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Highlights

SIMPOSIUM PENDIDIKAN ALAM SEKITAR

PENGETUA-PENGETUA SEKOLAH *PERINGKAT KEBANGSAAN 2001*

Oleh **Tunku Khalkausar Tunku Fathahi**

PENDAHULUAN

Pembangunan pesat negara telah banyak membawa faedah kepada kita. Akan tetapi, implikasi pembangunan yang kita kecapi juga memungkinkan timbulnya masalah alam sekitar. Memandangkan pembangunan lestari kurang dititikberatkan, maka kesan-kesan seperti pencemaran, banjir, pembuangan sampah, ketidaktentuan cuaca, dll. yang menyebabkan kualiti hidup terjejas telah dialami.

Memandangkan kepentingan pendidikan dalam pengurusan alam sekitar amat dirasai, maka Kementerian Pendidikan telah memperkenalkan pengetahuan ini dalam kurikulum KBSR dan KBSM. Walaupun pendidikan alam sekitar telah diterapkan dalam pengajaran dan pembelajaran mata pelajaran sedia ada, perlaksanaannya di sekolah masih bergantung kepada guru-guru yang perlu memastikan pengajaran dilakukan secara integrasi merangkumi unsur-unsur alam sekitar supaya pelajar-pelajar mendapat pendedahan awal dan mengamalkannya di dalam kehidupan seharian. Apa yang pasti, sokongan semua pihak masih diperlukan untuk menjayakan penerapan nilai-nilai ini. Di sekolah, pihak pentadbir, khususnya

Bersambung ke mukasurat 3

FROM THE DG'S DESK

The promotion of environmental awareness has always been an integral effort of the Department of Environment (DOE) towards achieving environmental objectives. Since its establishment in 1975, promotion of environmental awareness has been progressively intensified.

To mention a few, for schools, many environmental protection and conservation activities have been introduced: Wira Alam, Environmental Awareness Camps, PRIAS (Environment Scrap Book Competition), Inter-Varsity Environmental Debate, Environmental Poetry, Essay Writing Competition were some of the activities that have been successfully implemented much with the support of the Ministry of Education, NGOs and others. Various educational materials in the form of posters, videos, bulletins, fact-sheets, songs were developed and distributed widely to schools, institutions, government agencies, etc throughout the country. Due to popular demand on the DOE quarterly bulletins Era Hijau, and IMPAK, the number of copies published is now increased five folds.

The Malaysia Environment Week (MASM) is the premier environmental awareness event celebrated from 21-27 October annually. Throughout the week, various environmental-themed activities such as seminars, 'gotong-royong', beach clean-up, tree planting campaigns and enviro-camps were conducted.

At the international level, Malaysia participated in various awareness programs such as Eco-Club Conference in Japan, the UNEP Young Environmental Envoys Project, the ASEAN Working Group on Environmental Information, Public Awareness and Education and others. DOE has its own web site (http://www.jas.sains.my) that provides up-to-date information and announcements. In addition, DOE's enviro-library gives services and briefings to local and foreign visitors, and of course many reference text, bulletins, magazines, seminar/conference papers, etc to the users.

DOE will endeavor to plan and implement more environmental education and awareness programs as a continuous effort in building a civil society that loves and cares for our environment.

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pengetua dan guru besar memainkan peranan penting bagi memastikan pendidikan diterapkan samada melalui amali ataupun secara teori. Pengetua perlu memastikan dan memberi ruang untuk guru dan pelajar untuk melaksanakan pendidikan alam sekitar secara menyeluruh di sekolah supaya amalan mesra alam menjadi sebahagian kehidupan mereka. Malah sokongan dan bantuan Pengetua juga adalah perlu bagi menggerakkan atau membolehkan guru-guru melaksanakan aktiviti-aktiviti pendidikan alam sekitar seterusnya.

Menyedari keperluan ini, maka pada 27-30 Ogos 2001, Unit Promosi Kesedaran Alam Sekitar, Jabatan Alam Sekitar dengan kerjasama Bahagian Sekolah, Kementerian Pendidikan Malaysia dan Maktab Perguruan Teknik Cheras selaku Urusetia telah menganjurkan satu Simposium Pendidikan Alam Sekitar bagi Pengetua-pengetua Sekolah seluruh Malaysia bertempat di Riviera Bay Resort, Melaka.

