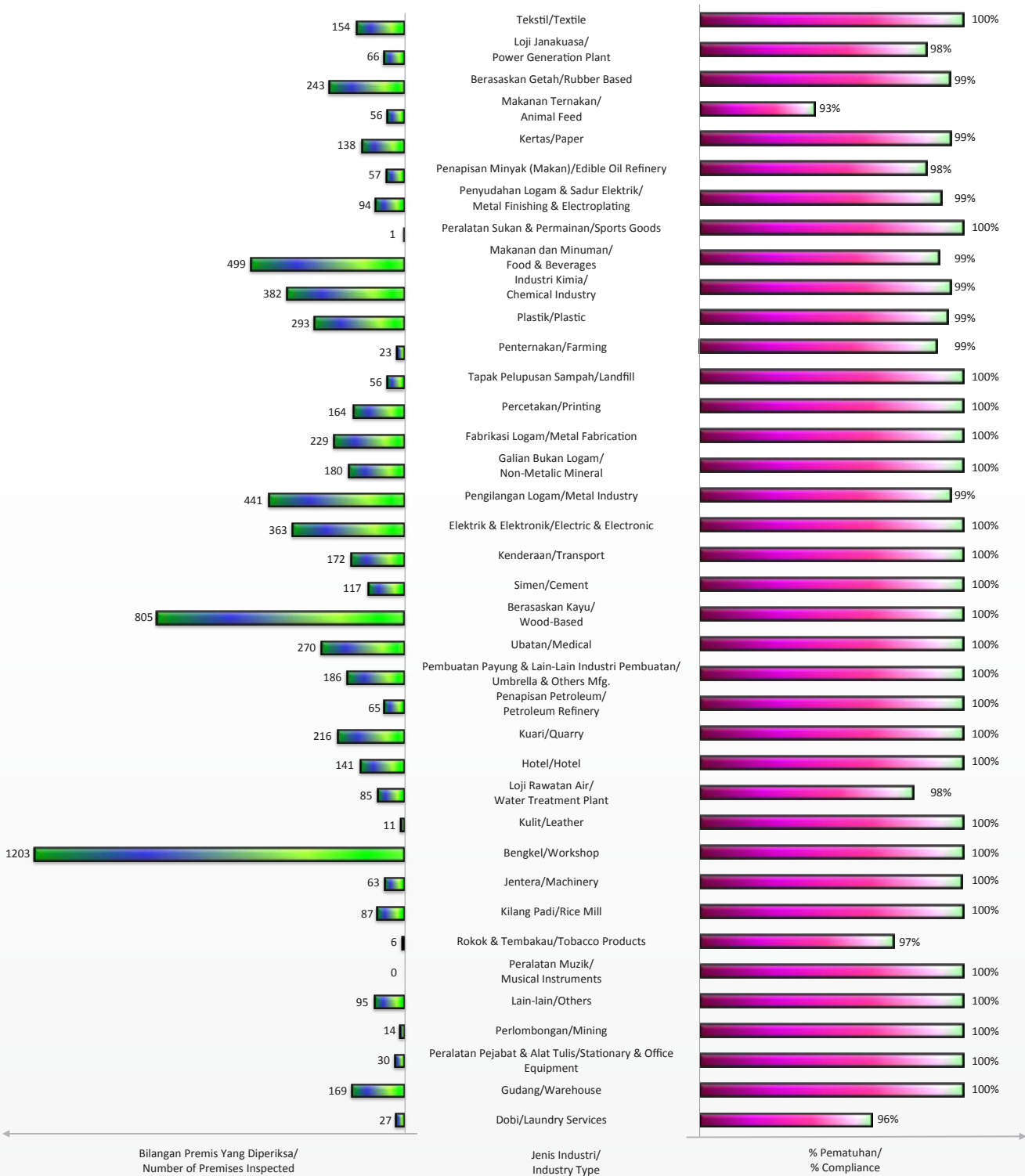
In order to improve compliance to regulations, DOE has issued written directives to the industries to install appropriate and efficient control equipment, upgrade existing pollution control facilities and to have a good planning and implementation schedule of environmental management systems. In addition, various awareness activities were implemented throughout the year for specific target groups. Such activities included dialogues, seminars and

kumpulan sasaran yang spesifik. Aktiviti-aktiviti tersebut termasuklah dialog, seminar dan bengkel untuk industri dengan tujuan untuk meningkatkan tahap pematuhan undang-undang. Jabatan Alam Sekitar juga dalam usaha memastikan pematuhan sepenuhnya, mempromosi penggunaan teknologi kawalan yang efisien, amalan pengeluaran bersih serta pematuhan sendiri. Pihak industri juga dinasihatkan untuk mewujudkan sistem pengurusan alam sekitar yang baik dan digalakkan untuk mendapatkan pensijilan ISO 14000.

workshops for industries, with the aim of improving the level of regulatory compliance. The Department of Environment, in its effort to ensure full compliance, also promoted the adoption of more efficient control technologies, cleaner production practices as well as self-regulations. The industries were also advised to set up a good environmental management system and be ISO 14000 certified.

