



# **Dumping in Malaysian Seas: An Assessment of the Present Situation *vis-à-vis* International Legal Regimes\***

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## *Abstract*

Malaysia is almost entirely surrounded by sea. The west coast of Peninsular Malaysia faces the Malacca Strait which is 765 kilometres long and is the busiest strait in the world used for international navigation. The rest of Malaysia is bounded by the South China Sea, the Sulu Sea, the Celebes Sea and other narrower straits and waterways. Malaysia's marine environment with its diverse ecology is constantly subjected to marine pollution. The dumping of wastes into Malaysian seas is but one of the many marine pollution occurrences which have escalated in recent years. Surveillance and enforcement measures have been enhanced, but without firm legal provisions particularly for enforcement beyond territorial waters, efforts to curb indiscriminate dumping will continue to be a frustrating task. This article reviews these issues and suggests that it is imperative that current national laws be supplemented by those provisions of international law which govern the dumping of wastes and other matter.

## *Key Words*

Marine Environment, Marine Pollution, Malaysian Waters, Dumping, Pollutants

This article reflects the law up until 28 February 1998.

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## **Introduction**

The control and prevention of pollution of the Malaysian marine environment has yet to receive the attention already accorded to her terrestrial environment. This is not to say that the state of the Malaysian marine environment has been ignored. On the contrary, general laws on the protection and preservation of the marine environment are in place. However, there is a lack of standards and conditions that are targeted toward regulating specific and different uses of the marine environment. Such tools become vital and necessary when public awareness on the average is minimal. An increasing number of incidences of discharges and disposal of wastes into the sea in recent years indicates that the lack of respect for the marine environment cannot be taken lightly. National and international legal regimes for controlling discharges from ships and dumping at sea must be enforced without discrimination.

Pollution of the marine environment may emanate from various sources: vessel-sourced operational, intentional or accidental discharge; land-based points; or ocean dumping. Vessel-sourced operational, intentional or accidental discharge arises when pollutants such as oily-water, noxious liquids, sewage, garbage, or contaminated ballast water are released into the marine environment. Land-based sources of pollution are the result of industrial, agricultural, municipal and development discharges or run-offs which find their way into water-bodies and eventually into the sea. Dumping is the deliberate act of disposing of any wastes in whatever form, whether generated on land or at sea, into the marine environment.<sup>1</sup>

## **Ocean Dumping**

Reports provided by countries to the International Maritime Organization (IMO) between 1976–1985 show that dredged materials, industrial wastes and sewage sludge are the most common wastes dumped at sea.<sup>2</sup> The key environmental problems associated with the disposal of such wastes include, *inter alia*:

- risks to human health due to the presence of pathogens;
- eutrophication from nutrients and organics;
- toxic effects on marine organisms and/or humans; and
- resource-conflict use with other legitimate uses of the sea.

<sup>1</sup> This is a general definition. Specific definitions are provided in later parts of this article.

<sup>2</sup> Office of the London Dumping Convention *The London Dumping Convention: The First Decade and Beyond* (International Maritime Organization, London: 1991) 55–66.

A survey conducted by the Office of the 1972 London Convention<sup>3</sup> revealed that dredged materials constitute 80–90 per cent of the materials dumped at sea.<sup>4</sup> In the main, dredging operations are required to prevent rivers, estuaries, harbours, ports and shipping lanes from silting up. The contaminants present in dredged materials often include heavy metals like cadmium, mercury, chromium, pesticides and tributyltin. The release of these contaminants into the marine environment may cause eutrophication with acute or chronic toxic effects on marine organisms, the potential contamination of human food sources, and major physical impacts, like depositing of sediments into aquaculture farms.

Industrial wastes consisting of acid, alkaline, coal ash, scrap metal and fish processing wastes and flue gas desulphurisation sludge are also wastes dumped into the sea. Such wastes persist for a long time in the marine environment and may have lethal effects on marine species and damage habitat. Sludge resulting from sewage treatment may contain high levels of metals, oils and organic materials which can be toxic to the marine organisms and may eventually find their way into the human food chain. Eutrophication can result from the existence of large quantities of disposed municipal sewage sludge. Such wastes can be used beneficially as fertiliser or for land reclamation. But dumping sewage sludge into the sea may be seen as more economical than processing it for land-based uses.

### ***Sea Dumping Practices in Malaysia***

There are currently no formal records on dumping activities in Malaysian seas<sup>5</sup> other than the dumping of oil (sludge) from vessels into Malaysian territorial seas and the exclusive economic zone (EEZ). Table 1 illustrates the increasing number of reported oil spill incidences in Malaysia over a 20 year period from 1976 to 1996.<sup>6</sup> Though there are no records on how the spillage occurred, the majority of the spillage was ascribed to deliberate dumping of sludge from tankers or barges.<sup>7</sup> Table 1 also shows an alarming rate of spills for the period 1995–1996. Out of 93 incidences recorded in 1995, 15 spills occurred in the months of May, June and July

3 1972 Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (London Convention), 1046 UNTS 120.

4 Office of the London Dumping Convention, note 2 at 56.

5 These include internal seas, territorial sea, the exclusive economic zone and continental shelf areas.

6 Whilst the increasing numbers reflected in later years might also be the result of more comprehensive reporting and recording procedures, there is little evidence to suggest that such procedures vary from year to year; however, the number of incidences fluctuates markedly between certain years (eg 1993, 1994 and 1995). The sheer magnitude of the increased number of reported oil spills from the single event of 1976 to 93 such spills in 1995 suggests that even allowing for improved procedures, there is prima facie evidence of a substantial increase in oil spills in Malaysian waters.

7 Personal communication with the Department of Environment, Malaysia.

respectively. Incidences over these months in 1996 are less but remain high compared to other months; however, in the final months of 1996 the numbers increased dramatically to five in September, eight in October and seven in November. Regrettably, such numbers suggest that further incidences of indiscriminate dumping will continue.

**Table 1: Year and number of oil spill incidences in Malaysian seas**

1976–1996											
1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
1	1	1	0	13	12	13	5	5	6	25	14
1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
26	22	9	12	16	24	17	93	60	na	na	na

Adapted from Department of Environment (Malaysia), Kuala Lumpur: 1996

### Reported Dumping Cases

In March 1995, 42 drums of potassium cyanide were found dumped near a jetty on the island of Pangkor of the Perak state. As a result of the leakage from the drums, thousands of fish in three fish farms were killed. The owner of the fish farm estimated a loss of RM350,000.<sup>8</sup> On 3 October 1996, the *New Straits Times* reported the dumping of sludge off Penang, allegedly committed by a company carrying out “deepening” (sic) (dredging) operations of a river and nearby harbour. The newspaper article quoted the Penang Inshore Fishermen’s Welfare Association in claiming that the operations had been going on since 1993. Barges had dumped the dredged sludge three kilometres off the beaches of Penang – an area well within the territorial sea of Malaysia. This incident of illegal dumping polluted the waters of the island’s northern coastline and endangered at least 54 species of fish. The incomes of some 6,000 fishermen were also adversely affected.