Antara objektif penganjuran simposium ini adalah untuk:

i) Mewujudkan kesedaran dan kepekaan pengetua-pengetua sekolah tentang kepentingan pendidikan alam sekitar dan isu-isu alam sekitar.

ii) Melahirkan individu dan masyarakat yang peka terhadap alam sekitar dan mempunyai sikap proaktif terhadap alam sekitar.

iii) Melahirkan pengetua yang menggerakkan aktiviti mesra alam, baik dalam kurikulum mahupun ko-kurikulum di sekolah.

iv) Menanam dan melahirkan pengetua yang bersemangat dan bertanggungjawab dalam menghadapi isu-isu berkaitan alam sekitar, bekerjasama dengan semua pihak serta bertindak untuk melindungi dan memelihara alam sekitar.

Program sepanjang 4 hari 3 malam ini telah berjaya menarik seramai 69 orang pengetua dari seluruh Malaysia (5 orang bagi setiap negeri) yang dipilih khas oleh pihak Bahagian Sekolah, Kementerian Pendidikan Malaysia yang turut membiayai tuntutan perjalanan mereka. Golongan Pengetua dipilih untuk mengikuti simposium ini kerana mereka merupakan golongan *"decision-maker"* di sekolah yang menentukan samada sesuatu projek itu perlu dilaksanakan atau tidak serta menentukan hala-tuju sesuatu projek yang dijalankan oleh pihak sekolah.

Oleh kerana banyak program kesedaran Jabatan Alam Sekitar (JAS) tertumpu di sekolah, maka dirasakan bahawa golongan Pengetua perlu didedahkan kepada kepentingan penyerapan nilai-nilai murni alam sekitar di kalangan pelajarnya melalui penyertaan pelajar ke dalam projek-projek kesedaran JAS di samping melengkapkan pengetahuan alam sekitar serta bahan rujukan yang berkaitan bagi membolehkan pembelajaran alam sekitar merentas kurikulum dilakukan dengan lebih berkesan.

PERLAKSANAAN PROGRAM HARIAN

Program yang dijalankan merangkumi beberapa sesi ceramah, pembelajaran secara teori dan praktikal, sesi bengkel serta lawatan ke premis-premis kontraktor yang terlibat di dalam pengurusan alam sekitar negara. Sesi lawatan ini diselitkan bagi memberi peluang pendedahan terhadap dua jenis bidang pengurusan alam sekitar negara di samping meningkatkan kefahaman peserta terhadap isu-isu alam sekitar yang penting dan perlu diberi perhatian yang berada di bawah bidang kuasa JAS. Pendedahan terhadap sekolah yang telah dikenalpasti banyak menjalankan aktiviti-aktiviti penjagaan alam sekitar di sekolah akan diperlihatkan sebagai contoh kepada para peserta.

27 Ogos 2001

Pada hari pertama, majlis upacara aluan telah disempurnakan oleh Timbalan Ketua Pengarah Jabatan Alam Sekitar, Ir. Shamsuddin Hj. Abdul Latif dan diikuti dengan sesi suai-kenal dan pembentukan kumpulan di kalangan peserta pada sebelah malamnya.

28 Ogos 2001

Hari kedua dipadatkan dengan program ceramah yang disampaikan oleh pegawai-pegawai dari Jabatan Alam Sekitar dan Bahagian Sekolah serta penceramah-penceramah yang terdiri dari pakar-pakar alam sekitar dari Center For Environment, Technology and Development Malaysia (CETDEM), Gabungan Persatuan-persatuan Pengguna Malaysia (FOMCA), "Tree Planting Group", Persatuan Pencinta Alam Malaysia (MNS) dan Alam Flora Sdn.Bhd. Sebagai permulaan, para peserta didedahkan tentang fungsi dan peranan Jabatan Alam Sekitar, masalah alam sekitar yang sedang dihadapi, program-program kesedaran alam sekitar JAS, dasar dan perlaksanaan ko-kurikulum di sekolah serta topik-topik yang lebih spesifik dari agensi-agensi swasta yang berkaitan.

