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## DISPOSAL OF SCHEDULED WASTES



*Waste Storage Area at Integrated Scheduled Waste Treatment Facilities in Bukit Nanas.*

### *Policy Guidelines to guide waste generators on the requirements for installation of on-site scheduled wastes incinerators*

An integrated scheduled waste treatment facility has been set in Malaysia to enable the treatment and safe disposal of scheduled wastes generated in the country. This facility includes setting up of a sophisticated incinerator to destroy hazardous wastes under the most stringent conditions. The incinerator will be equipped with full range of air pollution control equipment. This facility is approved only after the most thorough examinations on location, siting design, construction and operation procedures and protocol. The Government is confident that the incinerator will be able to meet the latest and most stringent requirements on public health protection and pollution prevention requirements.

In recent years, especially after the establishment of the integrated scheduled waste treatment facilities at Bukit Nanas, the Department of Environment continues to receive many proposals from industries for the setting up of their own incinerator facilities for disposing of toxic and

### *In Appreciation*

The Department of Environment would like to thank our brave firefighters who risked their health and lives in tackling the smoke and haze from the smouldering forests in Sumatra and Kalimantan last October.

Battling horrendous conditions where the API was 900 or more in certain parts of Sumatra, they had, in an act of duty and sacrifice, shown the true meaning of 'Malaysia Boleh' - good neighbour.

The spirit, courage and commitment of our heroes from the Bomba Department will not be forgotten in our environmental history.





*Ir. Tan Meng Leng  
Director-General  
Department of Environment*



1997, will go down as a significant year in the environmental history of Malaysia. We were faced with challenges as never before. The choking haze, oil spills and contamination of the very source of our drinking water revealed disturbing truths about the state of our environment as well as about ourselves.

These were challenging times for us at the Department of Environment, which I must stress, has acted with the kind of commitment required of a dedicated team. We may be small but I am pleased to say that the staff of DOE proved their worth under these difficult times. I appreciate the sacrifice all of you had shown, putting work before anything else, working round the clock, cancelling your leave and so on - all for the sake of protecting the environment of the country. I would also like to extend my heartfelt appreciation to the families of the staff for being so understanding during the trying 3-month period.

A group that must be singled out for their tremendous courage shown during the haze are the Bomba firefighters. To them, the country is greatly indebted, and the DOE would like to extend its sincere thanks for their contribution in tackling the external sources of haze.

In the midst of last years' turbulent periods, there was some consolation. With the receiving of the ISO 9002 Certificate and several international awards, we were recognised as one of the world-class civil service and also as the leading country in phasing out ozone depleting substance.

DOE was again honoured and conferred with the United Nation Global Award during the 10-year Montreal Protocol Celebration. It was also honoured by the United States government in recognition of its global and domestic environmental protection efforts. In one of the ADB's report, it was mentioned that Malaysia is the most effective enforcement agency. Such recognition reflects the commitment and success of the staff of the DOE.

Lastly, if anything this last one year had taught us, it is that we cannot take air and water for granted anymore. What we sow, we reap. We have already seen the disastrous effects of our own making. There will be challenges ahead of us, no doubt. But, we will be more capable to meet whatever challenges there may be. In this, I would like to call upon the staff of DOE to keep on striving for excellence, as they have done in the past.

Syabas And Happy 1998 To All

*cont'd from page 1*

hazardous wastes generated by their activities. Many such proposals are being promoted by suppliers of dubious track records and by consultants who exonerate pollution free performances yet show lack of professional accountability when requested to accept liability.

DOE discourages the installation of such individual incinerators in the country, as the accumulative effect will bring about serious threats to public health and safety. There is serious doubt on the ability to eliminate the release of heavy metals and secondary formation of new chemicals arising from such combustion. There is little evidence that such minor incinerators have been adequately evaluated on transitional, short term and long term emission control. Proposed pollution control measures for the hazardous emissions, predominantly dioxin and furans cannot be established for majority of cases despite the ostentatious claims. Experiences abroad has shown that there is clearly some weaknesses and practical deficiencies in handling and operation of these minor incinerators. The stringency in monitoring and surveillances on such facilities would place heavy burden on premise owners as well as the enforcement agencies, if the proliferation of such minor incinerators be allowed to continue.

#### **SCHEDULED WASTES INCINERATORS POLICY**

The Department of Environment as a policy does not license on site incinerators to burn off hazardous wastes. Only under extreme and exceptional circumstances would consideration be given for such incinerator to be licensed. These applications were subjected to a very thorough and detailed examination of needs. Detailed Environmental Impact Assessment Report is mandatory for all cases. The Terms of Reference for the Detail EIA study shall be drawn out to enable significant environmental issues be addressed and the report shall be prepared in accordance with





*Schedule Waste Treatment Incinerator under construction.*

the EIA Guidelines For Toxic and Hazardous Waste Treatment and Disposal Projects.

### MANDATORY INFORMATION REQUIRED

The following are mandatory informations required to be submitted to the DOE for consideration :

- (i) A detailed waste characteristics report certified by a registered chemist; the origins, raw materials used, full chemical names, quantity used in process, details of process control (temperature, pressure), material balance etc. must be fully declared and disclosed;
- (ii) Full trial burn over extended period of at least 72 hours, sampling and analysis of all emissions inclusive of new chemicals formation during combustion;
- (iii) Full report and disclosure of performances of similar wastes, monitoring and surveillance results of, at least, the past five years;
- (iv) Report on impact assessment forecast and measured, studied endorsed by environmental agencies where the incinerator is manufactured/sited;

(v) Risk Assessment Analysis to evaluate the potential direct and indirect risk to human health and the environment from the incinerator operations including :

- A statutory declaration by proponent of [life long] assurance of public health protection and assumption of accountability and liabilities;
- A statutory declaration by equipment suppliers of [long life] assurance of public health protection and assumption of accountability and liabilities; and
- A statutory declaration by EIA consultants of [long life] assurance of public health protection and assumption of accountability and liabilities;

(vi) An Emergency Response Plan that includes a contingency plan and communication procedures (to inform in-plant personnel, surrounding neighbourhood inhabitants, authorities and evacuation procedures);

(vii) A description of safety procedures at all stages of waste handling. This procedure should also include structures, or equipment designed to prevent hazards, run-off and contamination of water supplies, and

undue exposure of personnel to hazardous waste, and to mitigate the effects of equipment failure or power shortages;

(viii) A full financial plan to assume liability on any damage caused ;

(ix) A report on consultation sessions conducted with workers, neighbours and other affected parties, complete with disclosure details made to them on type of wastes, impact, risks etc. ;

(x) The incinerator design and ancillaries should consist of the following :

(a) Proposed construction drawings of the incinerator, method of charging and control equipment, and calculation and design parameters prepared by a professional engineer ;

(b) Description of the principle components of the incinerator and of incineration process ;

(c) Proposed pollution control system for fuel gas treatment and liquid effluents discharged ;

(d) Management of the wastes residues with full disclosure and report on the assessment of residual disposal, inclusion of biomonitoring results; and

(e) An outline of the personnel training programme to handle the hazardous waste facilities;

(xi) A waste plan which encompasses various aspects pertaining to the management, treatment and disposal of scheduled waste. The waste plan should include company's commitment in giving priority to the 3 R's (Reduce, Reuse, and Recycle) in waste management ; and

(xii) A comprehensive stack and ambient monitoring programme including biomonitoring.