The two cases mentioned above are but two of many incidences of illegal dumping by local offenders in Malaysian territorial seas. Although dumping activities are often witnessed by fishermen or local people who report the sightings to authorities and newspapers, a paucity of local laws and the inadequate coordination of enforcement measures frequently combine to delay investigations and thwart the apprehension of offenders.

### Dumping by Foreign Vessels

A spate of oil and waste dumping in the South China Sea and the Strait of Malacca by foreign vessels escalated to an alarmingly consistent rate in 1995–1996. In 1995,

<sup>8</sup> Julie Goh, P. Chandar Sagar and Narsing Rao “Poison find in Pangkor – 42 drums of potassium cyanide dropped near beach” *The Sun* (Malaysia) 21 March 1995.

five foreign vessels were charged and fined for discharging and desludging oil. Two vessels were found guilty of offences under the Exclusive Economic Zone Act 1984, whilst the other three were charged and fined a total of RM145,000 under the Environmental Quality Act 1974 and the Environmental Quality (Scheduled Wastes) Regulations 1989 for carrying out illegal tanker cleaning and desludging.<sup>9</sup>

As early as January 1996, four ships were detected dumping sludge in Malaysian seas. Out of the four, two were successfully detained and prosecuted by Malaysian authorities.<sup>10</sup> Later in the year, two ships were detained for discharging toxic waste off the Johor and Sabah coasts. One of the detained ships were detected discharging waste into a river at Tanjung Piai, Johor.

The waters off Pulau Angsana – approximately six nautical miles off the south-western Malaysian Peninsula coast – are known to be a favourite dumping area for vessels plying the Strait of Malacca or for those calling at ports along the Strait in which they are unable to dispose of their wastes onshore.<sup>11</sup> The Pulau Angsana sea area is thronged with garbage, much of which is made of non-biodegradable plastic. Other targeted dumping spots along the Strait of Malacca include areas near Pulau Sembilan off Lumut, Pulau Pangkor off Perak, the waters off Port Dickson, Tanjung Bidara off Melaka and Tanjung Piai off Johor. Table 3 shows that in 1994, a total of 122,060 ships called at the main ports along the Strait of Malacca. With increasing trade in this region, the number must surely have increased in recent years. The lack of on-shore reception facilities along the Strait exacerbates the problem of illegal dumping by ships.

In the South China Sea, waters off Pulau Tioman, Tanjung Gelang Patah, and Sabah and Sarawak are the apparent favourite dumping spots. Although dumping in the South China Sea remains a serious problem,<sup>12</sup> the effects of dumping are not as immediately apparent as they are in the Malacca Strait. The Malacca Strait has a mean depth of 25 metres while the South China Sea is an average of 1,060 metres deep. Additionally, the territorial sea boundary between Malaysia and Indonesia in the Strait of Malacca is only a distance of 177.5 nautical miles.<sup>13</sup> The Strait has varying widths and is constricted by sand banks and shoals. Due to the heavy traffic in the Strait, particular channels are perpetually congested. Thus, the continuous and unregulated dumping of waste in this region, particularly waste that does not readily degrade, has resulted in accumulated pollution in the Strait which may well cause long-term damage to the marine environment.

9 V. Anbalagan and A. Hafiz Yatim "Two shipowners fined for dumping oil wastes" *The New Straits Times* (Malaysia) 3 February 1996.

10 See Table 2.

11 Personal communication with shipmasters.

12 The South China Sea seems to satisfy the criteria for that of a semi-enclosed sea, and as such warrants special consideration as reflected in the 1982 United Nations Convention on the Law of the Sea (1982) 21 ILM 1261, Arts. 122 and 123.

13 See Vivian L. Forbes *Indonesia's Maritime Boundaries* (Maritime Institute of Malaysia (MIMA), Kuala Lumpur: 1995).

**Table 2: Number of ships detained and prosecuted for dumping of sludge/oily wastes in Malaysian seas: 1995–1996**

Name of ship	Date of offence	Offence	Relevant National Act	Penalty
1. MT Elite Leader	3 Feb 1995	Desludging in the Malaysian Exclusive Economic Zone near Bintulu	s. 10, EEZA	Fined RM32,000
2. S. S. Song San	Feb 1995	Illegal tanker cleaning and desludging in Malaysian territorial sea	EQA and Environmental Quality (Scheduled Wastes) Regulations 1989	Collective fine of RM145,000
3. MT Solo	Feb 1995	Illegal tanker cleaning and desludging in Malaysian territorial sea	EQA and Environmental Quality (Scheduled Wastes) Regulations 1989	Collective fine of RM145,000
4. M. V. Redwood	Feb 1995	Illegal tanker cleaning and desludging in Malaysian territorial sea	EQA and Environmental Quality (Scheduled Wastes) Regulations 1989	Collective fine of RM145,000
5. M. V. Xing Hai I	28 Oct 1995	Illegal discharging in South China Sea about 41 nautical miles off Tanjung Manis, Sarawak and failure to inform the Director-General of the Environment of the desludging activity	EEZA	Fined RM33, 500
6. M. V. Golden Kris	8 Jan 1996	Discharging fuel about 14 nautical miles off Pulan Sembilan near Pulan Pangkor	s. 27, EQA	Fined RM10,000
7. M. V. Lydra	22 Jan 1996	Discharging oil 10 nautical miles to the west of Tanjung Bidara, Melaka	s. 29, EQA	Fined RM10,000
8. Langkah Perdana	2 Aug 1996	Dumping of sludge into Malaysian territorial sea in the South China Sea	s. 29, EQA	Fined RM100,000

Sources: See note 9; Department of Environment (Malaysia) “*Penguatkuasaan Pencemaran Marin dan Masalah-masalahnya*” (Enforcement of Marine Pollution and its Related Problems) (paper presented at the Malaysia Maritime Conference, Malacca:16–19 December 1996) (on file Maritime Institute of Malaysia). Legend: EEZA – Exclusive Economic Zone Act 1984 (Malaysia); EQA – Environmental Quality Act 1974 (Malaysia).

**Table 3: Number of ships calling at ports along the Strait of Malacca**

Ports	1993	1995
<b>Peninsular Malaysia:</b>		<b>16,936</b>
Port Kelang	5,537	7,180
Port Dickson		1,295
Malacca including Sungai Udang		215
Lumut		2,178
Penang		6,068
<b>East Coast Sumatra</b>		<b>3,133</b>
Lhokseumawe	622	738
Belawan	1,544	1,728
Dumai	427	667
Riau Archipelago	812	
Batam		991
<b>Singapore</b>	<b>92,655</b>	<b>101,000</b>
<b>TOTAL</b>		<b>122,060</b>

Source: Marine Department, Malaysia; Public Port Corporation, Indonesia and Port of Singapore Authority (1995)

Although individual dumping incidents associated with fishing are of a smaller scale and are therefore less graphic than the more substantial events – such as oil spills – caused by dumping from ships,<sup>14</sup> the dumping of waste at sea by fishing boats is at least as serious as that carried out by commercial vessels. In 1993, there were approximately 32,382 fishermen with 14,306 fishing crafts licensed to operate in the Strait of Malacca.<sup>15</sup> This represents nearly 70 per cent of the total number of Malaysian fishermen. In light of the number of illegal trawlers caught operating or sighted in Malaysian seas<sup>16</sup> the actual number of fishing boats operating in Malaysian seas certainly would be higher than that suggested by the official statistics. The sheer number of vessels and people involved in fishing in Malaysia means that the threat of serious environmental damage arising from the cumulative effects of long-term, indiscriminate dumping is very real indeed.