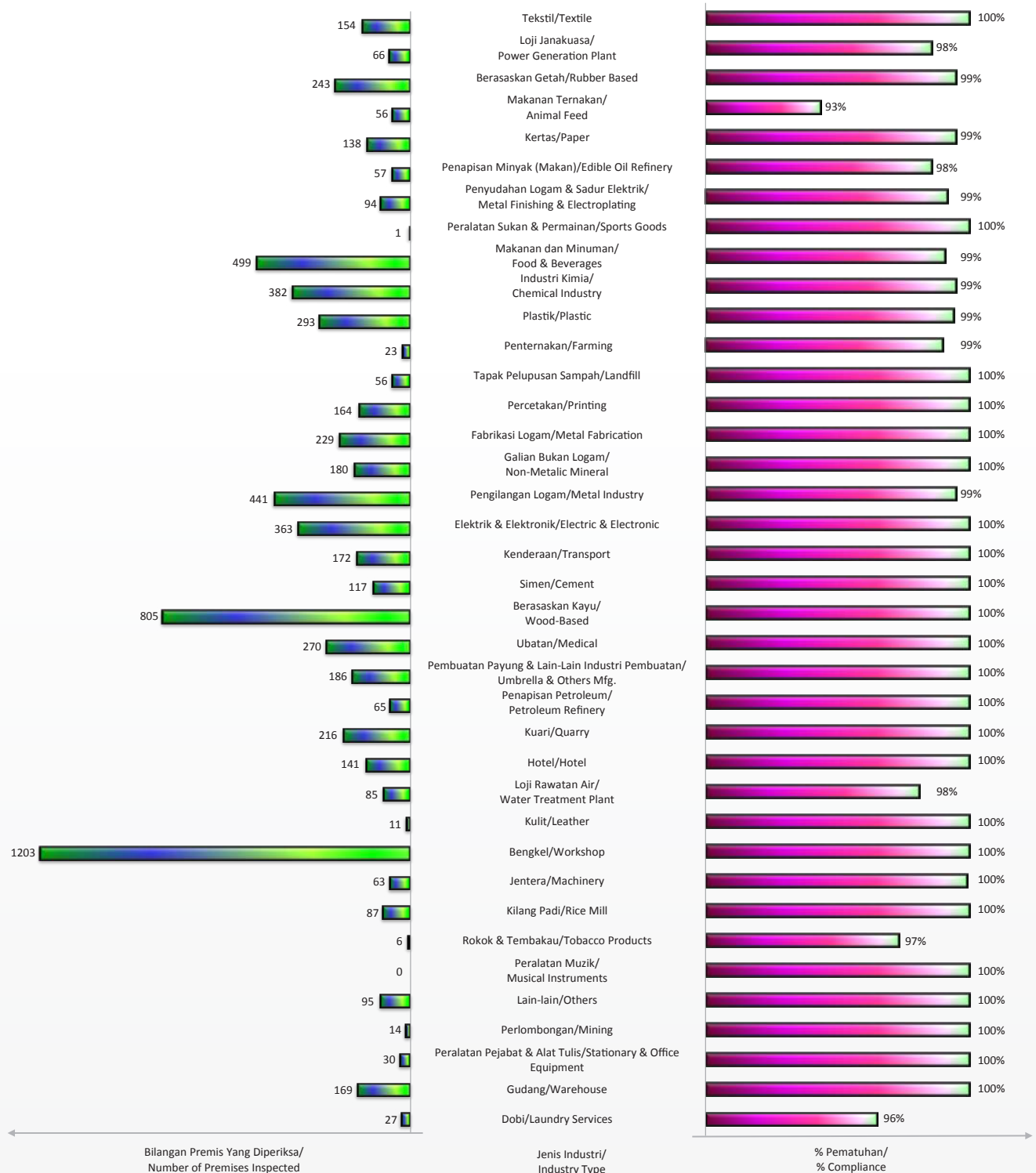


**Program Persampelan Pasar Basah - Jun-Ogos 2013**  
**Wet Market Sampling Program - June-August 2013**



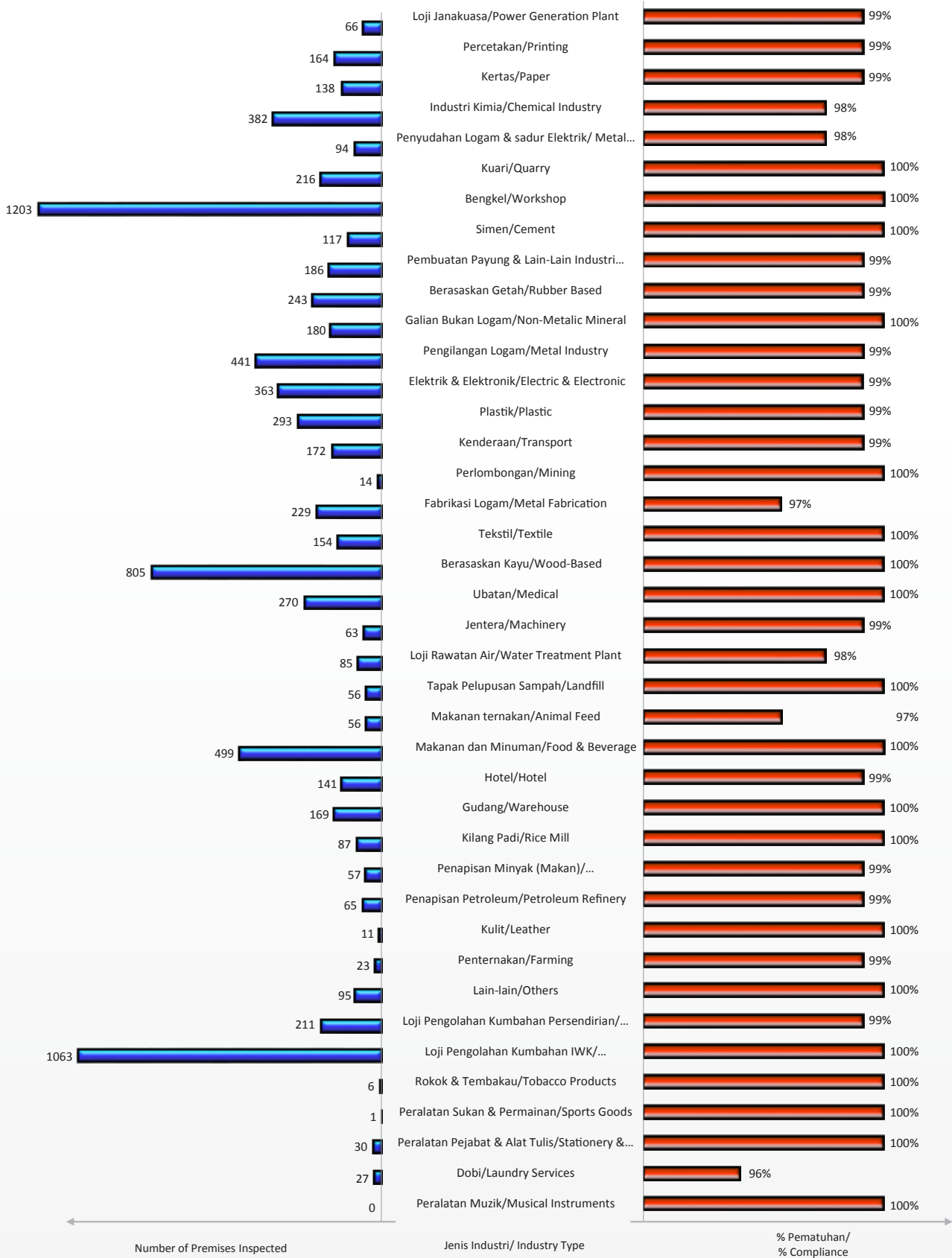
Rajah 4.7 JAS : Status Pematuhan Industri Terhadap Peraturan- Peraturan Kualiti Alam Sekeliling (Efluen Perindustrian) 2009, 2013

Figure 4.7 DOE : Compliance Status to the Environmental Quality (Industrial Effluent) Regulations 2009, 2013



Rajah 4.8 JAS : Status Pematuhan Industri Terhadap Peraturan-Peraturan Kualiti Alam Sekeliling (Udara Bersih) 1978, 2013

Figure 4.8 DOE : Compliance Status to the Environmental Quality (Clean Air) Regulations 1978, 2013



**Rajah 4.9 JAS : Status Pematuhan Industri Terhadap Peraturan-Peraturan Kualiti Alam Sekeliling (Buangan Terjadual) 2005, 2013**

**Figure 4.9 DOE : Compliance Status to the Environmental Quality (Scheduled Wastes) Regulations 2005, 2013**

## PUNCA-PUNCA BERGERAK (KENDERAAN BERMOTOR)

### MOBILE SOURCES (MOTOR VEHICLES)



Sehingga akhir tahun 2013, sejumlah 23,705,794 buah kenderaan bermotor telah berdaftar di Malaysia, iaitu pertambahan sebanyak 1,003,573 buah kenderaan (4.2%) berbanding tahun 2012. Pecahan keseluruhan kenderaan bermotor yang berdaftar mengikut jenis kenderaan adalah seperti di **Rajah 4.10**.