*Note :*

*The acceptance of the above document for processing of the application does not mean approval and the applicant is advised not to make any commitment until processed and informed in writing.*





# Municipal Solid Waste Management

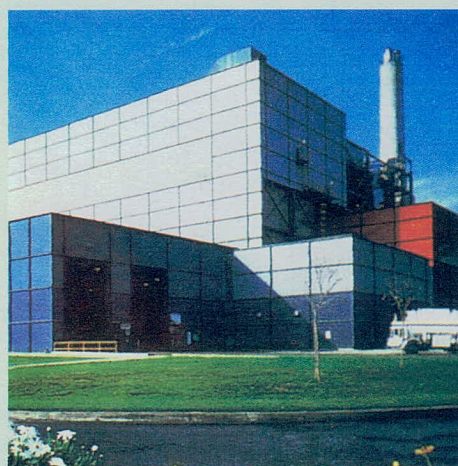
## - The French Way -

by Roshadah Hashim

**T**he Seminar on Municipal Solid Waste Management, organised by CFME-ACTIM (Agency for International Promotion of French Technologies and Companies), was held on September 29-October 8, 1997 in Paris, France with participation from 4 Asian countries namely, Malaysia, Indonesia, the Philippines and Sri Lanka. Malaysia was represented by 5 participants comprising one each from the 4 solid waste management consortiums - Alam Flora Sdn. Bhd., Northern Waste Industries Sdn. Bhd., Southern Waste Management Sdn. Bhd. and Eastern Waste Management Sdn. Bhd., with the Department of Environment (DOE) being the sole representative from the Government sector.

Solid waste management policy in France has been guided primarily since the last 20 years by the **1975 Act on Solid Wastes**. This Act was focused on the following principles:

- the Polluter Pays Principle
- the liability of solid waste producers



(does not stop before final elimination or disposal of waste)

- the liability of local governments to control the collection and the disposal of municipal solid waste (msw); and
- the creation of a 'National Waste Recovery and Disposal Agency' which became the 'Agency for Environment and Energy Management (ADEME)' since 1992.

Several economic instruments have been successfully set up in order to facilitate the implementation of this policy, including the municipal budget

as well as through specific charges that may or may not be connected with the real operational cost.

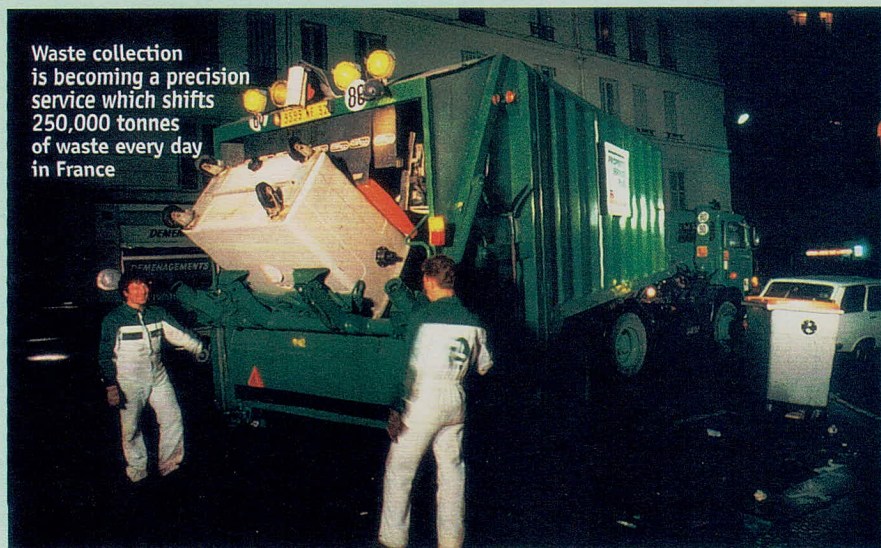
The **1975 Act on Solid Wastes** also allow issuing of special regulations appropriate to specific categories of solid wastes. The regulatory and financial instruments have resulted in:

- the collection of msw that now covers nearly 100% of French population as compared to 50 percent 20 years ago; and
- glass separation that covers about 85 percent of the population, compared to 25 percent only 20 years ago.



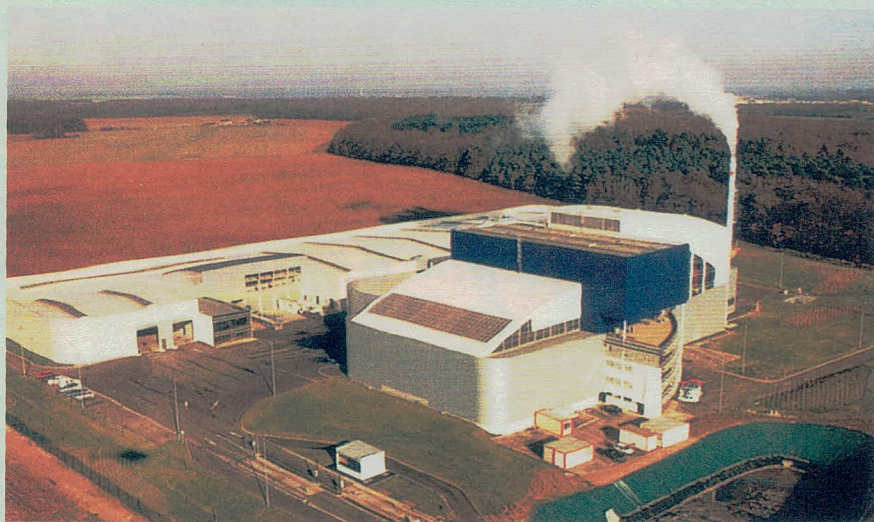
However, these instruments have reached a limit at the end of the '80s, while the quantity of msw is still increasing (378kg per capita/year today vs 220 kg 30 years ago). Consequently, the Act on Solid Wastes was amended by the French Parliament in July 1992, comprising a more comprehensive and modern solid waste control policy, laying down some new principles and goals as follows :

- Solid waste management planning Master plans must be achieved



Waste collection is becoming a precision service which shifts 250,000 tonnes of waste every day in France





before 1996 in each administrative district, taking into account the need to optimise solid waste transportation;

- Notion of 'final residue', i.e. waste resulting from solid waste treatment and stabilised in the best available technique: by July 1, 2002, waste landfilling should be limited to only 'final residues';
- Rehabilitation of former landfills and remediation of contaminated sites: ADEME fulfills the responsibility for decontaminating 'abandoned' contaminated sites (i.e. whose operator has disappeared or cannot pay);
- Public information and awareness raising.

These stringent protective regulations sent landfill costs soaring, rising from FF50 a tonne to an average

of FF250-400 a tonne today. The quantity of solid wastes, especially of packaging wastes, should be reduced, sorted for the purpose of separate collection, then collected and treated through the following:

- increment of sorting, as much as possible;

- recovery and recycling, as much as profitable;
- one of the following processes: biological treatment (compost/methanisation); incineration; physico-chemical treatment; considering simultaneously; energy recovery (heat or methane); RDF (refuse-derived fuels) production; recovery and recycling of by-products and residues; as well as environmental protection (neutralisation of flue gas emissions), minimisation of liquid and solid emissions; and
- final storage in landfill for 'final residues', with stabilisation techniques.

In total, 25% of French household waste is now incinerated with energy recovery, 7% is incinerated without energy recovery, 8% undergoes biological treatment (composting), 1% is sorted and then recycled, and 59% ends up in landfill sites.



Today, waste reduction at source and recycling have become two significant priorities in French waste management policy. The recyclable materials are then processed and returned to the economy as new products.

Two main economic instruments have been set up to implement this policy, which leads to a doubling of





# MALAM PUISI ALAM '97

## ANJURAN JABATAN ALAM SEKITAR

**M**alam Puisi Alam '97 (MPA) telah diadakan pada 11 November 1997. Ianya bertujuan untuk meningkatkan kesedaran masyarakat melalui penghayatan puisi, menyampaikan mesej tentang pentingnya memelihara kualiti alam sekeliling melalui pertandingan penulisan dan persembahan puisi berunsurkan alam sekitar.