**Table 4: Number of illegal foreign fishing vessels caught in Malaysian seas**

1990–1995						
1990	1991	1992	1993	1994	1995	TOTAL
150	158	96	107	148	126	<b>785</b>

Source: Fisheries Department (Malaysia) *Activity Report of the Marine Branch* (Fisheries Department, Kuala Lumpur: 1995)

14 The figures shown at Table 1 do not reflect the numerous minor spills that can reasonably be expected to occur from fishing vessels and almost all of which presumably go undetected and unreported.

15 Fisheries Department (Malaysia) *1993 Annual Statistics* (Fisheries Department, Kuala Lumpur: 1994).

16 See Tables 4 and 5.

**Table 5: Encroachment by foreign fishing vessels into Malaysian seas according to areas**

Areas	1991-1995				
	1991	1992	1993	1994	1995
Strait of Malacca	381	485	124	302	538
East Coast	1670	2149	1339	1101	368
Sabah	41	26	36	54	57
Sarawak	326	36	96	224	217
<b>TOTAL</b>	<b>2418</b>	<b>2696</b>	<b>1595</b>	<b>1681</b>	<b>1180</b>

Source: Fisheries Department 1995 Activity Report (Marine Branch, Fisheries Department, Kuala Lumpur: 1996)

There are no formal records of other types of dumping at sea. Other wastes and matters listed under the Environmental Quality (Scheduled Wastes) Regulations 1989 are required to be disposed of or treated on land at prescribed premises. The dumping of these materials at sea is officially proscribed and therefore will not be considered in this study.

### Policing of Sea Dumping

Most dumping activities are sighted by fishermen or enforcement agencies particularly by the Marine Fisheries Enforcement Wing, the Royal Malaysian Police Air Wing, the Royal Malaysian Air Force and the Royal Malaysian Navy. Reporting and enforcement procedures are cumbersome under the present arrangements. Sightings are conveyed to the Maritime Enforcement Co-ordinating Centre (MECC) which will then report to the Department of Environment for the delegation of enforcement powers to the relevant agency.<sup>17</sup> The process may take as long as six to ten hours before the responsible agency arrives at the scene of the alleged crime, thus delaying the taking of samples of waste for “finger printing” which is crucial for any eventual court proceedings. In addition, most enforcement agencies lack the funds to satisfactorily undertake a marine pollution enforcement operation. Many delays or poor enforcement measures have been linked to the lack of patrol boats, qualified personnel or sophisticated communication tools which might have assisted in the reduction of delay-time, amongst other failure factors.<sup>18</sup>

17 The deployed enforcement agency, more often than not, will be the agency nearest to the location of the alleged incident. Relevant enforcement agencies have jurisdiction in different maritime zones. The Marine Department, the Customs and Excise Department, the Fisheries Department, the Navy and the Police have delegated powers under the EQA for enforcement purposes in the territorial sea. The Navy, Air Force, Police Air Wing and the Fisheries Department have jurisdiction in the exclusive economic zone.

18 Personal communication with enforcement agencies.



## Disposal Sites

In encouraging environmentally sound management of wastes, the Malaysian Government, through the efforts of the Department of Environment, has encouraged private companies to establish and operate land-based integrated waste treatment and disposal facilities. The approved facilities are not yet in operation. At present, waste treatment and disposal facilities are located away from port areas but in due course the granting of licences for operation of similar facilities at critical port areas is expected. At present, apart from the reception facilities owned and operated by major oil companies at their respective receiving terminals,<sup>19</sup> only two shore reception facilities have been licensed to receive slop and oily sludge and, as neither of them is located along the Strait of Malacca, they are isolated from the heavy traffic of that region.

Three land-based sites have been approved by the Department of Environment for the operation of waste disposal, storage and/or treatment facilities. The private companies mandated to manage the operations are:

- the Indah Water Konsortium (IWK) for sewage and sewerage wastes;
- Worldwide Sita Sdn. Bhd. (SITA) for organic municipal wastes; and
- Kualiti Alam Sdn. Bhd. (KA) for toxic and hazardous wastes that are scheduled wastes.

To date, information is available only on the operations of Kualiti Alam (KA). According to an agreement between the Government and KA signed on 18 December 1995, the KA facility was expected to receive wastes by August 1996 and operate fully by mid-1998. Appendix 2 illustrates the classification of wastes by KA which will be treated accordingly through incineration, solidification or disposal at prescribed landfills.

As mentioned earlier, there are currently only two shore reception facilities licensed by the Department of Environment to receive, store and recover slop oil and oily sludge resulting from tanker cleaning and desludging operations. Both facilities are located in Johor. In light of the high occurrence of dumping in Malaysian seas, particularly of sludge and oily substances, the establishment of only two reception facilities located at the southern tip of the Peninsula, seems hardly to be an adequate response and will probably do little to encourage vessels to dispose of their wastes properly and legally on land. As a coastal State with significant seaborne trade, it is both necessary and urgent that Malaysia provide adequate reception facilities especially at the main ports along the Malacca Strait.

<sup>19</sup> Mainly to receive ballast or slop. In any case, the Sungai Udang Port in Melaka which operates an oil terminal does not have crude oil washing nor tank cleaning and gas freeing facilities in port; see *Ports Guide 1997* (Fairplay Publications, Surrey: 1997) 1881.

The 1996 *Environmental Quality Report* lists oil and grease (72 per cent), total suspended solids (53.8 per cent) and *Escherichia coli* (29.6 per cent) as the main pollutants found in the coastal areas of all states in Malaysia. As mentioned above, the environmental risks posed by waste dumping can be chronic and harmful not only to marine species but also to humans. Thus, uncontrolled and unscrupulous dumping of wastes can result in both a loss of marine species and also interfere with other legitimate uses of the sea.<sup>20</sup> For example, the livelihood of fishermen can be jeopardised and potential marine tourism destinations may be damaged. In the case of Penang, dumping of waste in nearby waters would certainly blight the appearance of its world famous beaches and harm important tourist developments. However, the incidences illustrated in Table 2, along with anecdotal reports of other local incidents, indicate that the dumping of waste is rife in Malaysian seas and that stricter laws and enforcement measures are needed if this problem is to be overcome.