Dari sejumlah 1,202,674 buah kenderaan baru yang didaftarkan dalam tahun 2013, kategori kereta merupakan yang tertinggi iaitu sebanyak 583,060 unit (48.48%) diikuti motosikal sebanyak 528,508 unit (43.94%), manakala sebanyak 91,106 unit (7.58%) adalah dari lain-lain jenis kenderaan termasuk lori, bas, van dan sebagainya.

Taburan bilangan kenderaan bermotor di Malaysia yang didaftarkan mengikut negeri adalah seperti di **Rajah 4.11**. Wilayah

By the end of 2013, a total of 23,705,794 motor vehicles was registered in Malaysia, an increase of 1,003,573 units (4.2%) compared to 2012. The breakdown of the total registered vehicles according to type of vehicles is given in **Figure 4.10**.

Out of 1,202,674 new vehicles registered in 2013, motorcars made up the highest number with 583,060 units (48.48%) followed by motorcycles 528,508 units (43.94%), while the remaining 91,106 units (7.58%) were from the other type of vehicles such as lorries, buses, vans and others.

The distribution of registered vehicles throughout the states is given in **Figure 4.11**. The Federal Territory of Kuala Lumpur

Persekutuan Kuala Lumpur mendahului negeri-negeri lain dengan mempunyai bilangan kenderaan yang tertinggi iaitu sebanyak 5,227,031 unit (atau 22.05%) daripada keseluruhan bilangan kenderaan yang berdaftar di negara ini, diikuti oleh negeri Johor, Selangor, Sarawak, P. Pinang dan Perak.

### **Kawalan Pelepasan Asap dan Gas dari Kenderaan Bermotor**

Pelepasan asap serta gas-gas pencemar seperti karbon monoksida (CO), hidrokarbon (HC), oksida-oksida nitrogen (NO<sub>x</sub>) 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.

### **Kawalan Pelepasan Asap Hitam Dari Kenderaan Diesel**

Kawalan pelepasan asap hitam berlebihan dari ekzos kenderaan diesel dipantau melalui Program AWASI (Area Watch And Sanction Inspection). Melalui program ini, skuad peronda JAS akan menjalankan rondaan, pemerhatian pelepasan asap hitam dari ekzos kenderaan dan memberhentikan kenderaan untuk menjalankan ujian asap ke atas kenderaan-kenderaan diesel yang diperhatikan mengeluarkan asap hitam berlebihan.

recorded the highest number of vehicles registered, with 5,227,031 (22.05 %) and followed by Johor, Selangor, Sarawak, P. Pinang and Perak.

### **Control of Smoke and Gaseous Emissions From Motor Vehicles**

Emission of smoke and gaseous pollutants such as carbon monoxide (CO), hydrocarbons (HC), oxides of nitrogen (NO<sub>x</sub>) and particulate matters (PM) emitted from motor vehicle exhausts are controlled under the Environmental Quality (Control of Emission from Diesel Engines) Regulations 1996 and the Environmental Quality (Control of Emission from Petrol Engines) Regulations 1996.

### **Control of Black Smoke Emission From Diesel Vehicles**

The control of excessive black smoke emission emitted from diesel vehicle exhausts is monitored through the Programme AWASI (Area Watch And Sanction Inspection) Programme. Through this programme the DOE's mobile squad would patrolling the streets, observing, stop and test diesel vehicles belching excessive smoke.

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

Pada tahun 2013, sebanyak 2,546 program penguatkuasaan telah dilaksanakan di bandar-bandar di seluruh negara. Sejumlah 344,742 buah kenderaan diesel telah diperiksa secara visual. Dari jumlah tersebut, 2,020 buah kenderaan telah dikompaun kerana gagal mematuhi had pelepasan asap hitam 50 HSU manakala 86 kenderaan telah dikenakan perintah larangan beroperasi sehingga lulus ujian asap semula oleh JAS. Pada keseluruhannya, peratus pematuhan oleh kenderaan diesel adalah 99.41%. Ini adalah peningkatan sebanyak 0.41% berbanding dengan tahun 2012.

Bilangan kenderaan diesel yang dikompaun dan peratus pematuhannya mengikut jenis kenderaan adalah seperti di **Rajah 4.12**. **Rajah 4.13** pula menunjukkan bilangan kenderaan dikompaun, pengeluaran perintah larangan serta peratus pematuhan mengikut negeri. Tindakan mahkamah juga telah diambil ke atas 87 pemandu serta pemilik kenderaan kerana gagal menjelaskan kompaun yang telah dikenakan.

Perjanjian perkhidmatan untuk pengujian semula pelepasan asap daripada kenderaan berenjin diesel antara Jabatan Alam Sekitar (JAS) dengan PUSPAKOM Sdn. Bhd. Telah

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

In 2013, a total of 2,546 enforcement programmes were conducted in the cities throughout the country. A total of 344,742 diesel vehicles were inspected visually. Out of these, 2,020 vehicles were compounded for failing to comply with the 50 HSU smoke limit while 86 vehicles were issued with the prohibition order until their vehicles passed or undergo smoke retest by the DOE. Generally, the percentage of compliance of diesel vehicles were 99.41%. This is an increase of 0.41% compared to 2012.

The number of diesel vehicles summoned and their percentage of compliance according to type of vehicle is given in **Figure 4.12**. **Figure 4.13** shows the number of vehicles compounded, number of prohibition orders issued and the percentage of compliance according to the states. Court actions were also taken against 87 drivers and vehicle owners for failing to settle the compounds issued.

The service agreement for the testing of emissions from diesel-driven vehicles between Department of Environment (DOE) and PUSPAKOM Sdn. Bhd. was signed in 23rd

ditandatangani pada 23 Ogos 2013. Bermula pada 1 September 2013, kenderaan berenjin diesel yang didapati melepaskan asap hitam berlebihan yang menerima Notis Arahan atau Perintah Larangan adalah diwajibkan untuk menjalankan ujian pelepasan asap di pusat ujian PUSPAKOM. Sebanyak 41 pusat ujian PUSPAKOM di seluruh Negara telah dipilih untuk menjalankan perkhidmatan tersebut. Dalam tempoh 1 September 2013 sehingga 31 Disember 2013 bilangan kenderaan diesel yang telah diuji oleh PUSPAKOM adalah sebanyak 933 buah. Dari jumlah tersebut, sebanyak 902 buah kenderaan yang diuji semula di PUSPAKOM adalah yang menerima Notis Arahan dan 31 buah kenderaan menerima Perintah Larangan.