Terdahulu dari itu, pada 11 Mac 1997, satu Majlis Pelancaran Pertandingan Menulis Puisi Bertemakan "Hidupan di Dunia" telah dilancarkan oleh Y.B. Datuk Law Hieng Ding, Menteri Sains, Teknologi dan Alam Sekitar, bertujuan memberi peluang kepada orang ramai menghayati dan menanam semangat cintakan alam sekitar melalui karya-karya puisi, di samping meningkatkan kesedaran mereka tentang isu-isu alam sekitar semasa. Pertandingan tersebut yang terbuka kepada dua kategori iaitu Kategori Pelajar bagi pelajar sekolah di bawah umur 18 tahun dan Kategori Awam bagi orang dewasa yang berumur 18 tahun ke atas.

Sehingga 30 April 1997 iaitu tarikh tutup penyertaan pertandingan Menulis Puisi Alam, sebanyak 280 penyertaan dari orang awam dan lebih dari 1,000 penyertaan dari pelajar telah diterima oleh pihak penganjur. Daripada jumlah tersebut hanya 4 karya terbaik dipilih dari kedua-dua kategori untuk memenangi hadiah dan mendeklamasikan puisi mereka pada Malam Puisi Alam, bagi meraih hadiah Persembahan Puisi Terbaik 1997. Malam ini merupakan kemuncak kepada Pertandingan Menulis Puisi di mana penyampaian hadiah bagi Pertandingan Penulisan Puisi Terbaik juga telah dilangsungkan.

### **Pemenang Pertama - Puisi 1997 Kategori Pelajar**

#### **APA KHABAR ALAM**

Hai, apa khabar alamku  
masih ceriakah seperti semalam  
masih anggunkah seperti dulu  
dengan pepohon menghijau,  
dengan anak-anak sungai mengalir jernih  
dengan udara yang bersih  
membuatkan aku senang,  
menjadikan mereka girang,  
dada kami lapang  
menghela nafas siang malam.

Hai, apa khabar alamku  
hari ini ku lihat kau berduka  
siang dan malam berlagu resah  
duka nestapa gundah gelisah  
pepohon hijau bertukar wajah  
anak-anak sungai bersarap sampah  
udara bersih tepu berdebu membawa padah  
aku, mereka dan siapa-siapa diancam  
penyakit dan lain musibah.

Hai, apa khabar alamku  
esok, lusa dan bila-bila  
nasibmu belum tentu,  
mungkin kembali ceria seperti dulu  
atau terus kusam seperti hari ini  
yang pasti, aku, mereka dan siapa-siapa  
hanya ada azam, ada tekad  
menatang mu siang dan malam  
agar terus berkemilau, anggun berseri  
biar pun pembangunan mendatang  
dan masa bersilih ganti.

**oleh Atikah Bt. Desa**





## Pemenang Pertama - Puisi 1997 Kategori Awam

### INI BUMI KITA; PETA PUSAKA WARISAN ZAMAN

ini bumi kita, peta pusaka warisan zaman  
ini tanah kita, ladang saujana hamparan maya  
ini hutan kita, warisan hijau menyantun alam  
ini bukit kita, banjaran semangat membenteng hasrat  
ini gunung kita, puncak gagah berdiri megah  
ini sungai kita, jenih air di tenang mengalir  
ini tasik kita, daratan bening perlindungan angin  
ini laut kita, samudera tertera menyimpan segala rahsia  
ini alam kita, rumah insan segala manusia  
(di sini kita datang dan berpulang kepada-Nya);  
ya, inilah bumi kita; peta pusaka warisan zaman  
menjadi rimba tebal tempat bercambah segala pohon  
menjadi rimba tebal tempat merendang segala daun  
menjadi musim semi tempat berbauh segala rezeki;  
di sini juga seluruh flora dan fauna  
yang melata dari tanah pamah ke bukit tinggi  
tunduk pada hukum alam yang menyulam pesan  
lalu menjalin diri dalam rantaian azali lingkaran ekologi  
membentangkan wajah awal-awal bumi yang kita miliki  
ihsan dari ilahi.  
wajah asal tidak kekal rupanya;  
air sungai keruh di hulu beracun di muka kuala  
ikan di laut lemas di bawah lapisan minyak tumpah  
puncak gunung dicalar mesin, tumit bukit dikelar musim  
tasik tenang mengepung segala bimbang  
hutan telah mengusung jerit pohon rebah bergalang-tanah  
alam luas meraung kesakitan menangkap jerit pembangunan;  
inilah harga yang harus kita lunaskan untuk sebuah kemajuan.  
dengan apologi kepada semangat bumi  
kita mengatur perencanaan rapi  
merencanakan pembangunan tapi memerangi polusi  
mengejar masa dengan menggapai kualiti alam  
kerana kita mahu anak cucu kita pada hari muka  
masih memiliki degup sekepal jantung  
kemudian dapat terus mengenal kelopak yang jingga  
rangkap dan hijau  
bukan diserkup langit yang semakin jelaga  
atau dikepung musim payah yang semakin lelah;  
ini bumi kita, peta pusaka warisan zaman  
- mari kita pertahankan.

oleh Awang Abdullah

*cont'd from page 5*

municipal solid waste treatment costs. These are tax on solid waste, and the household packaging waste systems. The tax on solid waste is levied on municipal solid waste and general industrial waste landfilled. It amounts to about US\$7 per ton of solid waste in 1997, and is due to increase progressively to about US\$8 by 1998. This tax is collected and managed by ADEME. Its proceeds, which amounted to about US\$120 million in 1996 (US\$145 million in 1997) is called 'waste management modernisation fund'. Its main goal is to finance solid waste management projects comprising MSW management installations; general industrial waste management installations; research and development (R&D); and public information and awareness raising.

With regard to household packaging waste, a 1992 decree compels the packaging producers and importers, as well as the packagers/fillers, to ensure the management of their packaging waste through one of the following options:

- organising a deposit-refund system for their packaging waste;
- organising an individual system for disposing their packaging waste provided they obtain a ministerial authorisation;
- contribution to a registered organisation ensuring collectively packaging waste management.

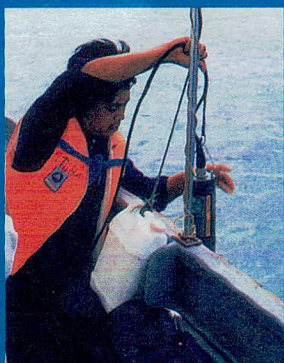
Founded in 1992, Eco-Emballages (*emballage* means 'packaging' in French) is the only registered organisation dealing with all kinds of packaging waste. Its primary objective is to recover packaging waste, which it either recycles as raw materials or converts to energy through incineration. The company has proposed an ambitious target for local authorities - to recover 75% of all household packaging discarded in refuse bins by the year 2002 (the current recovery rate for this type of waste is less than 15%). Companies contributing to Eco-Emballages (approaching 10,000 in number) must pay a fee of one French centime (about a fifth of a US cent) per packaging whatever its weight, size or material. This fee is due to increase to 3 French centimes in the future. A green dot on the packaging indicates that the fee has been paid. The proceeds, which reached the order of US\$110 million in 1996, allows Eco-Emballages, which acts as an intermediate between professionals and municipalities, to ensure adequate packaging waste recovery and valorisation, either through recycling or through incineration with energy recovery. Eco-Emballages concentrate on 5 major materials namely, glass, steel, aluminium, plastics and paper/cardboard.

With these new instruments, the French solid waste management policy is now mainly a combination of regulations and of public or private driven revenue raising instruments with appropriate objectives and support measures. It is expected that France will promote a comprehensive and effective solid waste management by the year 2000.