### **Malaysian Marine Environmental Protection Laws**

The Environmental Quality Act 1974 (EQA), Merchant Shipping Ordinance 1952, Exclusive Economic Zone Act 1984 (EEZA) and Continental Shelf Act 1966 (CSA) are the four principal Acts governing the protection and preservation of the marine environment in Malaysia. However, sea dumping is not addressed specifically by these existing laws. Presently, only the EQA, EEZA and CSA can be interpreted as encompassing activities relating to dumping at sea. The provisions of sections 27, 29 and 34B of the EQA can be interpreted in such a way as to encompass the dumping of wastes at sea, while the EEZA expressly provides for the dumping of wastes in section 10. Whilst the CSA does not specifically protect the continental shelf from pollution or wastes, section 6(1) does allow for the promulgation of regulations in that respect. For example the *Yang di-Pertuan Agong*<sup>21</sup> may make regulations for “prescribing measures to be taken in any such safety zone for the protection of the living resources of the sea and the natural resources of the continental shelf from harmful agents”.<sup>22</sup>

The three Acts discussed above govern the responsibilities and obligations required of both the public and private sectors over the marine environment in

20 Fishermen have noted that “crude oil in plastic containers dumped by ships is washed ashore causing vegetation rot and the soil to wash into the sea”. In the case of Pulau Kukup, the world’s biggest single vegetation mangrove island situated in the Strait of Malacca, dumped sludge may be carried by the current up to Kukup affecting its coastal vegetation and its cage-fish breeding: Shahr Yaacob “Letting nature run its course” *The Star* 10 September 1996.

21 The title referring to the reigning constitutional monarch of Malaysia.

22 Continental Shelf Act 1966 s. 6(1)(f) (Malaysia).

different maritime zones. The EQA is applicable to inland waters, internal waters and “Malaysian waters” defined as territorial waters in accordance with the Emergency (Essential Powers) Ordinance No 7 of 1969.<sup>23</sup> The territorial waters of Malaysia are the waters within a zone measured from the baselines extending 12 nautical miles seawards.<sup>24</sup> Interpretation of inland and internal waters vary according to the applicable regulations provided under the EQA.

The principal provisions contained in the EEZA on similar matters are reflected in Part IV “Protection and Preservation of the Marine Environment” of the Act. The Act is applicable over the EEZ of Malaysia which is the area “beyond and adjacent to the territorial sea<sup>25</sup> of Malaysia and ... extends to a distance of two hundred nautical miles from the baselines from which the breadth of the territorial sea is measured”.

The continental shelf is defined in the CSA as:

the sea-bed and subsoil of submarine areas adjacent to the coast of Malaysia but beyond the limits of the territorial waters of the States,<sup>26</sup> the surface of which lies at the depth no greater than two hundred metres below the surface of the sea, or, where the depth of the superjacent waters admits of the exploitation of the natural resources of the said areas, at any greater depth.<sup>27</sup>

Regulations made under section 6 can be extended to cover the “continental shelf” areas within the limits of the territorial waters of the states provided that the rights and powers of the state authorities are not affected.<sup>28</sup> In the light of this, dumping activities considered as presenting harmful agents into the continental shelf environment can be regulated thereunder. To date, however, no regulations have been promulgated governing any pollution or waste disposal matters within the ambit of section 6 of the CSA.

### The Environmental Quality Act 1974

The EQA came into force on 15 April 1975 and is the principal legislation relating to the prevention, abatement and control of pollution and enhancement of the environment. The latest amendments to the Act introduced via the Environmental Quality

23 Section 3(1), as amended, declares the breadth of territorial waters of Malaysia as 12 nautical miles, “except in the Straits of Malacca, the Sulu Sea and the Celebes Sea, whereby for measurement purposes Articles 3–12 of the Geneva Convention on the Territorial Sea and the Contiguous Zone, 1958 apply”. Malaysia became a party to the 1958 Convention, 516 UNTS 205, on 21 December 1960.

24 Such a definition is consistent with the 1982 United Nations Convention on the Law of the Sea, Art. 3.

25 The “territorial sea” also means the territorial waters of Malaysia determined in accordance with the Emergency (Essential Powers) Ordinance, No. 7, 1969 (Malaysia) as per Exclusive Economic Zone Act 1984 s. 2 (Malaysia).

26 “State” means a State of Malaysia; see Interpretation Acts 1948 and 1967 (Rev. 1989) s. 3, Pt 1 (Malaysia).

27 Continental Shelf Act 1966 s. 2 (Malaysia).

28 Ibid s. 6(2).

(Amendment) Act 1996 came into force on 1 August 1996. The amendments have added a new dimension to the prevention of marine pollution which may be interpreted as including dumping activities. The prohibition of the discharge of oil and wastes into Malaysian territorial seas provided for in sections 27 and 29 and the new section 34B of the EQA can be interpreted as encompassing a prohibition of dumping in the sea of similar matters. Section 27(1) reads: "No person shall, unless licensed, discharge or spill any oil or mixture containing oil into Malaysian waters in contravention of the acceptable conditions specified under section 21."

Section 27 thus prohibits the discharge of oil defined under section 2 of the Act whether from vessel or land by any person into the territorial waters of Malaysia beyond the conditions deemed acceptable as specified under section 21 by the Minister, unless licensed to do so. Acceptable conditions for discharge have thus far yet to be specified by the Minister. This automatically limits the application of section 27 and in effect renders the section ineffective, at least until those acceptable conditions have been specified.

#### *Discharge of Wastes*

Section 29 prohibits the discharge of wastes into Malaysian territorial seas. The new amendment has widened the scope to include a prohibition on the discharge of environmentally hazardous substances or pollutants. The discharge of wastes is again deemed acceptable if carried out in accordance with the provisions of section 21, and may go beyond those provisions if licensed. Hence, given that the Minister is yet to specify acceptable conditions for discharge, any person can discharge wastes, environmentally hazardous substances or pollutants without concern for the requirements of section 21. Likewise with section 27, the provisions seem sufficiently wide to include even dumping activities. However, until the "acceptable conditions" are specified by the Minister, the provisions respecting discharge in the EQA are very limited and remain dubious for application and enforcement purposes.

The new Part IV-A of the Environmental Quality (Amendment) Act 1996 concerning "Control of Scheduled Wastes" provides for the control of transboundary movement of scheduled wastes, specifically hazardous wastes, and their disposal pursuant to the provisions of the 1989 Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (Basel Convention)<sup>29</sup> to which Malaysia acceded on 8 October 1993. Section 34B(1)(a) of Part IV-A stipulates that no person shall:

[p]lace, deposit or dispose of, or cause or permit to place, deposit or dispose of, except at prescribed premises only, any scheduled wastes on land or into Malaysian waters; ... without any prior written approval of the Director-General.

29 (1989) 28 ILM 657.

The placing, depositing or disposing of scheduled wastes into the territorial seas of Malaysia is again upon prior approval from the Director-General who may grant such approvals with or without conditions. On this premise, despite Part IV–A being the result of the promulgation of Basel Convention principles, basic dumping regulations can be construed as having been taken into account within this section.