### **Kawalan Pelepasan Gas CO dan HC Dari Kenderaan Petrol**

Sepanjang tahun 2013, sejumlah 2,516 buah kenderaan berenjin petrol telah diuji pelepasan CO dan HC dengan menggunakan meter gas CO-HC Analyzer melalui kaedah "ujian idling" di jalan raya. Dari jumlah ini, 118 buah kenderaan telah dikompaun kerana gagal mematuhi had pelepasan yang ditetapkan. Peratus pematuhan keseluruhannya adalah 97.08% iaitu peningkatan 9.02% berbanding dengan tahun 2012. Surat amaran juga telah dikeluarkan kepada pemandu-pemandu kenderaan yang gagal mematuhi had-had pelepasan CO dan HC supaya segera menyenggara kenderaan bagi memastikan kenderaan sentiasa mematuhi had pelepasan yang ditetapkan oleh undang - undang.

August 2013. Starting from 1st September 2013, diesel-driven vehicles that are found emitting excessive black smoke which have received Notice or Prohibition Order from DOE's enforcers are required to conduct the smoke emission retesting at PUSPAKOM testing center. A total of 41 PUSPAKOM testing centers have been selected to run the service throughout the country. From 1st September - 31st December 2013, the number of vehicle have been tested by PUSPAKOM are 933. Out of this number, 902 vehicles were the ones that received written Notice and 31 vehicles received the Prohibition Order.

### **Control of CO and HC Gas Emissions from Petrol Vehicles**

Throughout 2013, a total of 2,516 petrol engine vehicles were inspected using the CO-HC gas analyzer via the idling test method conducted by the road side. From the above a total of 118 vehicles were compounded for failing to comply with the stipulated CO and HC limits. The overall percentage of compliance is 97.08%,. an increase of 9.02% compared to 2012. Warning letters were also issued to drivers for immediate servicing of their vehicles to ensure compliance with the emission limits stipulated in the law.

### Ujian Kelulusan Jenis (Kenderaan Petrol)

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

Mana-mana model baru kenderaan bermotor pada atau selepas 1 Januari 2000 adalah dikehendaki mematuhi standard pelepasan pencemar yang ditetapkan dalam Jadual Ketiga, Peraturan-Peraturan Kualiti Alam Sekeliling (Kawalan Pelepasan Daripada Enjin Petrol), 1996. Jisim karbon monoksida yang dibenarkan hendaklah tidak melebihi 2.2 g/km, manakala kombinasi hidrokarbon dan nitrogen oksida hendaklah tidak melebihi 0.5 g/km. Pada tahun 2013, Jabatan Alam Sekitar telah mengeluarkan 91 Sijil Ujian Kelulusan Jenis bagi model baru kenderaan yang akan dipasarkan di Malaysia.

### Pengwujudan Kemudahan Yang Diluluskan

Bagi memudahkan orang awam menghantar kenderaan mereka untuk menjalani ujian pelepasan asap dan gas, Jabatan Alam Sekitar melalui program "Kemudahan Yang Diluluskan (KYDL)" telah memberi pengiktirafan kepada bengkel-bengkel kenderaan yang memenuhi kriteria-kriteria yang telah ditetapkan. Kemudahan ini boleh bertindak sebagai pengujian segera dan kenderaan yang tidak mematuhi diperbaiki di pusat-pusat ini supaya memastikan kenderaan sentiasa mematuhi had pelepasan asap.

### Type Approval Test (Petrol Vehicles)

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

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 Environmental 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 2013, the Department of Environment has issued 91 Type Approval Test Certificates for new models to be marketed in Malaysia.

### Establishment of Approved Testing Facilities

To facilitate the public for easy access to these workshops for smoke and gaseous emission testing, DOE accredited a number of workshops that fulfilled the prescribed criteria as "Approved Testing Facilities". These testing facilities could also serve as immediate testing and repair centres for the non-complying vehicles, to ensure they are always in compliance with the emission limits stipulated.

Sehingga akhir tahun 2013, sejumlah 61 bengkel serta pusat-pusat pemeriksaan kenderaan di seluruh negara telah diberikan sijil pengiktirafan sebagai “Kemudahan Yang Diluluskan” oleh JAS.

### **Kawalan Pelepasan Asap Daripada Motosikal**

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

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

Pengimport motosikal 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. Pada tahun 2013, 54 Sijil Kelulusan Jenis telah dikeluarkan kepada pembuat, pemasang dan pengimport motorsikal untuk pasaran tempatan.

### **Bunyi Bising Kenderaan Bermotor**

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

By the end of 2013, a total of 61 workshops and vehicle testing centres throughout the country were accredited as “Approved Testing Facilities” by DOE.

### **Control of Emission from Motorcycles**

The Environmental Quality (Control of Emission from Motorcycles) Regulations, 2003 was gazetted and enforced on 1 January 2004. Under this regulation, the emission standards 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)

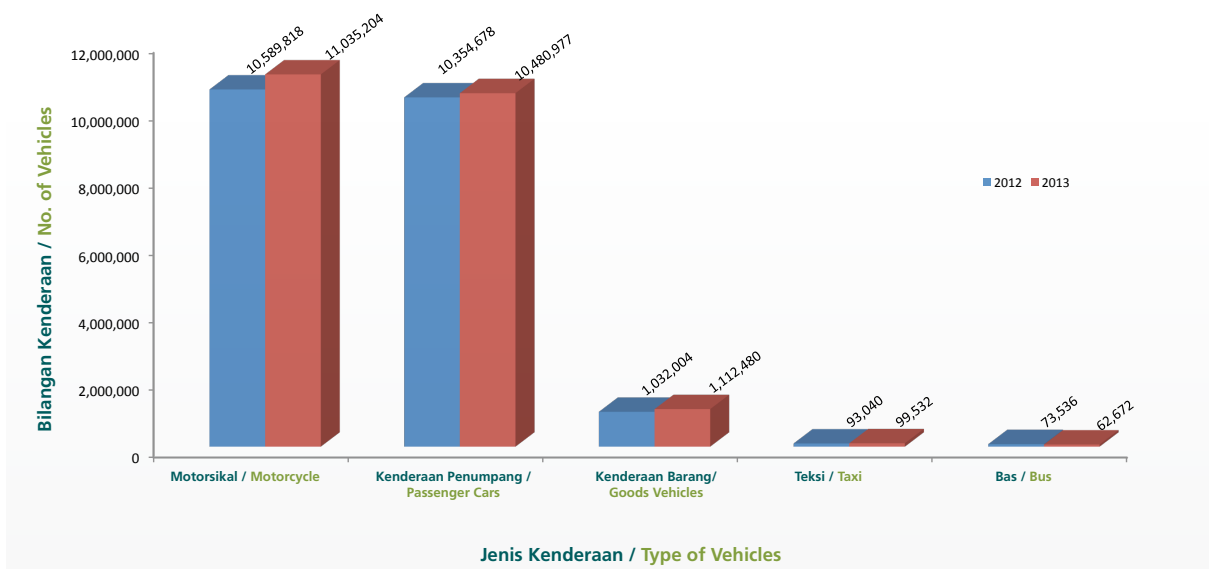
Importers of motorcycles are required to comply with the new emission standards effective from 1 January 2005 for new models and 1 July 2005 for current models, while the local manufacturers have to comply with the new emission standards effective from 1 July 2005 for new models and 1 July 2006 for current models. In 2013, a total of 54 Type Approval Test Certificates were issued to the manufacturers, assemblers and importers of motorcycles for the domestic market.