**Forthcoming issue :**

**Municipal Solid Waste Management - The Malaysian Way**





# Capacity Building for DOE



By  
Mr Christian Schriver and  
Mr Peter Jans

well as overseas study-tours and attachment programs. Presently 3 course and an attachment programme are in the design phase: A course in Malaysia and an attachment programme in Denmark on Enforcement, a course on Stack Sampling and Quality Assurance and a courses on Awareness Campaigns. Other courses will be tailored according to the needs of the DOE.

ii. Training curricula and training material from a number of training courses will have been developed and will be ready to use by the Environmental Training Institute (IKLAS) that will be established by DOE over the next years. The training courses will form the basis for the in-service training that IKLAS will be responsible for.

iii. In order to further assist staff, a number of manuals (flow-charts, checklists, procedures) will be made that can be used in daily work. Such manuals will be developed concomitantly with the training courses.

iv. There is a functioning HRD system in DOE that can:

- identify future training and manpower needs and take action as appropriate;
- develop and implement DOE policies on HRD to attract and maintain qualified staff; and
- continue the work of organising and starting the Environmental Training Institute; IKLAS

There are four main components to this project:

- i. Establishment of a system for Human Resources Development in the Department of Environment
- ii. Development of guidelines and manuals for staff and external parties
- iii. Development of training material and training programs
- iv. Development of an awareness programme

By the end of the project in February 2000, it is expected that:-

- i. Staff of DOE and other organisations involved in management and enforcement of the Environmental Quality Act (EQA) has been trained, both through local training courses as

The inputs to the project are 90 work months of international consultants and 60 work months of local consultants plus substantial inputs from the Department of Environment. Puan Rahani Hussin from the Research Unit is the Project Manager and coordinates the project activities.

**T**he project, "Capacity Building for DOE" sponsored by Danced, actually started as two projects- one project on Capacity Building for Hazardous Waste Management (Scheduled waste) and one for Capacity Building for Human Resources Development. DOE and a Malaysian firm formulated these two projects in June 1996. In December 1996, a Danced Appraisal mission combined the two projects, as both were concerned with Capacity Building. Based on a tender process in the spring of 1997, the contract for advisory services was awarded to Carl Bro International in association with CETEC.

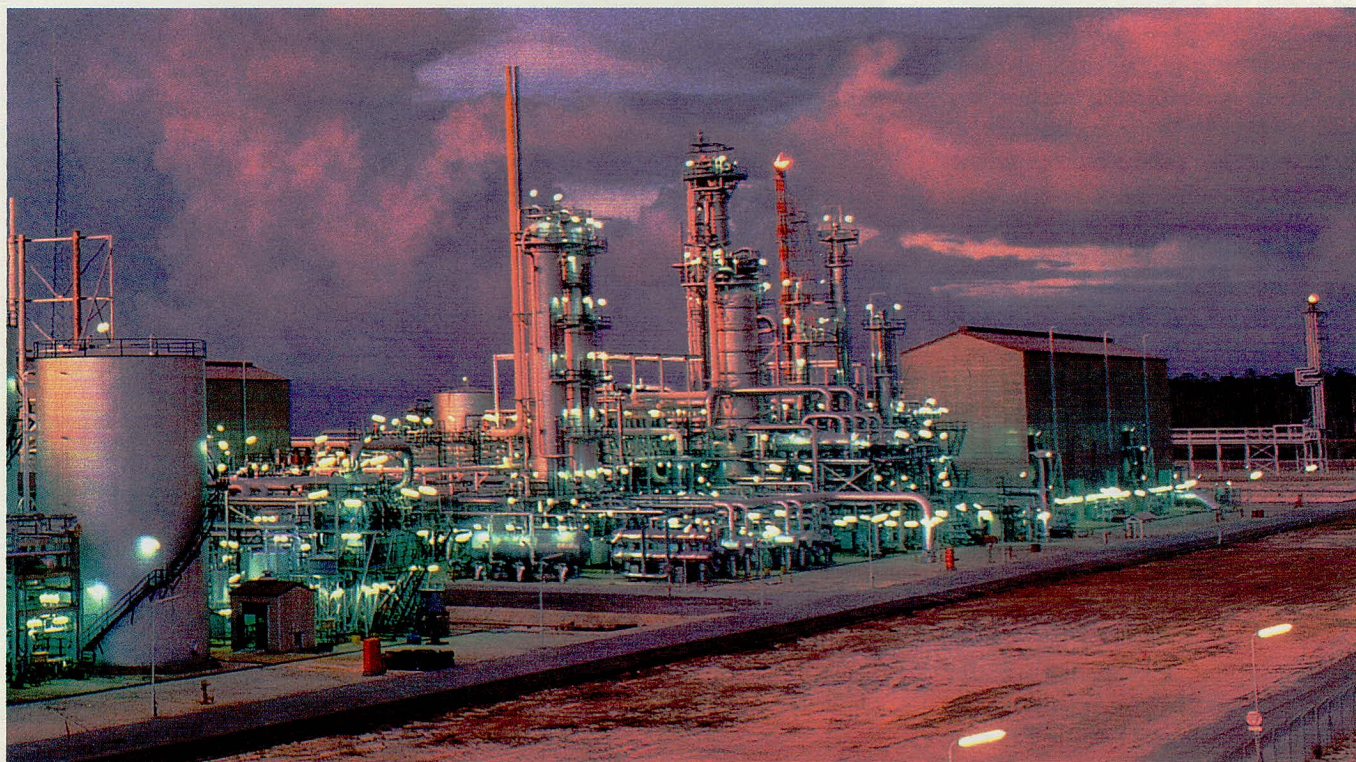
The two long-term Danish Consultants, Christian Schriver and Peter Jans, arrived in August 1997.





# ENVIRONMENTAL PLANNING FOR HAZARDOUS CHEMICAL INDUSTRY

by Hassan Mat



Picture: Courtesy of Petronas

## INTRODUCTION

Malaysia, in the past, depended on the agricultural sector for its economic development. The discovery of vast fossil fuel resources, especially oil and gas, has been the catalyst for industrial development. Besides supplementing the power requirements for industrial development, the new-found resources also provide the necessary feedstock for petrochemical industries. Hazardous chemical industry in Malaysia include among others, petroleum refineries, gas processing plants, acid plants, chlor-alkali plants, petrochemical plants, and gas and petroleum depots.

Development of this industry has brought about many new challenges to Malaysia, in term of environmental planning. It brought new challenges in term of normal emissions and discharges into the air and water, and

solid waste by-products which are not friendly to the environment. In addition, there are potential hazards or risks due to accidental release from handling, transportation, processing and storing of the raw materials and products.

## THE NEED TO MANAGE

Why is the management of hazardous chemical industry so important? An accident at properly sited plant or facility may cause the fatality of a few workers, but at an improperly sited plant (uncontrolled site), hundreds or thousands including the public just like Bhopal.

The fatalities of the Sungai Buloh tragedy, seven years ago, which killed 20 people, would have been lower had the factory been sited in a proper area.

In 1992, the explosion on board of a ship carrying dangerous chemicals at Port Klang, Malaysia resulted in a tank

fire at a nearby depot storing petroleum and petrochemical products. The accident caused at least 10 fatalities, mostly workers from the ship and the depot. Had not the facility been located in a port area, but surrounded by residential areas, the scenario result could have been totally different. Even so, families of port workers living in flats just 0.5 km from the area had to be evacuated as a safety measure.