An examination of the listing of the 107 categories of toxic and hazardous wastes defined as “scheduled wastes”<sup>30</sup> under the Environmental Quality (Scheduled Wastes) Regulations 1989 in particular strengthens this argument as similar wastes identified by the principal international convention governing dumping of wastes and other matter, the London Convention, are prohibited from being dumped at sea. Furthermore, the Environmental Quality (Prescribed Premises) (Scheduled Wastes Treatment and Disposal Facilities) Order 1989 prescribes six types of premises<sup>31</sup> for the treatment and disposal of scheduled wastes on land. Such regulated procedures are one of the main requirements under the London Convention for the control and prevention of dumping into the sea of listed wastes or other matter. The fine and term of imprisonment for offenders under all the above sections is RM500,000 and/or a maximum of five years imprisonment respectively.

No express definition of “discharge, place, deposit or dispose of” is offered in the EQA. To a certain extent, these words can be interpreted to include dumping activities, however, each section has certain limitations on the extent to which the prevention of pollution in the Malaysian territorial sea can be governed. Because of these limitations, and in light of the absence of enabling sections for the provision of further subsidiary legislation on dumping at sea, the control and prevention of dumping at sea remains a problem that needs to be addressed.

A reasonable case may be argued that dumping provisions, taking into account international standards, are not catered for in the present EQA. Arguably, important deficiencies would include the absence of a definition of dumping, along with stipulation of the category of wastes deemed suitable or unsuitable for dumping purposes. To a large extent, the non-existence of effective measures necessary to prevent pollution of the sea may add to the lacuna in the Act.

“Waste” has been re-defined in section 2 by the EQA (Amendment), 1996 as including:

[A]ny matter prescribed to be scheduled waste, or any matter whether in a solid, semi-solid or liquid form, or in the form of gas or vapour which is emitted, discharged or deposited in the environment in such volume, composition or manner as to cause pollution.<sup>32</sup>

30 See Appendix 1.

31 The premises are: i) land treatment facilities; ii) off-site recovery facilities; iii) off-site treatment facilities; iv) scheduled waste incinerators; v) off-site storage facilities including transport vehicles; and vi) secure landfills designated for the disposal of scheduled wastes.

32 The London Convention, on the other hand, gives a very wide description of “wastes and other matter” which includes “material and substance of any kind, form or description”.

The EQA registers toxic and hazardous wastes as scheduled wastes where discharge standards and the manner in which the waste should be discharged into the environment are stipulated in the relevant subsidiary legislation.<sup>33</sup> Further discussion on the compatibility of national laws and the international stipulations required under the London Convention is considered below.

### The Exclusive Economic Zone Act 1984

As mentioned earlier, provisions of the EEZA principally deal with the protection of the marine environment within the EEZ. Section 9, Part IV of the EEZ Act 1984 states that: "Malaysia has the sovereign right to exploit her natural resources in the exclusive economic zone pursuant to her environmental policies and in accordance with her duty to protect and preserve the marine environment in the zone."

In this respect any legitimate uses of the EEZ area are subject to environmental protection measures. Notwithstanding that, dumping of wastes or other matter may be carried out under a licence issued by the Director-General subject to conditions that may be imposed as stipulated in section 10(4). In addition, unless the dumping activity was necessary for the purpose of saving life or to secure the safety of the vessel, a place on land, or an installation, device or aircraft,<sup>34</sup> dumping is an offence liable to a fine not exceeding RM1 million if the person or persons contravene section 10(1).

Dumping under section 2 of the EEZ Act 1984 means:

- any deliberate disposal of wastes or other matter from vessels, aircraft, platforms or other man-made structures at sea; or
- any deliberate disposal of vessels, aircraft or other man-made structures at sea.

The definition excludes dumping due to:

- the disposal of wastes or other matter incidental to, or derived from, the normal operations of vessels, aircraft, platforms or other man-made structures at sea and their equipment, other than wastes or other matter transported by or to vessels, aircraft, platforms or other man-made structures at sea, operating for the purpose of disposal of such matter or derived from the treatment of such wastes or other matter on such vessels, aircraft, platforms or structures; or
- placement of matter for a purpose other than the mere disposal thereof, provided that such placement is not contrary to the aims of this Act, any applicable written law or international law.<sup>35</sup>

33 Environmental Quality (Scheduled Wastes) Regulation 1989 (Malaysia); Environmental Quality (Prescribed Premises) (Scheduled Wastes and Disposal Facilities) Regulations 1989 (Malaysia); Environmental Quality (Prescribed Premises) (Scheduled Wastes Treatment and Disposal Facilities) Order 1989 (Malaysia).

34 Exclusive Economic Zone Act 1984 s. 11 (Malaysia).

35 Activities related to this exclusion may be interpreted as being covered under the purview of the earlier part of s. 10 where discharge of oil and wastes into the EEZ is absolutely prohibited, and are not even subject to

The definition of “dumping” in this Act is adopted wholly from the definition given by the London Convention.

“Waste” has been broadly defined in section 2 of the EEZA as including liquid, solid, gaseous, radioactive or any matter prescribed by the Minister<sup>36</sup> to be waste which if entered into the marine environment would “cause an alteration” to the environment. However, the Act does not list any specific waste or make an assumption of what causing an alteration to the marine environment should mean. At a glance, the dumping provisions under the EEZA do seem to adopt some of the London Convention principles but incorporation of further specific regulations and measures of the London Convention (and of other relevant treaties) would make dumping regulations and procedures under the EEZA more complete.

### The Continental Shelf Act 1966

Little can be said of the provisions under the CSA concerning control and prevention of pollutants into the marine environment. As mentioned earlier, it can only be inferred that any regulation made under section 6 for the protection of the living resources of the sea and the natural resources of the continental shelf against harmful agents include the dumping of wastes. Nonetheless, the prescribed regulations are only applicable to designated safety zones in the continental shelf defined as: “Extending to a distance not exceeding five hundred meters measured from each point of the outer edge of the installation or device, around any such installation or devices in, or above, the continental shelf.”<sup>37</sup> “Device” includes any ship, floating platform, or aircraft that is used in connection with any installation or device.<sup>38</sup> There is no definition of “installation”, but in relating “installation” to the purpose of this Act, it may be construed as the mechanism “used to explore, prospect or bore for or carry on any operations for the getting of minerals”,<sup>39</sup> other than petroleum, in the sea-bed or subsoil of the continental shelf. In this respect, protection of the marine environment within the continental shelf areas is limited to areas designated for mineral prospecting.

In confronting future acts on dumping of solid matters like vessels, platforms, installations used for either mineral or petroleum exploration and exploitation, provisions under section 6 CSA do not seem adequate. Notwithstanding that, at regional and international fora arguments about the viability of dumping these gigantic pieces of equipment remain to be resolved. Efforts towards meeting the

licences as required under EQA. The offender of s. 10(1) is liable to a fine not exceeding RM1 million. Only when the defence against s. 10(1) offences relate to the securing of life or vessels may the person charged be exempted as stipulated in s. 11.

36 Who is charged with responsibility for the environment which is currently the Minister of Science, Technology and the Environment.

37 Continental Shelf Act 1966 s. 6(1)(c) (Malaysia).

38 Ibid s. 5(5).

39 Ibid s. 4(3).

Malaysian Government's commitment to preserve and protect the marine environment, in particular from the potential threat posed by the dumping of offshore installations at sea, must be strengthened if they are to be fully effective.