### **Noise from Motor Vehicles**

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

Operasi penguatkuasaan bagi mengawal pelepasan bunyi bising dari motorsikal telah dilaksanakan oleh Pejabat-pejabat JAS Negeri dengan kerjasama Polis DiRaja Malaysia (Cawangan Trafik). Pada 2013, sejumlah 6,570 buah motosikal telah ditahan bagi menjalani ujian pelepasan bunyi bising. Dari jumlah ini, 85 penunggang motosikal telah dikompaun oleh pihak polis kerana melanggar had bunyi bising yang dibenarkan. Peratus pematuhan secara keseluruhannya ialah 98.7 % (Rajah 4.14) yang mana meningkat 0.1% berbanding pada 2012.

Enforcement operations to control excessive noise from motorcycles were jointly conducted by the State Offices and the Traffic Police. In 2013, a total of 6,570 motorcycles were inspected for the noise emission. Out of these, 85 motorcyclists were compounded by the traffic police for violating the stipulated noise limits. The overall percentage of compliance is 98.7 % (Figure 4.14) which is an increase of 0.1% compared to 2012.

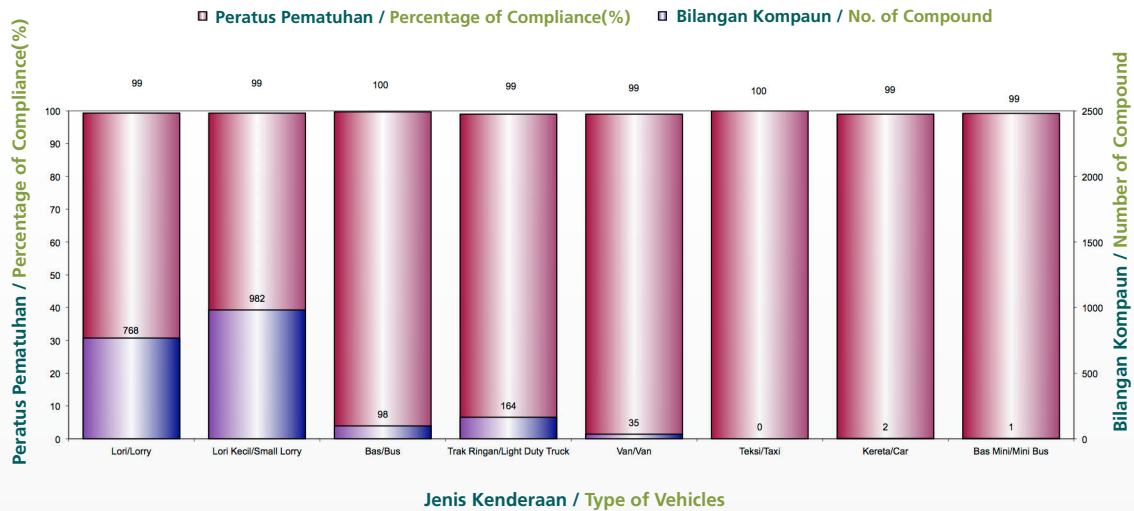


**Rajah 4.10 JAS: Bilangan Kenderaan Bermotor Mengikut Jenis, 2013**  
(Sumber : Jabatan Pengangkutan Jalan, 2013)

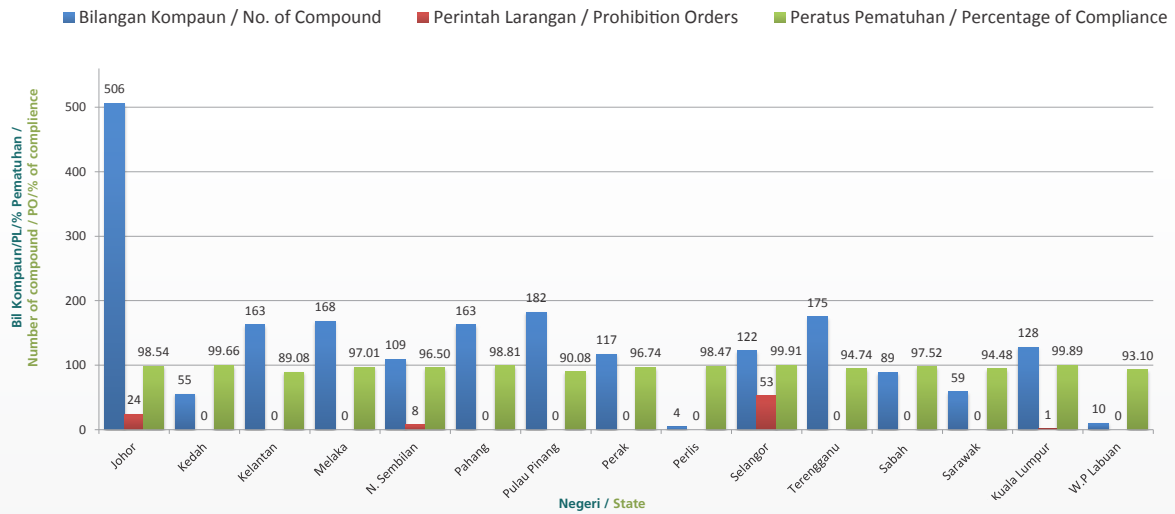
**Figure 4.10 DOE: Number of Motor Vehicles According to Type of Vehicles , 2013**  
(Source : Road Transport Department, 2013)



**Rajah 4.11 JAS : Bilangan Kenderaan Bermotor Mengikut Negeri, 2013**  
**Figure 4.11 DOE : Number of Motor Vehicles by State, 2013**