Program praktikal bagi membuat baja kompos dan pembuatan kertas kitar semula juga didemonstrasikan masing-masing oleh Puan Tan Siew Luang (CETDEM) dan Cikgu Koh Kian Choon yang dibantu oleh 6 orang pelajarnya dari SMK Durian Tunggal, Melaka. Lebihan sisa makanan dari kantin sekolah serta rumput rampai yang telah dipotong dari padang sekolah memungkinkan idea membuat baja kompos dan penanaman pertanian organik dipraktikkan di

sekolah. Manakala kertas kitar semula dapat dijadikan aktiviti bulanan yang bakal menjana sumber kewangan kelab di sekolah. Ide-ide inilah yang ingin diterapkan ke dalam minda para pengetua yang hadir. Ternyata bahawa ide ini dapat dimunafaatkan oleh pihak sekolah dan telahpun dapat menarik minat para peserta.

Pada malam harinya, para peserta telah diminta untuk menghasilkan satu kurikulum wawasan sekolah lestari yang memberikan penekanan tentang berbagai aspek alam sekitar bagi program yang boleh dijalankan di peringkat sekolah masing-masing. Kurikulum wawasan ini akan dimurnikan lagi oleh pihak penganjur sebelum dihantar semula kepada semua peserta yang terlibat. Wawasan ini boleh dijadikan panduan bagi membentuk imej sekolah lestari alam sekitar dalam usaha melindungi dan memelihara alam sekitar.

29 Ogos 2001

Hari ketiga dipenuhi dengan sessi lawatan ke Stesen Pengawasan Kualiti Air & Udara (Alam Sekitar Malaysia Sdn. Bhd.) dan ke Pusat Pengolahan & Pelupusan Bersepadu Buangan Terjadual di Bukit Nenas, N.Sembilan (Kualiti Alam Sdn.Bhd.). Kunjungan ke sebuah sekolah yang berwawasan sekolah lestari iaitu Sekolah Rendah Bukit Bruang, Melaka di mana para peserta telah disambut dengan penuh rasa bangga oleh murid-murid dan guru-gurunya dengan iringan lagu-lagu patriotik negara serta laungan Merdeka. Walaupun hanya sekolah rendah, sekolah ini aktif menjalankan kegiatan alam sekitar dan ianya patut dicontohi oleh para peserta yang mengambil bahagian.

Jabatan Alam Sekitar juga ingin mengucapkan ribuan terima kasih kepada Alam Sekitar (M) Sdn. Bhd. (ASMA) dan Kualiti Alam Sdn.Bhd. serta Sek. Ren. Bukit Bruang, Melaka di atas kesudian mereka menerima kunjungan rombongan seramai hampir 85 orang ini.

30 Ogos 2001

Majlis Penutup dan Penyampaian Sijil yang dijalankan pada hari keempat telah disempurnakan oleh YB Datuk Hj. Zainal bin Dahalan, Timbalan Menteri Sains, Teknologi dan Alam Sekitar. Turut hadir adalah Y. Bhg. Puan Hajah Rosnani Ibarahim, Ketua Pengarah Jabatan Alam Sekitar dan wakil dari Bahagian Sekolah dan Bahagian Pendidikan Guru, Kementerian Pendidikan serta wakil dari Jabatan Pendidikan Negeri Melaka. Antara acara menarik pada majlis tersebut ialah pendeklamasian puisi alam yang telah menjadi Johan pertandingan puisi alam sekitar antara kumpulan yang dijalankan pada malam sebelumnya.

Ucapan dari "Penghulu" atau wakil peserta antara lain telah menyuarakan tentang program simposium yang terlalu padat sehinggakan tiada ruang untuk berehat. Walau bagaimanapun, rata-rata mengakui bahawa pengetahuan dan bahan pendidikan yang dibekalkan amatlah berfaedah untuk dilaksanakan di sekolah masing-masing.