Another point to be considered is that no matter how safe the plant is or facility, designed with the best safety specification, equipped with the most modern equipment, and controlled with the most advance computer, fail-safe backup, manned by well-trained operators following the most well-prepared procedures, something is bound to go wrong due to system failure. Clearly, there is a need for a proper management of this industry so as not only to avoid financial



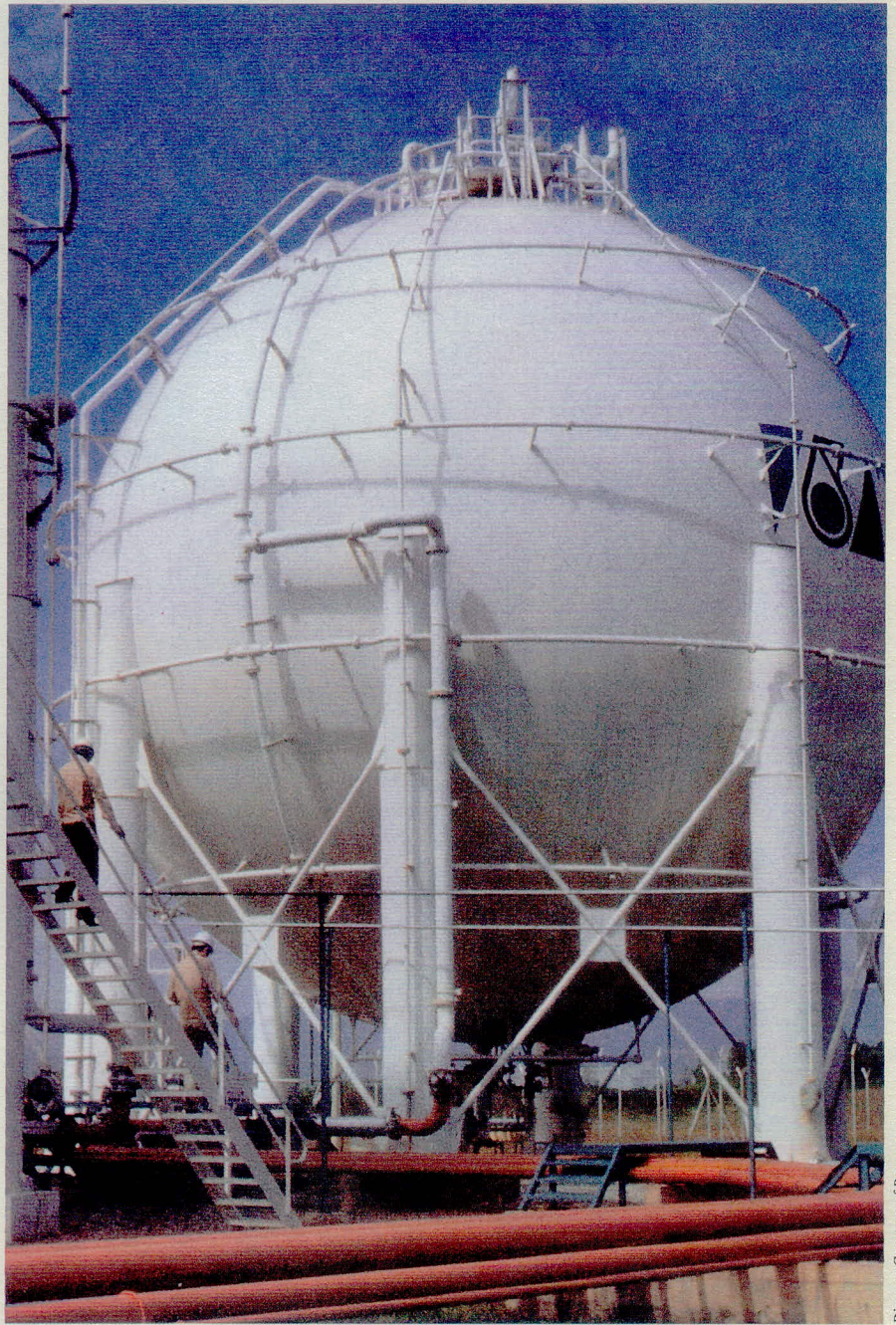
problems, and opportunity lost but also to avoid any tragedy. In less developed countries the issue of proper land use planning and trained personnel are important issues to be looked into by industrialists.

The World Bank, stressed the importance of Quantitative Risk Assessment (QRA) whereby hazardous industries for proposed bank-financed project require major hazard assessment to be prepared as part of project preparation to achieve the following objectives:-

- i) to identify the nature and scale of use of hazardous substances at the proposed installation;
- ii) to specify control measures for safe operation and emergency response procedure; and
- iii) to ensure the project proponent appreciate the potential hazard, and adequate mitigation and control measures are taken.

#### BASIC REQUIREMENT

One of the basic requirements that the industrialist, the government and the public (not in priority) must know managing risk is the nature of hazards from this industry. The government should provide proper infrastructure such as proper industrial estates, and laws to control this kind of industry. The industrialist should let the government and the public know the hazards involved. The public is now aware of environmental problems and risks associated with this industry, and they need to be informed and consulted. The World Bank, also emphasised the need for the industrialist themselves to appreciate the potential hazards of the proposed industry. The public must not choose to reside close to this industry but if there are no proper land use plans or no knowledge on potential hazards of such industry, they are normally at a disadvantage. After a proper planning has been done, more important is that government planners must ensure that no residential development be allowed to encroach on the industry. All effort will be put to waste if it happens.



Storage spheres at the LPG-import terminal cum bottling plant in Prai

Unplanned or uncontrolled planning will not only cause problems to industrialist but also cause problems to the government and the public. The problem is not only when accidents happen but during normal operations, more stringent safety, air pollution control, and noise control measures need to be taken by the industrialist (industrialist can always pass the burden to the public). This does not mean the industrialist need to be more relaxed at a properly sited plant because there are local, regional or

global environmental issues such as air quality, acid rain or greenhouse effect associated with the industry.

#### QRA: A TOOL FOR ENVIRONMENTAL PLANNING

In the past, Malaysia had been using guidelines which require a buffer of at least 1.5 km to be provided between hazardous installation and residential area. However, this has not been very successful because of the difficulties to





justify why such a buffer is required. Not only is the industrialist reluctant to obtain land for such buffer but the state authority is also reluctant to provide the buffer which is considered to be wastage of valuable land. QRA provides a much better alternative because it provides a quantified measure on which decisions can be made depending on the type of installation proposed, not on a fixed buffer basis as has been used previously.

### ENVIRONMENT PLANNING BASED ON QRA

If QRA is to be a tool for environment planning, it must provide some form of output that can be used by government agencies. Putting aside the problem of risk criteria or uncertainty on risk level, QRA offers risk contours which can be overlaid on land use maps. There are three criteria which can be used i.e. hazard zone, individual risk criteria, and social risk criteria. Hazard zone is considered very stringent while societal risk is the least stringent. From these overlays some decision can be made. The decision sometime could be of great significance to the industrialist, the public and also the government. The QRA can also identify the area to be excluded for residential area i.e. overall planning of industrial area.

QRA is not only valuable to the government agencies but also the industrialist. Beside securing a good site for the installation with sufficient buffer to accommodate the risk involved, QRA will provide the necessary information for overall safety planning of the installation. Normally, the industrialist is also required to provide facilities or provisions for immediate actions to be taken to counter any problems that have the potential to developed into a tragedy. Emergency Response Procedure (ERP) must be ready to be implemented when there is a problem. A well prepared hazard or risk assessment will provide most of the answers required to prepare a good ERP. A Plant with QRA, may also get reduction in insurance premium.

This is a benefit which should be explored by industrialist if it has not been done.

Failure to address environmental issues, such as risk, in project planning may cause some delays in project implementation and the possibility or additional capital cost to mitigate or solve the issue. On the hand, QRA may generate a false sense of safety, without addressing a good design, construction, management, procedures, maintenance, organisation, discipline, training etc. as a basis for a safe operation of hazardous installation.

### PROBLEM IN USING QRA

As was mentioned earlier, risk criteria still has not been develop in Malaysia. There are views, such as Malaysia is still developing its industries and it should have not follow what have been practised by more developed countries. Malaysians should accept slightly higher risk. However, this view should not be accepted because the cost to comply with acceptable international standard will be costly. As the people become more aware of the risk involved they will demand that environmental pollution and high risk should not be imposed on them. Furthermore, tools such as QRA is available whereby it can be used for environmental planning and history should not be repeated. It may be viewed as costly but the benefits are tremendous.