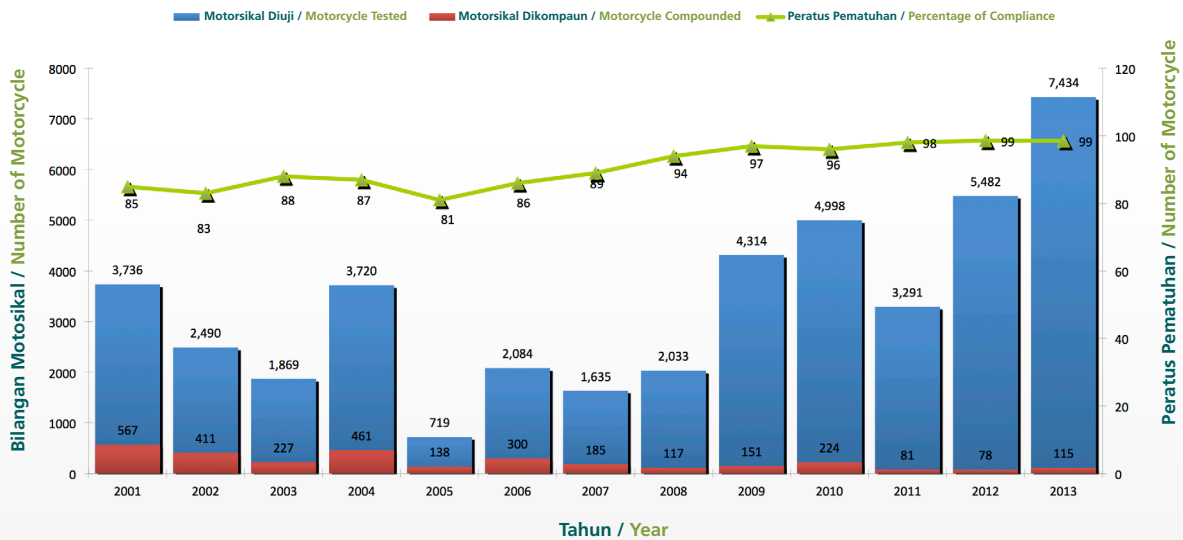


**Rajah 4.12 JAS : Peratus Pematuhan Mengikut Jenis Kenderaan Dan Bilangan Kompaun, 2013**  
**Figure 4.12 DOE : Percentage Of Compliance According To Type Vehicles And Number Of Compound, 2013**



Rajah 4.13 JAS: Bilangan Kenderaan Bermotor Mengikut Jenis, 2013  
(Sumber : Jabatan Pengangkutan Jalan, 2013)

Figure 4.13 DOE: Number of Motor Vehicles According to Type of Vehicles, 2013  
(Source : Road Transport Department, 2013)



Rajah 4.14 JAS: Peratus Pematuhan Bilangan Motosikal Diuji dan Bilangan Kompoun (2001 - 2013)

Figure 4.14 DOE: Percentage Of Compliance, Number Of Motorcycle Tested And Compounded (2001 - 2013)

## TINDAKAN UNDANG-UNDANG

### LEGAL ACTION



#### Pendakwaan

Pada tahun 2013, sejumlah 380 kes kesalahan di bawah Akta Kualiti Alam Sekeliling (AKAS) 1974 telah didakwa di mahkamah dengan denda yang dikenakan berjumlah RM7,865,350.00. **(Rajah 4.15).**

Daripada jumlah keseluruhan kes tersebut, sebanyak 135 (35.53%) kes mahkamah adalah melibatkan kesalahan di bawah Peraturan-Peraturan Kualiti Alam Sekeliling (Efluen Perindustrian) 2009 dengan jumlah denda sebanyak RM 6,241,150.00. Sebanyak 98 (25.79%) kes mahkamah melibatkan kesalahan pencemaran udara daripada kenderaan bermotor iaitu pelepasan bendasing ke udara melebihi had yang ditetapkan di bawah Seksyen 22(1), AKAS 1974 dengan jumlah denda sebanyak RM 154,700.00.

#### Prosecution

In 2013, a total of 380 offences were prosecuted under the Environmental Quality Act (EQA) 1974 with a total fine of RM7,865,350.00. **(Figure 4.15).**

Out of these, a total of 135 (35.43%) court cases involved offences under Environmental Quality (Industrial Effluent) Regulations 2009 with a total fine of RM 6,241,150.00. There were 98 (25.79%) court cases involved offences related to air pollution from motor vehicle emissions exceeding the stipulated standards under Section 22(1) of the EQA 1974 with a total fine of RM 154,700.00.

Selain itu, sebanyak 58 (15.26%) kes adalah melibatkan kesalahan pelanggaran syarat lesen di bawah Seksyen 16, AKAS 1974 dengan jumlah denda sebanyak RM452,000.00 sementara 89 (23.42%) kes yang selebihnya melibatkan kesalahan-kesalahan lain di bawah AKAS 1974.