Di sepanjang simposium berkenaan, kesemua peserta telah dibekalkan secara berperingkat-peringkat dengan bahan-bahan penerbitan JAS, buku aktiviti yang disumbangkan oleh pihak Motorola Sdn. Bhd. dan Buku Panduan menjalankan Pertanian Organik serta pita video yang berkaitan. Pasti bahan-bahan ini akan dapat dimunafaatkan oleh para peserta apabila kembali ke sekolah masing-masing. Malah, pihak penganjur berharap dengan adanya simposium yang julung-julung kali diadakan ini, akan dapat membuka minda dan menyuntik rasa minat dan cintakan alam sekitar bagi menggerakkan usaha menjaga dan melindungi alam sekitar dilakukan di peringkat sekolah.

Kepada para peserta, walaupun jadual program simposium yang telah dijalankan agak memenatkan, namun ianya hanyalah bertujuan bagi memberikan sepenuh pengetahuan yang boleh dipraktikkan oleh Pengetua-pengetua di sekolah masing-masing. Walau bagaimanapun, kerjasama dan sokongan padu para peserta sepanjang simposium ini berlangsung, amatlah kami hargai. Cadangan dan komen semua peserta akan diambilkira bagi penganjuran simposium yang sama pada masa akan datang.

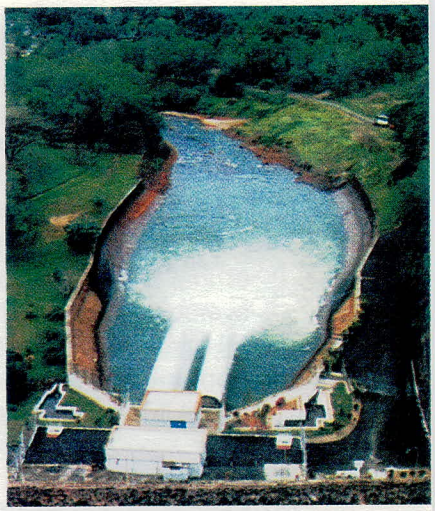
PENUTUP

Kesedaran pengetua dalam mengintegrasikan pendidikan alam sekitar adalah penting bagi membekalkan anak-anak yang bakal mewarisi negara ini dengan ilmu pengetahuan mengenai alam sekeliling mereka dan saling-kebergantungannya di samping memupuk nilai-nilai murni alam sekitar dalam diri anak-anak tersebut.

Memandangkan kursus dalam perkhidmatan / seminar tentang pendidikan alam sekitar adalah terbatas, maka simposium ini diharapkan dapat membuka hati dan minda para pengetua terhadap pendidikan alam sekitar dan kepentingannya, serta melengkapkan mereka dengan pengetahuan, kemahiran dan memupuk nilai-nilai murni alam sekitar supaya mereka peka dan menyedari tanggungjawab mereka terhadap alam sekitar. Para pengetua yang menjadi warga mesra alam ini seterusnya boleh dijadikan teladan untuk dicontohi oleh semua warga sekolah.

Rakaman terima kasih kepada pihak Maktab Perguruan Teknik yang telah bertungkus lumus bagi menjayakan simposium yang julung-julung kalinya diadakan. Diharapkan agar kerjasama ini akan berpanjangan. IMPAK

Environmental Management Plan For Dam : Regulator's Perspective*



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Synopsis

This paper discuss the salient elements in an environmental management plan (EMP), positive initiatives in enhancing EMP, and an EMP format for report writing.

Keywords: responsibility, monitoring, indicators.

1. INTRODUCTION

Environmental impact assessment (EIA) process does not end once an EIA approval has been granted to the project proponent. The process continues with the formulation and implementation of Environmental Management Plan (EMP) which is a key outcome of the EIA process. In broad term EMP should guide the project proponent to manage environmental impact arising during project implementation, to ensure the effectiveness of environmental protection and conservation measures identified in the EIA report, and to ensure project compliance with legislative requirements and conditions attached to the approval. These can be achieved by implementing efficient operational controls, environmental monitoring, inspections,quality assurance and auditing activities.