### ***Malaysia and International Dumping Treaties***

Malaysia's recent ratification of the 1982 United Nations Convention on the Law of the Sea means that it has a responsibility and obligation to prevent illegal dumping activities as far as practicable. To date, many regional anti-dumping agreements have been established around the world, none of which apply to Southeast Asia. In view of the serious efforts that have been taken to curb the incessant dumping operations that continue to pollute Malaysian seas, and in the absence of regional agreements, Malaysia would be wise to consider seriously the option of becoming a party to an international convention governing the dumping of wastes and other matter. Participation in such a regime would underpin Malaysian municipal law with a firm foundation of international law and respected standards. Introduction of the new 1996 Protocol to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter<sup>40</sup> provides Malaysia as a non-contracting State to the London Convention an alternative to becoming a party to the original London Convention.

An examination of the relevant Malaysian national laws such as the EQA, EEZA and CSA suggests that there is a significant lacunae in Malaysian law respecting provisions on dumping at sea. Although a certain interpretation might conclude that the existing Acts do address dumping activities, the present provisions are neither adequate nor precise enough for the effective administration of ocean dumping in Malaysian seas. At present, EEZA is the only Malaysian Act which has specific provisions on dumping. Ocean dumping is defined in EEZA and unlicensed dumping is an offence liable to a fine not exceeding RM1 million. However, the EEZA pertains only to the exclusive economic zone and falls far short of the sophisticated provisions reflected in international instruments. Certainly, the imprecision of present arrangements mitigates against enforcement efficacy. The need for specific regulations on dumping at sea is urgent. Such regulations might be embodied in the three existing enabling Acts, or, alternatively, a more practical direction might be to regulate dumping by way of new, comprehensive dumping legislation covering the whole expanse of Malaysia's maritime jurisdiction. Enactment of purposely directed legislation would

40 (1997) 36 ILM 7.



seem to hold the greatest promise for achievement of efficient and effective ocean dumping administration and enforcement measures.

Taking as examples the London Convention and the 1996 Protocol, Malaysia's national dumping laws need to specify that dumping is not permitted except for certain wastes deemed suitable for dumping under licence. Other particular issues for consideration include:

- provisions on standards and conditions for dumping;
- permits for dumping;
- designated dump sites; and
- delegation of powers to various agencies for enforcement purposes.

Any ocean-dumping legislation would also need to incorporate provisions for emergency dumping which recognised the requirement for consultation with other countries that might be affected by such dumping operations. The development of simpler, cohesive regulations to govern enforcement, along with streamlined procedures and organisational structures for enforcement, would help to ensure that illegal dumping was effectively prevented or that violations were traced and offenders apprehended.

There are no direct financial ramifications for a State when it becomes a party to either the London Convention or the 1996 Protocol. However, indirectly, State parties are obliged to provide waste reception facilities preferably on land to avoid as far as possible dumping at sea. This is one measure that can be taken by coastal States like Malaysia to demonstrate a desire to promote the effective prevention, reduction and, where practicable, elimination of sea pollution caused by dumping of wastes or other matter in accordance with the objectives of the London Convention or the Protocol. Although the provision of reception facilities on-shore is not an explicit requirement of either the London Convention or the Protocol, they are in effect land-based alternatives to sea dumping. In this regard, Malaysia has already initiated such moves by encouraging the private sector to take responsibility for providing facilities to receive, treat and dispose of industrial, municipal, toxic and hazardous wastes. These efforts take time to be fully operational, and in Malaysia waste-reception infrastructure is far from meeting national needs. Participation in either the London Convention or the 1996 Protocol would open the possibility for technical and financial assistance to be sought from other State parties through the IMO. Indeed, efforts to consolidate and strengthen technical cooperation and assistance have been enhanced in the 1996 Protocol provisions and are readily available even before a State<sup>41</sup> becomes a party to the Protocol.<sup>42</sup>

<sup>41</sup> State is referred to as "developing countries and countries in transition to market economies".

<sup>42</sup> See (Draft) Resolution LC.55(SM) on the Technical Co-operation and Assistance Activities Related to the London Convention (7 November 1996) LC/SM 1/DC.3.

## **Conclusion**

Government efforts to control and prevent pollution of the Malaysian environment have, of late, been enhanced. Enforcement procedures have been tightened which, when combined with stricter national environmental laws, have resulted in the prosecution of several large-scale offenders. State governments, local councils and the corporate sector have also become increasingly aware of environmental pollution and have begun to take remedial and preventative action. Support given by both the public and private sectors indicate that efforts by both the government and relevant interested parties in promoting a pollution-free environment have in many respects proved successful, but this does not mean that Malaysia can rest comfortably on its laurels. The numerous incidents of indiscriminate dumping that have been documented by government agencies and the Malaysian press suggest that more needs to be done and be seen to be done.

National marine-pollution laws seem to be inadequate to prevent and control sea dumping activities. Offenders are not only Malaysians but also foreign vessels traversing the Strait of Malacca and other parts of Malaysian seas. Thus, as sea dumping is not a problem concerning Malaysia alone, but a nuisance with implications beyond national boundaries, Malaysia would benefit from adopting international measures into its national law. Malaysia has an opportunity to capitalise administratively, technically and perhaps even financially on the experience and assistance of the Contracting Parties to the London Convention in the implementation of dumping laws. Acceptance of the 1996 Protocol to the London Convention would assist Malaysia to realise such benefits more readily. As Malaysia strives to achieve its industrialisation goals it has not blindly disregarded social and environmental concerns. Recent national efforts to control and prevent marine pollution in Malaysian seas suggest that acceptance of international instruments regarding sea dumping would not bind Malaysia to obligations that are appreciably more onerous than those already dictated by prudence and common sense.

## **Appendix I**

### **Scheduled Wastes as Listed in the Environmental Quality (Scheduled Wastes) Regulations 1989**

#### **FIRST SCHEDULE (REGULATION 2)**

##### **PART I SCHEDULED WASTES FROM NON-SPECIFIC SOURCES**

1. Mineral oil and oil contaminated wastes
  - N011 Spent oil or grease used for lubricating industrial machines.
  - N012 Spent hydraulic oil from machines, including plastic injection moulding machines, turbines and die-casting machines.
  - N013 Spent oil-water emulsion used as coolants.
  - N014 Oil tanker sludge.
  - N015 Oil-water mixture such as ballast water.
  - N016 Sludge from oil storage tank.
2. Water containing polychlorinated biphenyl (PCB) or polychlorinated triphenyls (PCT)
  - N021 Spent oil contaminated with PCB or PCT.
  - N022 Discarded electrical equipment or parts containing or contaminated with PCB or PCT.
  - N023 Containers contaminated with PCB or PCT.
3. Spent organic solvents containing halogen or sulphur, including methylene chloride, 1,1,1, trichloroethane, perchloroethylene and dimethyl sulphide
  - N031 Spent halogenated solvents from cleaning and degreasing processes.
4. Spent aromatic organic solvents without containing compounds of organic halogen or sulphur, including toluene, xylene, turpentine and kerosene
  - N041 Spent aromatic organic solvents from washing, cleaning or degreasing processes.
5. Spent non-aromatic organic solvents without containing compounds of organic halogen or sulphur, including acetone, ketones, alcohol, cleansing-benzene and dimethyl formamide