There are also problems in understanding the acceptable risk level by industrialist, government and the public. The common perception is that  $1 \times 10^{-6}$  fatality/person/year or 1 fatality/person in 1,000,000 years, acceptable a figure to be used, it seldom happen or only happens in a million years. One of the main reasons for the wrong perception is the failure to note that the figure is just an indication or measure of the total risk from a facility. What should be realised is that an accident can happen today. The Bhopal factory had waited only 10 years before the worst industrial

disaster took place. It is apparent that 1,000,000 years does not come into the picture at all. By the way, this industry has not been in operation for more than 150 years.

Many accidents involving the chemical industry have occurred and have caused many fatalities. Industrialists and the government should realise that they have a time bomb which can explode any moment. However, it is interesting to note that there are many existing hazardous installations which are operating close to residential areas without any major accident. Our job is to ensure that no accident happens, but if any accident does happen, ideally there should be no casualties.

Generally, there is still a lack of appreciation by all players including industrialists, government agencies, environmental consultants and the general public of the benefits of QRA. However, some industrialist realising the nature of their industries have taken necessary steps including carrying hazard and operability (HAZOP) studies as well as QRA to determine the level of risk from their plants. Necessary steps were taken to improve the safety of the plant as a result of these studies. To improve the level of acceptance of QRA as a tool for environmental planning, further effort is to be taken to educate the industrialists, government agencies, environmental consultants of the benefits of QRA.

### CONCLUSION

Industrial development has brought many types of hazardous chemical industry to Malaysia which need special attention because of distinct environmental issues that are of risk. Quantitative risk assessment is a valuable tool for environmental planning of this industry and has used with some success in Malaysia. To increase the acceptance of its usage, more effort must be put to educate the industrialist, government agencies and the public.





# GIS APPLICATIONS IN EIA

- Norlin Jaafar -

GIS or geographical information system is a computer-assisted and integrated environment for geographic data creation, storage and retrieval, management, manipulation, analysis and display. It is able to provide effective and efficient functions for handling geographic data and aids data inventory, management, problem solving, and decision making. Increasingly, GIS is being used as a tool in environmental impact assessment studies.

During the 1980s, many GIS were designed for natural resource analysis and management. These have proved efficient in assessment of environmentally sensitive areas as well as in implementation of conservation efforts, and appraisal of alternative plans for acquisition, preservation, and development. GIS is widely used to assemble and manage large spatial

databases, perform analyses and produce effective visual representation of management options.

The three main potential uses of GIS are, for map presentation and production, environmental analysis, and application specific systems.

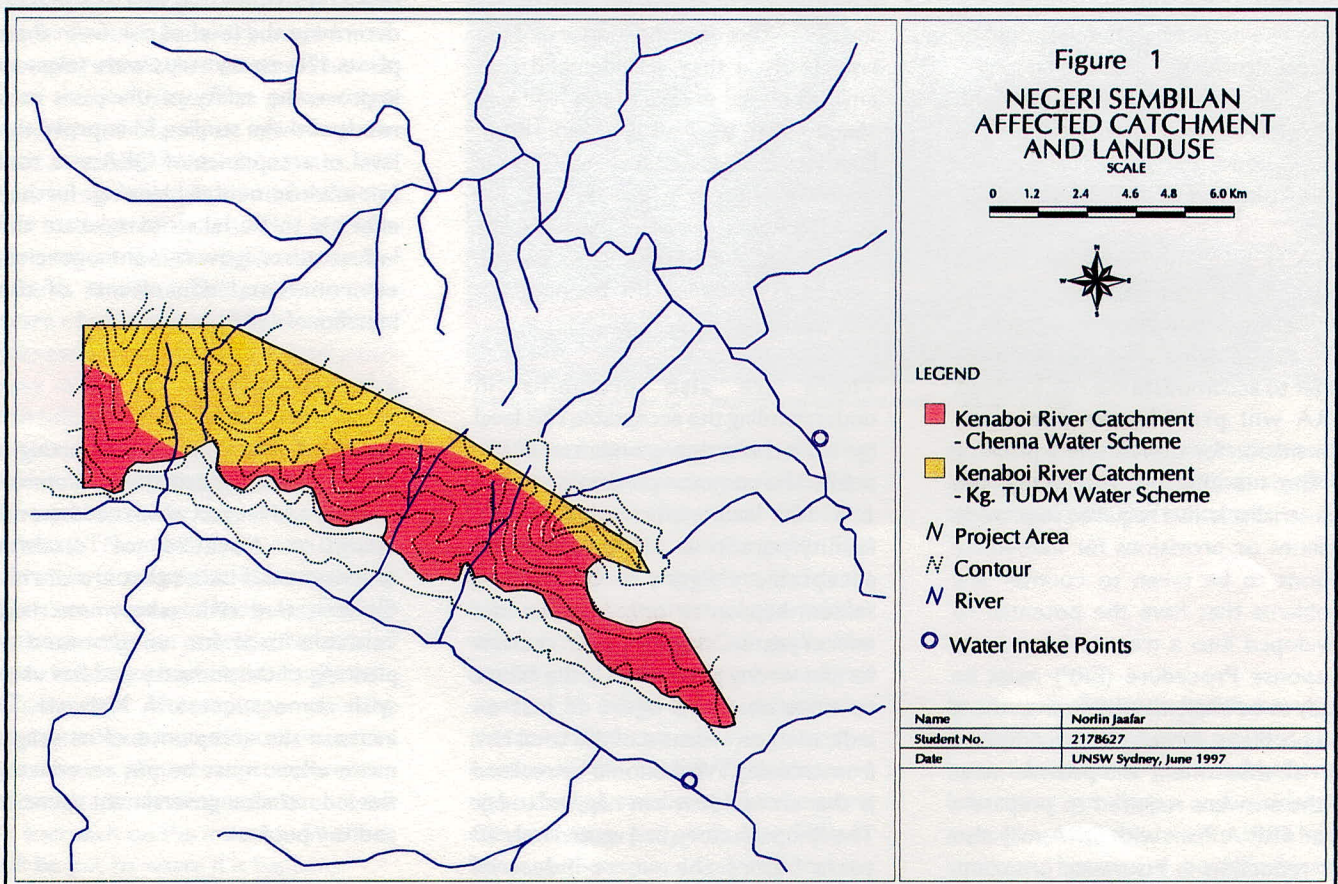
Other examples on the usefulness of GIS are as follows:

- management of large data sets;
- data overlay and analysis of development and natural resources patterns;
- trend analysis;
- data set for mathematical impacts models;
- habitat analysis;
- aesthetics analysis; and
- public consultation