2. OBJECTIVES OF AN EMP

An EMP is to achieve the following objectives:

(a) To comply with legislation, policy,guidelines,and specified conditions by the project proponent as well as the authorities;

(b) Guiding day to day environmental management in order to ensure consistency in the overall operations;

(c) Reporting plans and actions in a systematic way to ensure proper actions are taken to meet the requirement;

(d) Reviewing current and past practices in order to assess their effectiveness;

(e) Communicating the environmental policies and environmental management practices to all relevant parties; and

(f) Paving the way for long term sustainability of the environment as well as the project itself.

3. RESPONSIBILITY DURING PROJECT IMPLEMENTATION.

The responsibilities and action required of the project proponent, his project manager or implementing body should be identified with completion of EIA study report. Some of those responsibilities and actions include:

(a) Allocate institutional/administrative responsibilities for planning and management of environmental requirement. The result of the EIA are to be applied and shape the project and influence engineering design;

(b) Allocate responsibility to execute mitigation action to the project manager and/or the contrac-

tors responsible for project construction (For example,soil erosion control planning and execution by earthworks contractor may be incorporated in the agreement for such work);

(c) Implement a program of monitoring to check the effectiveness of mitigation measures, and modify, or implement additional measures, to correct or overcome the impact in question;

(d) Appoint relevant expertise or consultants to assist if in-house capability is not available;

(e) Ensure mitigation measures, as appropriate,are incorporated into detailed design and contract documents;

(f) Allocate an adequate budget for implementing the EMP.

It is pertinent to note that issues of relevance to public authorities must be reported. Such issues are, as the need to restrict land use of adjacent surrounding areas,control of development allowed in the project area, and requirements for collection, treatment and disposal of liquid and solid wastes are particularly relevant to local authorities and other specific agencies who ultimately are responsible for the management of these areas.

4. ENVIRONMENTAL MANAGEMENT PLAN

The EMP should recognize and include the followings :

(a) Management of soil erosion and river siltation during site clearing and earthworks - a soil erosion control plan is generally necessary ;

(b) Management of runoff to minimize floods ;

(c) Regulation of the type of development allowed in the project area ;

(d) Management of any liquid , solid and hazardous wastes generated;

(e) Environmental monitoring requirements;

(f) Responsibilities and role of the project proponent for the environment;

(g) Emergency Response Plan (ERP) - This plan is essential for Dam Projects - the ERP may not be completed and selected in the EIA but it is essential that a schedule be drawn up, responsibilities for its production identified and a budget allocated, all in the EIA;

(h) Watershed Management Plan - Similar to the ERP, the EIA needs to determine a schedule, responsibilities and budget for a Watershed Management Plan. Gazettment of the Watershed may be the only effective method of control and the manner in which this will be achieved needs to be documented.

An important aspect of the EIA document is the identification of monitoring requirement which the project proponent, and possibly the regulatory agency, should undertake during project development and operation (for example, air pollution due to emissions expected in the project area). The program for monitoring should generally identify;

(a) The type of monitoring required (for example, water quality measurement);

(b) The locations of monitoring stations (this should be identified on map or plan);

(c) The parameters to be maintained (for example, dissolved oxygen, if fisheries is important in a river); and

(d) The frequency of monitoring.

5. MONITORING PARAMETER AND INDICATORS FOR DAM AND RESERVOIR PROJECT

(a) Rainfall;
(b) Stored water volume in the reservoir;
(c) Annual volume of sediment transported into the reservoir;
(d) Water quality at dam discharge and at various points along the river, including: salinity, pH, temperature, electrical conductivity, turbidity, dissolved oxygen, suspended solids, phosphates, and nitrates;
(e) River flow at various points downstreams;
(f) Volume of water used, usage, at the reservoir and downstream;
(g) Hidrogen sulphide and methane generation behind dam;
(h) Limnologicals sampling of micflora,

microfauna,aquatic weeds and benthic organisms;
(i) Fisheries assessment surveys (species, population size) in river and reservoir;
(j) Wildlife (species, distribution, condition);
(k) Livestock (species, numbers, distribution, condition); (l) Vegetation changes (cover, species composition, growth rates, biomass) in the upper watershed, reservoir drawdown zone and downstream areas;
(m) Impacts on species or plant communities of special ecological significance (for example nightflies (kelip-kelip) at Kampung Kuantan and Kampung Belimbing, Kuala Selangor);
(n) Public health and disease vectors;
(o) In - and out - migration of people to the area;
(p) Changes in economic and social status of resettlement populations and people remaining in the river basin.