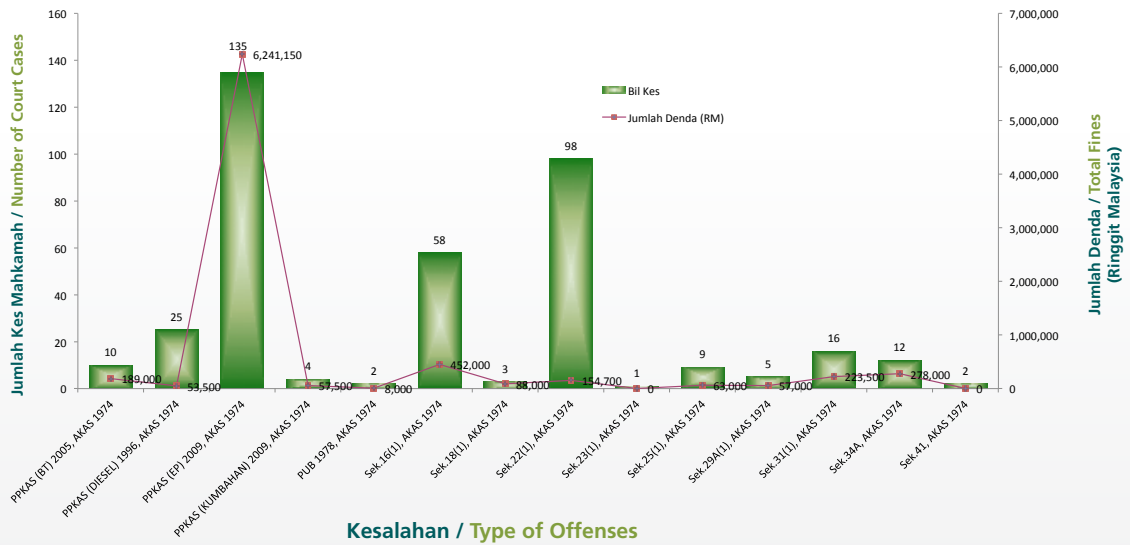
### Kompaun

Sejumlah 5,525 kompaun telah dikeluarkan sepanjang tahun 2013 kepada premis dan syarikat untuk pelbagai kesalahan di bawah AKAS 1974. Daripada jumlah keseluruhan tersebut, sebanyak 1,939 (35.09%) kompaun dikeluarkan bagi kesalahan di bawah Peraturan-Peraturan Kualiti Alam Sekeliling (Kawalan Pelepasan Dari Enjin Diesel) 1996, sebanyak 1,233 (22.3%) kompaun bagi kesalahan di bawah Peraturan-Peraturan Kualiti Alam Sekeliling (Buangan Terjadual) 2005, sebanyak 949 (17.18%) kompaun bagi kesalahan di bawah Peraturan-Peraturan Kualiti Alam Sekeliling (Udara Bersih) 1978, sebanyak 157 (2.84%) kompaun bagi kesalahan di bawah Peraturan-Peraturan Kualiti Alam Sekeliling (Kawalan Pelepasan dari Enjin Petrol) 1996, sebanyak 504 (9.12%) kompaun bagi kesalahan di bawah Peraturan-Peraturan Kualiti Alam Sekeliling (Efluen Perindustrian) 2009, sebanyak 579 (10.48%) kompaun bagi kesalahan di bawah Seksyen 29A, AKAS 1974, sebanyak 49 (0.88%) kompaun bagi kesalahan di bawah Peraturan-Peraturan Kualiti Alam Sekeliling (Kumbahan) 2009 dan sebanyak 115 (2.11) kompaun bagi kesalahan di bawah Peraturan-Peraturan Kualiti Alam Sekeliling (Bunyi Bising Kenderaan Motor) 1987 **(Rajah 4.16)**.

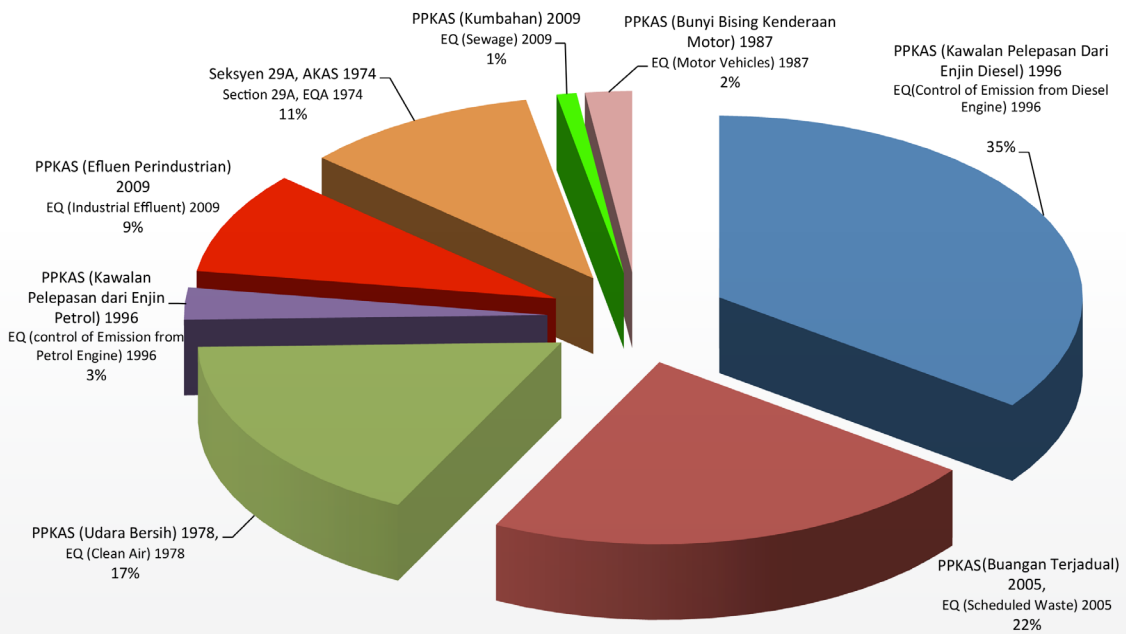
Apart from that, 58 (15.26%) cases were violating conditions of licences under Section 16 of the Act with a total fine of RM 452,000.00 while the remaining 89 (23.42%) cases were prosecuted for various other offences under the EQA 1974.

### Compounds

A total of 5,525 compounds were issued in 2013 against premises and companies for various offences under the EQA 1974. Out of this total, 1,939 (35.09%) were offences under the Environmental Quality (Control of Emission from Diesel Engine) Regulations 1996, 1,233 (22.3%) were offences under the Environmental Quality (Scheduled Wastes) Regulations 2005, 949 (17.18%) were offences under the Environmental Quality (Clean Air) Regulations 1978, 157 (2.84%) were offences under the Environmental Quality (Control of Emission from Petrol Engine) Regulations 1996, 504 (9.12%) were offences under the Environmental Quality (Industrial Effluents) Regulations 2009, 579 (10.48%) were offences under Section 29A of the EQA 1974, 49 (0.88%) were offences under the Environmental Quality (Sewage) Regulations 2009 and 115 (2.11%) were offences under the Environmental Quality (Motor Vehicle Noise) Regulations 1987 **(Figure 4.16)**.



Rajah 4.15 JAS : Jabatan Alam Sekitar : Bilangan Kes Mahkamah dan Denda, 2013  
 Figure 4.15 DOE : Number of court Cases and Fines, 2013



Rajah 4.16 JAS: Bilangan Kes Kompaun Mengikut Pecahan Peraturan Peraturan Kualiti Alam Sekeliling, 2013  
 Figure 4.16 DOE: Number of Compound Cases According to Enviromental Quality Regulations, 2013