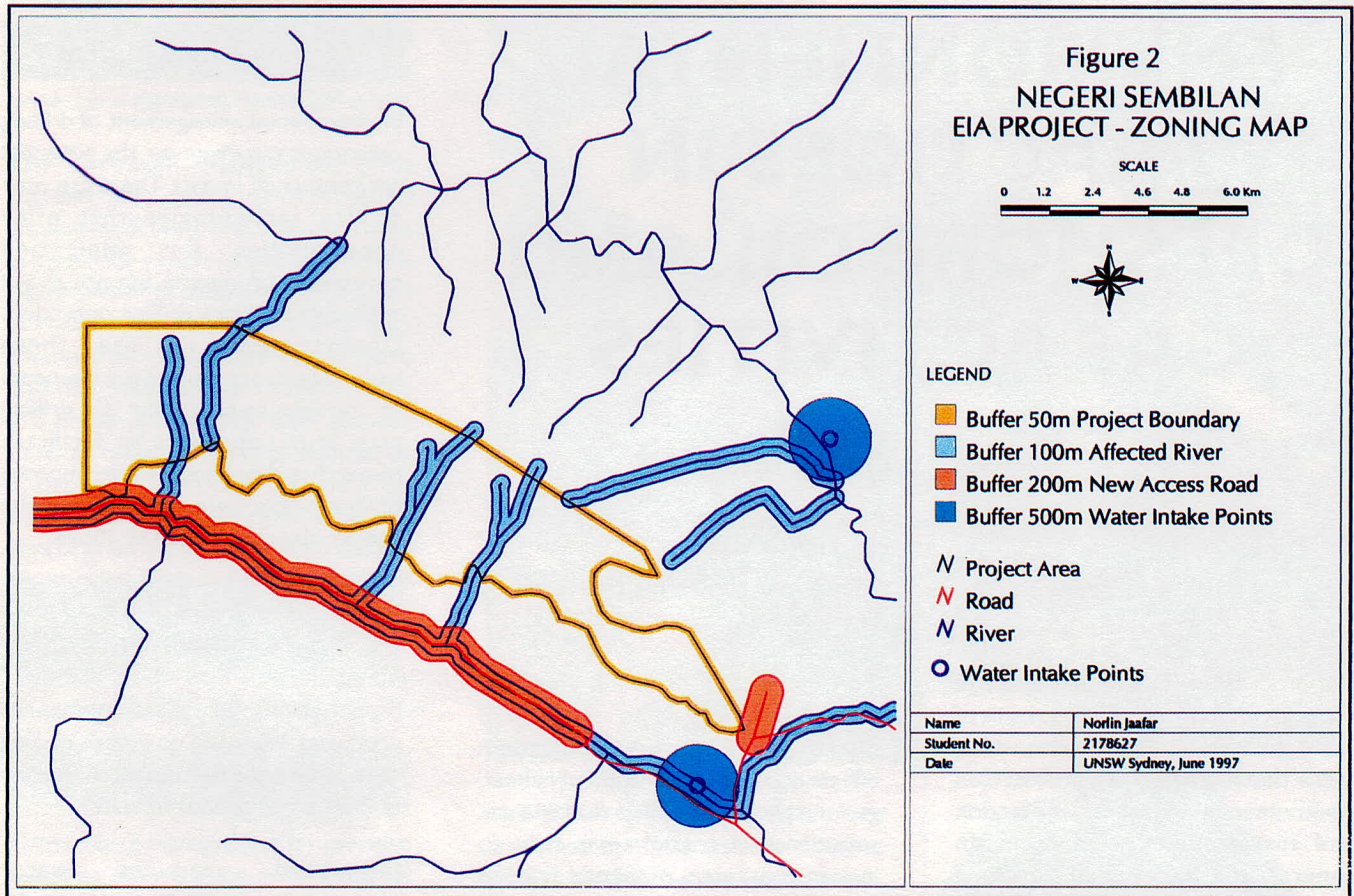
In addition, GIS can also serve as a tool for monitoring the impacts of developments and for

environmental assessment audits. Spatial data is vital for GIS in environmental assessment. There is a series of issues which need to be taken into account when using spatial data in GIS. Accuracy and data quality checks are important since these documents may be used in legal cases.

Furthermore, GIS can also be used for on site impact prediction by overlaying various development scenarios. Areas can be calculated for each ecosystem or land use type affected by construction or other development activities. For example, an area affected by a construction project could be identified within an ecological data base and the GIS could then calculate the extent of each resource within that area. The modelling involves the overlay of two coverages of land use and water







catchment which are able to identify the types of land use that will be affected and the water catchment area. The percentage of these affected areas can be calculated by using the GIS function. At the same time, the water intake points and the river network that will be affected by soil erosion during construction activities can also be identified and displayed as shown in Figure 1.

With respect to the establishment of mitigation and abatement measures, it is important to present these information on maps to assist the project proponent as the implementor and the DOE, as the enforcement agency, to conduct post-monitoring. For example the projected increase in the run-off has the potential to aggravate flash flooding in downstream settlements, various measures are needed to minimise the impact to the environment. Zoning is deemed important to make the development environmental friendly. The measures recommended here

involve a non-technical aspect with the use of buffers in GIS to allow the rivers to be protected, to restrict land use activities surrounding the water intake points and to prevent encroachment to the project boundary and new access road on the forest reserves. (Refer to Figure 2). The buffering criteria can be set as follows:

- Buffer 50 m of project boundary
- Buffer 100 m of river networks
- Buffer 200 m for new road access
- Buffer 500 m for water intake points

Before this buffering model is conducted, it is necessary to identify the rivers that will be affected and then, this is buffered to 100m. The new access road is digitised to produce a new coverage and later buffered to 200m. The next coverage is the water intake points, those which are nearest to the Project site are also buffered to 500m. Finally, the Project Boundary is buffered to 50m so as to prevent developments encroachment on the forest reserves.

GIS supports the overall EIA process in three ways. GIS technology can assist in guiding the analyst on the impacts at the regional scale that occur at different geographical levels. It also serves as a data set for a variety of mathematical models and is able to store and manipulate three-dimensional files, and it offers a spatial perspective for evaluation and communication of information. With the appropriate database, important analyses such as to determine site suitability, soil erosion estimation, visibility analysis, habitat analysis, buffering of land use to reduce noise, air pollution and the effects on property value of development proposals can be carried out.

Finally, another GIS analysis application in the environmental field that could be considered is in determining the best locations for environmental monitoring stations based on cost and accessibility with the networks.





# ENVIRONMENTAL PRACTICES IN OFFSHORE OIL AND GAS ACTIVITIES

by  
Mashitah Darus

## Introduction

The offshore oil and gas exploration and production (E & P) take place in many parts of the world. As a result of rapid growth of global economics, these developments call for increase environmental awareness, protection and sustainable development. In general, the benefits of adopting practices that are environmentally protective are widely recognised by regulators and oil and gas operators. As such, an offshore oil and gas industry, as the key player, should operate in the context of a multitude of social, economic, physical and environmental concerns. The balance between these varies from region to region; companies and joint-ventures operate on a global-scale in strong world market competition, as well as in the context of global and regional conventions.

This article will describe further the scope of environmental practises in offshore oil and gas exploration.

## Environmental Impacts Assessments (EIA)

EIA is one of the tools to ensure that protection of the marine environment is considered in the planning of offshore oil and gas activities. The scope of EIA in the management of E & P activities, from seismic exploration to decommissioning is applicable to all development steps and considers

cumulative effects on the receiving environment.

The main categories of potential impacts are related to operational discharges and leakages, ecosystem effects due to deterioration of habitat, geomorphological effects for instance, subsidence in coastal areas, risks to human consumers of tainted seafood as well as to socio-economic effects.

E & P activities have local impacts on the marine environment, the extent and nature of which, depend on the local environmental conditions and the operational practices. The degree of the potential impact of offshore oil and gas activities on the marine environment is considered to be largely local, but it differs in different ecosystems. The significance of the potential cumulative environmental impact of offshore activities can be related to the density of operations in perspective of the sensitivity of the local ecosystem.

Prior assessment is important and baseline assessments or studies is valuable to predict impacts. The verification of impacts by monitoring is important and a number of methodologies are available. In some areas, however, this is hampered by lack of monitoring or inadequate monitoring techniques or lack of manpower from regulatory agency side to ensure that environmental practices are materialised.

## Drilling Management

Environmental management of drilling operations can minimise the potential environmental impact. There are now drilling technologies that offer opportunities for minimising environmental impacts, but not all are applicable to every drilling operation. Opportunities to use these technologies are among the elements to consider in preparing the drilling plan. It is important to facilitate research and development to improve drilling technologies and achieve the overall objective as stated above.

## Produced Water Management

Proper environmental management of produced water will be able to reduce the quantity and to improve the quality of discharged produced water.

Integrated produced water management should be based on the following strategies:

- (i) Prevent the production or inject produced water for reservoir pressure maintenance;
- (ii) Inject produced water for disposal if energy requirements do not cause more environmental trade-offs;
- (iii) Minimise waste production; and
- (iv) Treat and dispose remaining production water.