- N051 Spent non-aromatic organic solvents from washing, cleaning or degreasing processes.
- 6. Residues from recovery of halogenated solvents, may contain oil, fat and solvents
  - N061 Residues from recovery of halogenated solvents.
- 7. Residues from recovery of non-halogenated solvents, may contain oil, fat and solvents
  - N071 Residues from recovery of non-halogenated solvents.
- 8. Spent organometallic compounds may be mixed with benzene excluding mercury compounds
  - N081 Residues of organometallic compounds, including tetraethyl lead, tetramethyl lead and organotin compounds from mixing process of anti-knock compound with gasoline.
- 9. Flux wastes, may contain mixture of organic acids, solvents or compounds of ammonium chloride
  - N091 Flux wastes from fluxing bath of metal treatment processes.
- 10. Spent aqueous alkaline solutions not containing cyanide, may contain heavy metals
  - N101 Spent aqueous alkaline solutions from treatment process of metal or plastic surfaces.
  - N102 Spent aqueous alkaline solutions from bleaching process of textile materials.
- 11. Spent aqueous alkaline solutions containing cyanide, may contain heavy metals
  - N111 Spent aqueous alkaline solution containing cyanide from treatment process of metal or plastic surfaces.
- 12. Spent aqueous chromic acid solutions
  - N121 Spent aqueous chromic acid solutions from treatment process of metal or plastic surfaces.
  - N122 Spent aqueous chromic acid solution from leather tannery processes.
- 13. Spent aqueous inorganic acid solutions other than spent chromic acid solutions, may contain heavy metals
  - N131 Spent aqueous acid solutions from treatment process of metal or plastic surfaces.

- N132 Spent aqueous inorganic acid solutions from industrial equipment cleaning.
- 14. Spent aqueous or discarded photographic waste from film processing or plates making
  - N141 Spent aqueous or discarded photographic waste from film processing or plate making.
- 15. Metal hydroxide sludge containing one or several metals, including chromium, copper, nickel, zinc, lead, cadmium, aluminium and tin
  - N151 Metal hydroxide sludge from wastewater treatment system.
- 16. Plating bath sludge containing cyanide
  - N161 Plating bath sludge containing cyanide from metal finishing processes.
- 17. Spent salt containing cyanide
  - N171 Spent salt containing cyanide from heat treatment process.
- 18. Sludge of inks, paints, pigments, lacquer with or without organic solvent
  - N181 Paint sludge from solvent recovery of solvent-based paint waste.
  - N182 Ink sludge from solvent recovery of solvent-based ink waste.
  - N183 Lacquer sludge from solvent recovery of solvent-based lacquer waste.
  - N184 Paint sludge from paint wastewater treatment system.
  - N185 Ink sludge from ink wastewater treatment system.
  - N186 Pigment sludge from pigment waste water treatment system.
- 19. Wastes of printing ink, paint, pigment, lacquer or varnish containing organic solvents
  - N191 Discarded or off specification ink, pigment and paint products.
- 20. Sludge, dust, slag, dross and ashes, may contain oxides or sulphate of one or several metals, including lead, cadmium, copper, zinc, chromium, nickel, iron, vanadium and aluminium
  - N201 Dross, slag, ash, dust from metal smelting process or dust emission control system.
  - N202 Dross from soldering process.
  - N203 Residues from recovery of acid pickling liquor.
  - N204 Oxide or sulphate sludge from waste water treatment system.

21. Spent or discarded strong acids or alkalis
  - N211 Spent or discarded acid of pH less or equal to 2.
  - N212 Spent or discarded alkali of pH greater or equal to 12.5.
22. Spent oxidising agents
  - N221 Spent oxidising agent.
23. Contaminated soil, water, debris or matter resulting from clean-up of a spill or chemical or schedule waste
  - N231 Contaminated soil, water debris or matter resulting from clean-up of a spill of chemical or scheduled waste.
24. Immobilised scheduled wastes, including chemically fixed or encapsulated sludge
  - N241 Immobilised scheduled wastes.
25. Discarded drugs except living vaccines and euphoric compounds
  - N251 Discarded drugs except living vaccines and euphoric compounds.
26. Pathogenic and clinical wastes and quarantined materials
  - N261 Pathogenic and clinical wastes and quarantined materials.
27. Containers and bags containing hazardous residues
  - N271 Used containers or bags contaminated with cyanide, arsenic, chromium or lead compound or salts.
28. Mixtures of scheduled wastes
  - N281 A mixture of scheduled wastes.
  - N282 A mixture of scheduled and non-scheduled wastes.

## PART II SCHEDULED WASTES FROM SPECIFIC SOURCES

1. Mineral oil and oil contaminated wastes
  - S011 Waste oil or oily sludge from wastewater treatment plant of oil refinery or crude oil terminal.
  - S012 Oil residue from automotive workshop or service station oil or grease interceptor.
  - S013 Oil contaminated earth from the refining of used lubricating oil.
  - S014 Oil or sludge from oil refinery maintenance operation.

2. Tar or tarry residues from oil refinery or petrochemical plant
  - S021 Tar or tarry residues from oil refinery or petrochemical plant.
3. Wastes of printing ink, paint, pigment, lacquer, varnish or wood preservative containing organic solvents
  - S031 Ink waste from washing of reaction tank or container of ink manufacturing plant.
  - S032 Paint waste from washing of reaction tank or container of paint manufacturing plant.
  - S033 Pigment waste from washing of reaction tank or container of pigment manufacturing plant.
  - S034 Lacquer or varnish waste from washing of reaction tank or container of lacquer or varnish manufacturing plant.
4. Clinker, slag and ashes from scheduled wastes incinerator
  - S041 Clinker, slag and ashes from scheduled wastes incinerator.
5. Waste of printing ink, pigment, paint, or lacquer without containing solvents
  - S051 Water-based paint waste from the washing of reaction tank or container of paint manufacturer plant.
  - S052 Water-based ink waste from the washing of reaction tank or container of ink manufacturing plant.
  - S053 Water-based pigment waste from the washing of reaction tank or container of pigment manufacturing plant.
  - S054 Ink waste from the washing or cleansing of printing machine of printing works.
  - S055 Pigment waste from tile works and hat manufacturing plant.
  - S056 Paint waste from the paint spraying or dipping process of metal works, motor vehicle assembly plant or electrical appliances manufacturing plant.
6. Spent tars or anti-corrosion oils
  - S061 Anti-corrosion oil or tar residue from the sealing or spraying or costing processes of motor vehicle assembly plant or automotive workshop.