6. SOCIAL ACCEPTIBILITY

Follow-up surveys of community groups which the EIA predicted could be possibly affected should be undertaken initially every year and after 5 years intervals . Information on the health and safety of the communities is available through annual health statistics, and information on population and community location is available through census data (every 10 years).

A complaint register should be maintained at the local project proponent office , and all complaints should be followed up by project proponent staff of the environmental unit.

7. FORMAT OF EMP REPORT.

In July 2001, the Department of Environment has issued a format for EMP reporting to be followed by project proponent. This EMP format is attached to the EIA approval and become part of the approval. It is hoped that with this standard format it would help project proponent in submitting a uniform EMP report and it would also be easier on the part of the DOE staff to evaluate the EMP reports . The EMP report format is as shown on Appendix A .

8. POSITIVE INITIATIVES

(a) Environmental Health Impacts Assessment (EHIA)

Environmental health impact assessment (EHIA) is an evaluation into the consequence on health as a result of change in an environment agent caused by any development activities. The Engineering Service Division, Ministry of Health, Malaysia is preparing these Guidelines.The guidelines are intended for use by everyone carrying out environmental impact assessment (EIA) of a development project in Malaysia and to strengthen environmental health impact assessment, significant focus, within the EIA process. However, the present emphasis of health impact assessment in the Department of Environment is given to projects that give significant health impacts such as construction of municipal waste and scheduled waste incinerators, and construction of dam. It is sufficient

to address the health impact assessment that falls within the EIA process.

Appendix 1 to the guidelines lists particular project-specific environmental health impacts that should at least be considered when preparing an EHIA. An extract of the Appendix is as shown on Appendix B of this paper. It is worth to note that a section in the guidelines would elaborate on Environmental Health Management Plan which is useful in formulating overall EMP. The establishment of a committee at the Ministry's level comprises of various discipline and expertise within the Ministry itself to study health aspects of developmental projects is commendable.

(b) Environmental Performance Evaluation (EPE).

Environmental performance evaluation is an internal management tool designed to provide management with reliable and verifiable information on an ongoing basis. With the availability of this information the organization can determine whether its environmental condition meets the criteria set by the management of the organization. ISO 14301 : 1999 provides the basis and on conducting the EPE .

One of the key features in EPE is that one can select environmental performance indicators (EPIs) which can be categorized as management performance indicators (MPIs), operational performance indicators (ECIs).

MPIs are a type of EPIs that provide information about management efforts to influence the environmental performance of the organization's operations. OPIs are a type of EPIs that provide information about the environmental performance of the organization's operations, and ECIs are specific expression that provides information about the local, regional, national or global condition of the environment.

(c) Feedback Monitoring

From experience, projects subject to EIA procedure, violation and complaints are largely related to resource developments and very few are related to industries. This is understandable as it is difficult to specify the exact requirement when elements of nature are involved as compared to man-made devices such as production machines , effluent treatment plants or air pollution control equipment. The degradation of nature by siltation, erosion, etc are more difficult to predict and quatifield . Hence surveillance or monitoring and audit to ensure adequate environmental protection measure are often requires on-site review and concept adjustments by experience professionals such as engineers, ecologists, geologists, hydrologists etc. Strategic feedback monitoring is a positive step towards this. It is an orchestrated joint application of numerical modeling and biological monitoring, provides an interactive system that allows project works to be optimized and performed within acceptable limits.

(d) Social Impact Assessment manual (SIA)

Ministry of National Unity and Social Development Malaysia is preparing a proposal for SIA pilot project to be funded under the UNDP, in relation to physical development process . The contents of the manual will be, among others are the usage of participatory approaches, objectives and subjective impacts,and potential and problem in approaches adopted . It is hoped that the SIA manual can strengthen and re-orientate the development process to make the lives of people and the human environment, more meaningful. An important tool especially at the policy formulation and strategic planning level, the Ministry is establishing an SIA Unit within the Ministry. The establishment of the unit is commendable because, concrete action plan, together with details on scoping and guidelines on SIA, could be drawn up for implementation. However, the present socio-economic component of the EIA Study is sufficient to address socio-economic concerns that fall within the jurisdiction of the DOE. Its jurisdiction and focus on socio-economic impact within the EIA Study is on the bio-chemical and physical impact on the population; including the community's view on the project. Issues like displacement, relocation and pollution may cause the deterioration of the quality of life will be addressed. This might not meet the full requirement of an SIA and it is recommended that the full SIA process should be introduced separately and taken up under the Ministry of National Unity and Social development.