Integrated produced water management would also require the minimisation of hazardous chemicals use in the treatment process. At the on-site, produced water management should take into account specific local conditions and technical limitations. The industry should not only continuously seek to develop new technologies, but also implement an optimal utilisation of existing technology and resources including continuous training of personnel.

## E&P Chemical Management

The objective of environmental



management of E&P chemicals is to minimise, optimise or substitute the use of chemicals with regard to production capability, health and safety.

E&P chemicals management is an integral part of the environmental management system as a whole. There is a need for expert judgement and the development of control systems based on both hazard and risk assessment. Methods for the environmental hazard and risk evaluation of E&P chemicals are presently available. Due account must be taken to lists of prohibited or approved chemicals by local or international bodies/conventions. It is also of great importance to oil and gas operators to be transparent and disclose information of chemicals used in the E&P activities whenever communication with relevant parties or public takes place.

### Other Waste Management

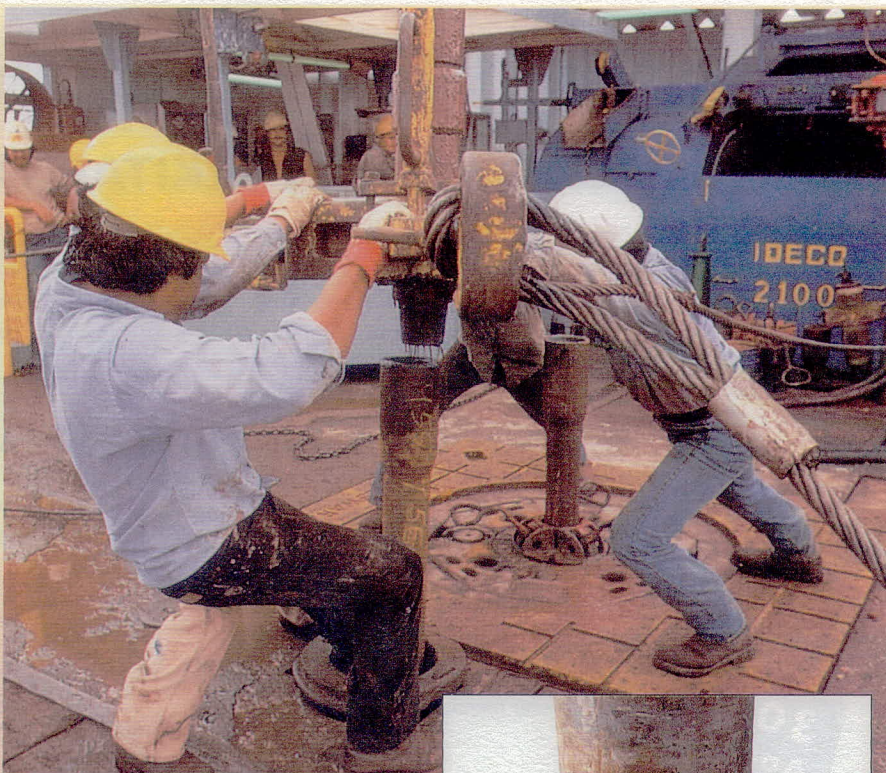
Other waste management for offshore activities can minimise environmental impact of discharges and disposal of solid and hazardous wastes. Waste should be managed in accordance to the following hierarchy:

- (i) Minimise;
- (ii) Reduce, Recycle and Recover;
- (iii) Treatment; and
- (iv) Disposal or Discharge

The key operational waste streams that occur as a result of offshore drilling and production activities include drilling and cutting muds, production water, pipeline treatment fluids, domestic and sanitary wastes, deck drainage water, desalination wastes, and anti-fouling paint. The component of these waste stream of particular environmental concern include hydrocarbons, chemical additives, naturally occurring radioactive materials (NORM) and heavy metals.

### Environmental Management Systems, EMS

Integration of sound environmental practices into the total management of offshore operations largely depends



*Drilling activities in progress.*

on the implementation of Environmental Management Systems (EMS) at company level. In principle, EMS should be part of an integrated overall management system.

The overall aim of petroleum industries in managing the environmental impact of their offshore oil and gas activities should be three-fold; to meet the requirements imposed by the regulatory system(s) under which they operate, to achieve control of all known environmental risks through the application of due diligence, and to continuously improve their environmental performance.

The ISO 14000 series can offer a useful approach for an operator in developing an acceptable Environmental Management System. The effectiveness of Environmental Management Systems will depend crucially on establishing a clear set of links between policies, objectives, targets and indicators, so that the translation of one into the other can be followed and checked. It is essential that there is an evaluation of the implementation of Environmental Management Systems, in particular, performance against targets.



*A drill bit*

### Conclusion

Regulators, offshore operators, non-governmental organisations and the general public share an interest in promoting good environmental practice. The development of such good environmental practice depends crucially on the availability of the relevant information, practical experience and scientific and technical expertise.

Oil and gas companies should have, and behave according to an integrated vision on production, safety, health and environment, regardless of where in the world they are active.





# “MILESTONES”

## JABATAN ALAM SEKITAR TAHUN 1997

17  
Feb

Mahkamah Rayuan mengenyepikan Perisytiharan Mahkamah Tinggi bahawa Arahan Pindaan perintah Kualiti Alam Sekeliling (Aktiviti Yang Ditetapkan) (Penilaian Kesan Alam Sekeliling) 1987 yang membenarkan Kerajaan Sarawak meluluskan Laporan EIA bagi Projek Empangan Bakun, sebagai tidak sah dan Ekran Bhd boleh meneruskan projek tersebut.

1  
Apr

Perlantikan Ahli Mesyuarat Majlis Kualiti Alam Sekitar (EQC) yang baru bagi penggal ke 9.

30  
Apr

Jabatan Alam Sekitar mendapat pengiktirafan ISO 9002.

6  
Mei

Majlis Pelancaran Information Kiosk (Bank Maklumat Alam Sekitar) oleh Y.B. Datuk Law Hieng Ding, Menteri Sains, Teknologi dan Alam Sekitar.

4  
Jun

Majlis perasmian logo baru Jabatan Alam Sekitar dan penyampaian sijil ISO 9002 oleh Y.B Datuk Law Hieng Ding, Menteri Sains, Teknologi dan Alam Sekitar.

3  
Jul

Mesyuarat MEXCOE kali ke-14 di Bilik Gerakan Jabatan Alam Sekitar.

Ogos  
okt

Jerubu melanda Negara.

18  
Ogos

Majlis Perlancaran ASEAN Youth Camp yang pertama di Kuala Lumpur, Malaysia.

14  
sept

JAS telah dikurniakan Anugerah “USEPA’s Best-of-the-Best Stratospheric Protection Award” oleh United States Environmental Protection Agency.

15  
sept

JAS dikurniakan Anugerah “Outstanding National Ozone Unit” oleh United Nations Environmental Programme (UNEP).

16  
sept

JAS dikurniakan “Global Ozone Award” oleh United Nations Environmental Programme (UNEP).

19  
sept

Sarawak diisytiharkan darurat jerubu apabila bacaan IPU melebihi 500.

28  
sept

Pengisytiharan darurat jerubu di Sarawak ditarik balik. IPU kurang dari 500.

1  
Okt

Ieng Leng, Ketua Pengarah Alam Sekitar pegawai kanan JAS, En. Ismail Ithnin kurniakan Anugerah “USEPA Stratospheric zone Protection Award” oleh USEPA

1  
Dis

Anugerah Perlindungan Lapisan Ozon Malaysia (MOLPA) ke 4 oleh YB Timbalan Menteri Sains, Teknologi dan Alam Sekitar.

### Announcement

DOE is reviewing the criteria for the registration of the EIA Consultants.  
Would those interested parties who wish to comment on the revised first draft criteria, please contact:  
Pn. Che Asmah Ibrahim cai @jas. sains. my  
or  
Puan Nor Aziah Jaffar aziah @jas. sains. my