7. Spent ethylene glycol
  - S071 Contaminated ethylene glycol from gas processing plant.
  - S072 Unhardened ethylene glycol from polyester manufacturing plant.
8. Wastes containing phenol or formaldehyde
  - S081 Phenol or formaldehyde waste from the washing or reaction or mixing tank of adhesive or glue or resin manufacturing plant.
  - S082 Sludge containing phenol or formaldehyde from the wastewater treatment system of adhesive or glue or resin manufacturing plant.
9. Residues of isocyanate compounds, excluding solid polymeric materials
  - S091 Residues of isocyanate compounds from foam manufacturing process.
10. Adhesive or glue waste may contain organic solvents, excluding solid polymeric materials
  - S101 Off-specification adhesive or glue products from adhesive or glue manufacturing plant.
  - S102 Effluent from washing of the reaction or processing tank of adhesive or glue manufacturing plant.
11. Uncured resin waste, may contain organic solvents or heavy metals including epoxy resin, phenolic resin
  - S111 Uncured resin residues from electronic or semiconductor, electrical appliances, fibreglass manufacturing plants and metal works.
  - S112 Effluent from washing of reactor of resin manufacturing plant.
  - S113 Resin sludge from wastewater treatment system of resin manufacturing plant.
12. Latex effluent, rubber or latex sludge containing organic solvents or heavy metals
  - S121 Rubber or latex sludge containing heavy metals from the wastewater treatment system of rubber products manufacturing plant.
  - S122 Rubber or latex sludge containing organic solvents from rubber products manufacturing plant.
  - S123 Latex effluent from rubber products manufacturing plants.
13. Sludge from the re-refining of used oil products including oily sludge containing acid or lead compounds
  - S131 Acid sludge from the re-refining of used lubricating oil.



14. Sludge containing fluoride
  - S141 Sludge containing fluoride from the wastewater treatment system of electronic or semiconductor manufacturing plant.
15. Mineral sludge, including calcium hydroxide sludge, phosphating sludge, calcium sulphite sludge and carbonates sludge
  - S151 Sludge from phosphating process of motor vehicle assembly, air conditioning, electrical appliances and electronic or semiconductor plants.
  - S152 Sludge from wastewater treatment system of plant producing ceramic or tiles, industrial gas and bleaching earth.
16. Asbestos wastes
  - S161 Asbestos sludge from wastewater treatment system of asbestos/cement products manufacturing plant.
  - S162 Asbestos dusts or loose asbestos fibre wastes from asbestos/cement products manufacturing plant.
  - S163 Empty bags or sack containing loose asbestos fibres from asbestos/cement products manufacturing plant.
17. Waste from the production, formulation and trade of pesticides; including herbicides, insecticides, rodenticides and fungicides
  - S171 Dust from air emission control equipment of pesticides formulation plant.
  - S172 Sludge from wastewater treatment system of pesticides formulation plant.
  - S173 Residues from filtering process of intermediate products at pesticides formulation plant.
  - S174 Waste from washing of reaction tank or mixing tank and spillage at pesticides formulation plant.
  - S175 Solid residues resulting from stamping process of mosquito coil production plant.
  - S176 Off-specification products from pesticides formulation plant and trade of pesticides.
  - S177 Waste from the production of pesticides.

18. Press cake from pre-treatment of glycerol soap lye
  - S181 Press cake from pre-treatment of glycerol soap lye from detergent or soap or toiletries plants.
19. Wastes containing dye
  - S191 Wastewater containing dye from textile manufacturing plant.
20. Wastes from wood preserving operation using inorganic slats containing copper, chromium as well as arsenic or fluoride compounds or using compound containing chlorinated phenol or creosote
  - S201 Wastes from wood preserving operation using inorganic salts containing copper, chromium and arsenic or fluoride compounds or using compound containing chlorinated phenol or creosote.
21. Mercury wastes, containing metallic mercury, organic and inorganic mercury compound
  - S211 Mercury waste containing metallic mercury from manufacturing of fluorescent lamps.
  - S212 Activated carbon waste containing mercury from hydrogen gas purification process.
  - S213 Mercury bearing sludge from brine treatment and mercury bearing brine purification mud from chlorine production plant.
22. Arsenic wastes from the purification process of phosphoric acid
  - S221 Arsenic waste from the purification process of phosphoric acid.
23. Spent catalyst
  - S231 Spent industrial catalysts from chemical plant and plant manufacturing detergent or soap or toiletries.
24. Leachate from scheduled waste landfills
  - S241 Leachate from scheduled waste landfills.
25. Rags, papers, plastics, or filters contaminated with organic solvents
  - S251 Rags, plastics, papers or filters contaminated with paint or ink or organic solvent from motor vehicle assembly plants, metal works, electronic or semiconductor plants and printing or packaging plants.
26. Containers and bags containing hazardous residues
  - S261 Used containers or bags contaminated with residues of raw materials and products of pesticides formulation plant.

27. Discarded or off specification batteries containing lead, mercury, nickel and lithium
  - S271 Discarded or off specification batteries from battery manufacturing plant.
28. Pharmaceutical wastes
  - S281 Wastewater from washing of reaction vessels and floors of pharmaceutical products manufacturing plant.
29. Spent aqueous inorganic acid solution
  - S291 Wastewater from acid and battery manufacturing plant.
30. Waste from manufacturing or processing or use of explosives
  - S301 Waste from manufacturing or processing or use of explosives.

## Appendix 2

### Kualiti Alam Waste Classification Code

Gp	Waste type
A	<b>Mineral oil wastes</b> Wastes containing mineral oil, hydraulic oil, heat transfer oil, drilling oil, cutting oil from traps, oil contaminated soil and other non-pumpable mineral oil wastes.
B	<b>Organic chemical wastes</b> (containing halogen or sulphur) Pumpable waste containing halogenated solvents such as trichloroethylene, tetrachloroethylene, chloroform, chloroethylene, gendklene and freons. <b>Other organic chemical wastes</b> (counting halogen or sulphur) Including PCB and PCT- containing wastes such as capacitors.
C	<b>Organic solvents wastes</b> (without halogen or sulphur less than 1%) Pumpable wastes containing more than 50% solvents as main part such as petrol, turpentine, benzene, toluene, xylene, ethanol, propanol, acetone, MIBK, MEK, ethylacetate, butylacetate.
H	<b>Organic chemical wastes</b> (without halogen or sulphur) Obsolete paint, distillation residues, organic chemical by-products tar, frying oil, organic acids and their salts, glue wastes, used developing baths, alkaline cyanide-free degreasing baths, grease, soaps wastes.
K	<b>Wastes containing mercury</b> COD liquids, kjeldahl liquids, mercury batteries, seed corns, treated with organo-mercury compounds.
T	<b>Pesticides wastes</b> Insecticides, fungus, and weed killer, rodenticides, treated corns and empty containers from pesticides.
X	<b>Inorganic chemical wastes</b> Obsolete pickling baths, galvanic baths, metalhydroxide sludge, wastes from regeneration of ion-exchangers, contaminated sulphuric, hydrochloric and nitric acids, chliche salts, sodium hydroxide, alkaline cyanide containing degreasing baths, hardening salts.
Z	<b>Other wastes</b> Isocyanates (MDI and TDI), medicine wastes, acid sludge, lab-packs, spray bottles, wastes from private household, batteries, pressure bottles and asbestos wastes.

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