## MAKLUMBALAS TERHADAP PENGADUAN AWAM

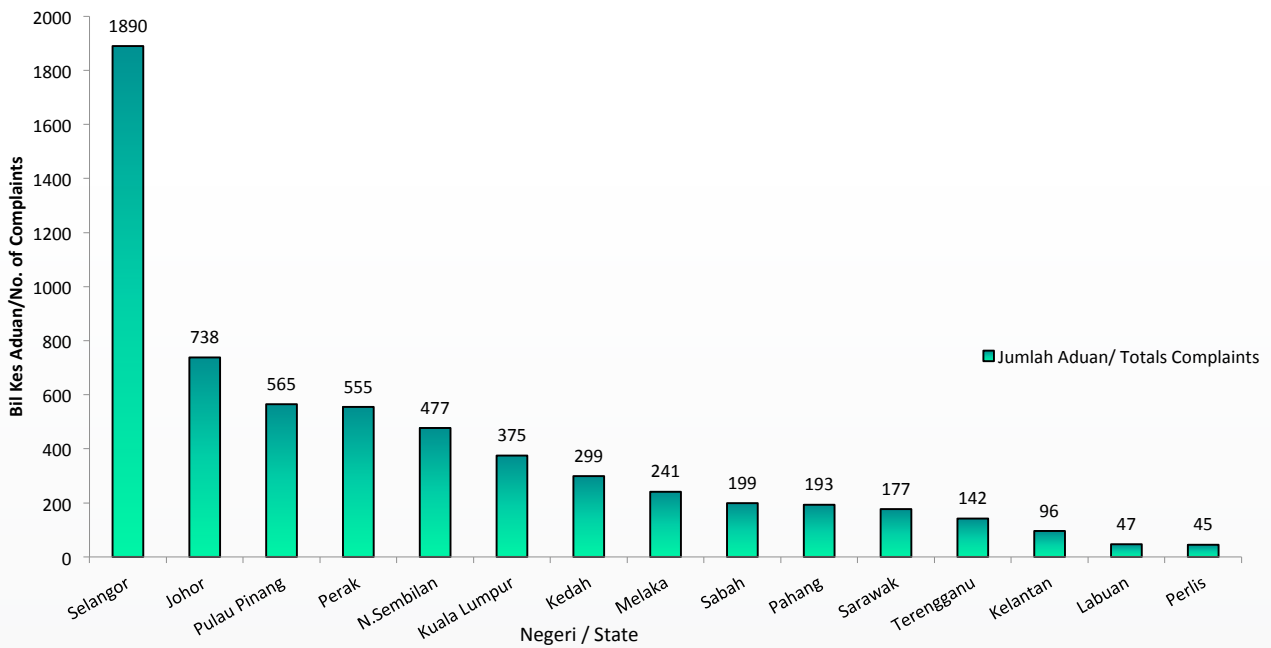
### RESPONSE TO PUBLIC COMPLAINTS

Jabatan Alam Sekitar telah menerima 6,039 aduan pencemaran alam sekitar pada tahun 2013. Daripada jumlah tersebut, 4,836 kes aduan adalah di bawah peruntukan Akta Kualiti Alam Sekeliling (AKAS) 1974 dan telah disiasat serta diambil tindakan. Manakala 1,203 kes aduan yang di luar bidangkuasa JAS telah dirujuk kepada agensi lain yang berkaitan untuk diambil tindakan (**Rajah 4.17**).

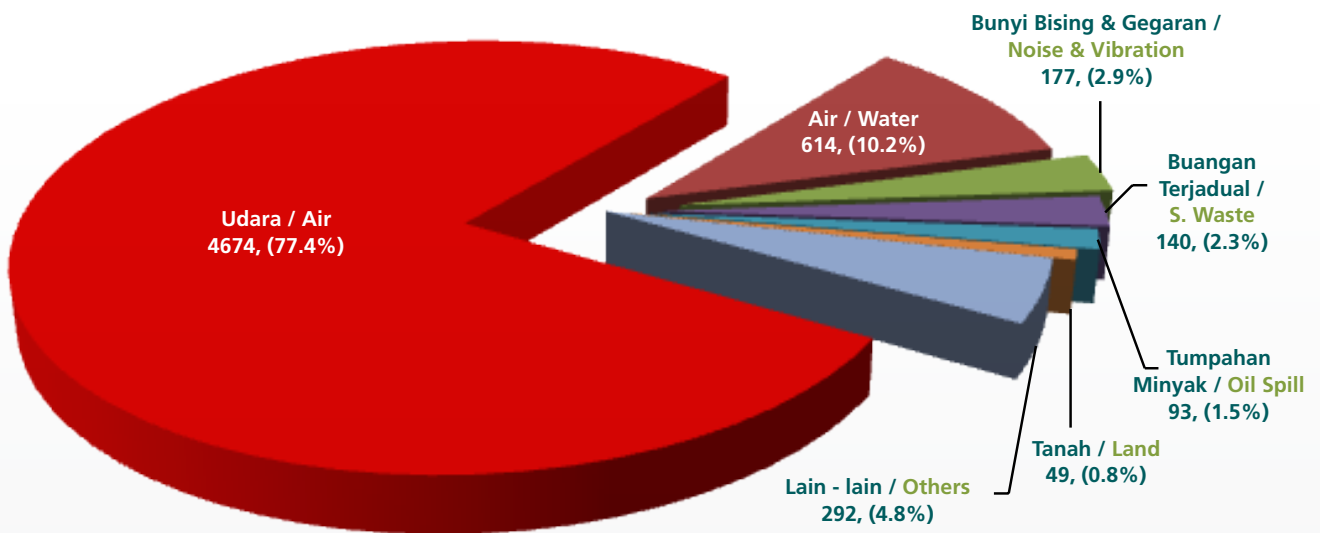
Pada tahun 2013, Selangor menerima aduan yang tertinggi iaitu sebanyak 1,890 kes (31.3%), diikuti oleh Johor 738 kes (12.2%) dan Pulau Pinang 565 kes (9.4%). Perlis menerima aduan yang paling rendah iaitu 45 kes (0.7%) dan diikuti dengan Wilayah Persekutuan Labuan iaitu 47 kes (0.8%). Seperti tahun-tahun yang sebelumnya, bilangan aduan pencemaran yang tertinggi adalah berkaitan dengan pencemaran udara iaitu sebanyak 4,674 kes (77.4%), 614 kes (10.2%) berkaitan pencemaran air, 177 kes (2.9%) berkaitan pencemaran bunyi, 140 kes (2.3%) berkaitan buangan terjadual, 93 kes (1.5%) berkaitan tumpahan minyak, 49 kes (0.8%) berkaitan pencemaran tanah dan 292 kes (4.8%) melibatkan aduan-aduan yang lain (**Rajah 4.18**).

The Department of Environment received 6,039 environmental pollution complaints in 2013. Out of these, 4,836 cases were under the Environmental Quality Act, 1974 whereby all these cases has been investigated with followed up actions, while the remaining 1,203 cases were not under the jurisdiction of DOE and were referred to other relevant agencies (**Figure 4.17**).

In 2013, Selangor recorded the highest number of complaints received 1,890 (31.3%), followed by Johor 738 (12.2%) and Penang 565 (9.4%). Perlis recorded the least number of complaints received with 45 (0.7%) complaints and followed by Federal Territory of Labuan 47 (0.8%) complaints. As in the previous years, most of the complaints received were related to air pollution 4,674 (77.4%), followed by 614 (10.2%) on water pollution, 177 (2.9%) on noise pollution, 140 (2.3%) on illegal dumping of scheduled or toxic wastes, 93 (1.5%) on oil spillage, 49 (0.8%) on land pollution and 292 (4.8%) on other complaints (**Figure 4.18**).



Rajah 4.17 - JAS : Bilangan Aduan Mengikut Negeri, 2013  
 Figure 4.17 - DOE : Number of Complaints by State, 2013



Rajah 4.18 JAS : Bilangan Kes Aduan Mengikut Jenis, 2013  
 Figure 4.18 DOE : Number of Complaint Cases by Types, 2013



**Pemeriksaan Ke Tapak Pelupusan Sampah Pajam, Pada 18 September 2013**  
**Inspection at Pajam Landfill on 18 September 2013**



**Pemeriksaan ke Premis QL Poultry Farm Sdn. Bhd., Pajam pada 18 September 2013 /**  
**Inspection at Premis QL Poultry Farm Sdn. Bhd., Pajam on 18 September 2013.**