9. CONCLUSION

Although EMP's requirement is as old as EIA itself, its implementation in Malaysia is not quite encouraging. This, might be, is due to misconception by many that it is thought to be add-on requirement , and the project is thought to be already secured once EIA approval has been granted . In actual fact, many resource-based project are likely to face problem once the project take-off the ground , if not properly planned . Thus , EMP could offer numerous benefits to project management such as continual improvement of the project implementation in complying with the legislation, policy, guidelines, and conditions of approval, guide to documentation and communicating environmental management practices to all relevant parties in which the project proponent can demonstrate transparencies and positive image of his company . Any positive initiatives and innovative approaches in EMP are most welcome and encouraged so that one can see the tangible benefits of EMP could give, cost-effectiveness in itself, and provide long term sustainability to the environment and the project .

Appendix A

ENVIRONMENTAL MANAGEMENT PLAN FORMAT
(Plan,Implement,Check and Review)

I INTRODUCTION

II POLICY

III ORGANISATION CHART,RESPONSIBILITIES & IMPLEMENTATION BUDGET

IV ENVIRONMENTAL REQUIREMENTS

V MONITORING PROGRAMMES

VI SIGNIFICANT IMPACT AND POLLUTION CONTROL MEASURES

VII ENVIRONMENTAL CONTINGENCY PLAN

I INTRODUCTION

a Summary of the approved concept for the project by The Local Authority
b Project Implementation Schedule

II POLICY

a Company objective in protecting the environment

b. Continuous commitment by the top management to ensure continuous compliance on environmental requirements

III ORGANISATION CHART/BUDGET

a. Top level management and officers responsible in managing environmental issues (to be amended should there be any changes)
b. Name of the environmental consultants and the certified laboratory to analyse and a complete monitoring report for the Department of Environment .
c. Frequency and type of training related to safety and environment for workers
d. Estimated budget for implementing the Environmental Management Plan

IV ENVIRONMENTAL REQUIREMENTS

a. EIA Appoval Conditions and Appeal of EIA Conditions (if any)
b. Related standard and regulations within Environmental Quality Act, 1974
c. Reports on environmental, monitoring and its frequency
d. Copies of any written approval or permission by DOE
e. Compendium of environmental information: document name, person responsible , location of document.

V MONITORING PROGRAMMES

a. Baseline studies for air, water and noise prior to the earthwork for data comparison during future monitoring
b. To identify and justify sampling stations for air, water & noise (on landuse map)
c. Effluent discharge point must be identified and reported

d. Frequency of monitoring
e. Sampling method for air, water & noise
f. Weather conditions before and during the monitoring period.

VI SIGNIFICANT IMPACT AND POLLUTION CONTROL MEASURES

a. To identify the significant due to the project implementation, followed by specific control measures such as exact location for proposed silt trap, to identify high erosion risk slopes and proposed control measures etc.
b. Suitable wastewater treatment system and air & noise pollution control equipment need to be indentified and summary of equipment operating procedure needs to be presented.
c. Abandonment plan need to be prepared in case the project is delayed.

VII ENVIRONMENTAL CONTINGENCY PLAN

a. Action or emergency response must be ready for any emergency such as landslide, oil or hazardous chemical substances spill, failure on any pollution control equipment, etc.
b. List of relevant agencies involved in managing the contingency plan.

VIII CONCLUSION

As a whole, the Environmental Management Plan will facilitate in terms of planning, monitoring, control and protecting the environmental as well as the enforcement implementation by the Department of the Environment to ensure the compliance of EIA conditions and the EQA, 1974.

This EMP should be able to be amended for any changes under any circumstances.

APPENDIX B

Dams and Reservoirs
Screening for Health Hazards

Project stage	Health Hazard	Causes
Location	Malnutrition	Loss of common property resources, loss of irrigation water
	Poisoning	Contamination of downstream waters
	Vector-borne disease	Endemic disease foci, access to forested hinterlands
Planning and Design	Malnutrition, vector-borne disease, communicable disease associated with poor living conditions	Resettlement, access roads
	Water-borne disease	Downstream river pollution
Construction	Poisoning, Injury	Inadequate occupational safety measures
	Communicable disease associated with poor living conditions	Poor sanitation, poor water supply, poor food hygiene, introduced diseases
	STDs	Labour camps
	Vector-borne disease	Exposure to vectors in endemic disease foci
Operation	Vector-borne disease	Creation of breeding sites through draw down operations and stream ponding, access to forested hinterland

SOIL AND GROUNDWATER POLLUTION: UNDERGROUND STORAGE TANK

By: **Muhammad Suhaimi Ismail**

Introduction

Organic compound can be a major pollution problem in groundwater. Their presence in water can create a hazard to public health and environment. One of the common source of underground water are spills involving the release of petroleum product such as gasoline, diesel fuel and lubricating and heating oil from leaking oil tanks. Because of their polarity and very soluble charateristics, the organic chemical of petroluem products known as BTEX will be able to enter the soil and groundwater system and cause serious pollution problems. The BTEX group of contaminants consists of benzene, ethyl benzene, toluene, and three isomere of xylene. All of them have some acute and long term toxic effect and in addition to the toxicity's, benzene is known to be carcinogen.

Underground Storage Tank (UST)

UST is any tanks or associated underground piping that has at least 10% of its volume underground. USTs have being causing problem due to four reasons. First of all most USTs in the ground are constructed of bare steel. This offers no corrosion protection as bare steel buried in the ground corrodes rapidly. Installation errors are another cause of tank leakage. Spill and overflow also contribute to UST underground pollution. When too much fuel is delivered to the UST, it overfills and enters the ground. When the operator disconnects the hose incorrectly a spill often result. The final cause of UST problem is piping failure. Underground piping is smaller and less durable than UST. This piping is located near the ground surface and suffers greatly from the effect of installation mistakes, surface loads, and underground movement.

Potential Threat to Soil, Ground Water and Health.

Although the number of cases of UST leakage being reported is still small but the actual number of cases are far greater than reported. It is estimated that about 25% of the Malaysian population are still using ground water as source of drinking water and majority of the population of North Kelantan are still using ground water as their drinking water and for irrigation. These are due to several reasons such as salt water intrusion into rivers, economic factor and a large reserve of ground water. USTs are of concerned to our water supply because of two reasons. First, they usually contained a toxic or potentially dangerous chemical and secondly, they can leak undetected for a long duration without the owner/operator being aware of the leakage.

The government and the general public are concerned on the problem as our ground water reserves and soil whenever directly in contact with the contaminant are subsequently contaminated. Potential toxic or explosive vapors can travel in the soil subsurface endangering lives and property. Gasoline is one of the most prevalent contaminants in the above instances especially in groundwater. Pollutants that are not detected relatively soon, after leakage could cause extensive ground water contamination.

The toxic effect from BTEX can cause acute and chronic health impact. All the compounds are acutely toxic and have noticeable health effect at high concentration. Exposure to these compounds from groundwater system is usually minimal but the exposure can be persistant over a long period of time. For that reason it's more of the long term effect of BTEX exposure and oral intake that needs to be considered.

BTEX compounds can enter the body through ingestion of contaminated crops, inhalation of vapour from the soil, drinking of the contaminated water and the skin exposure. Since BTEX will evaporate, one can also be exposed by inhaling the vapour that origins from the drinking and bathing water. Thus, resulting drinking and bathing water containing organic compound.

Benzene has been proven carcinogen and suspected to be linked to leukemia. The inhalation of toluene and xylene in concentration of 0.4 mg/I causes headache, dizziness and irritation of the mucous membranes. Long term exposure of toluene and xylene have been proven to cause brain damage, but neither of them are carcinogens.

Detection of UST Leakage

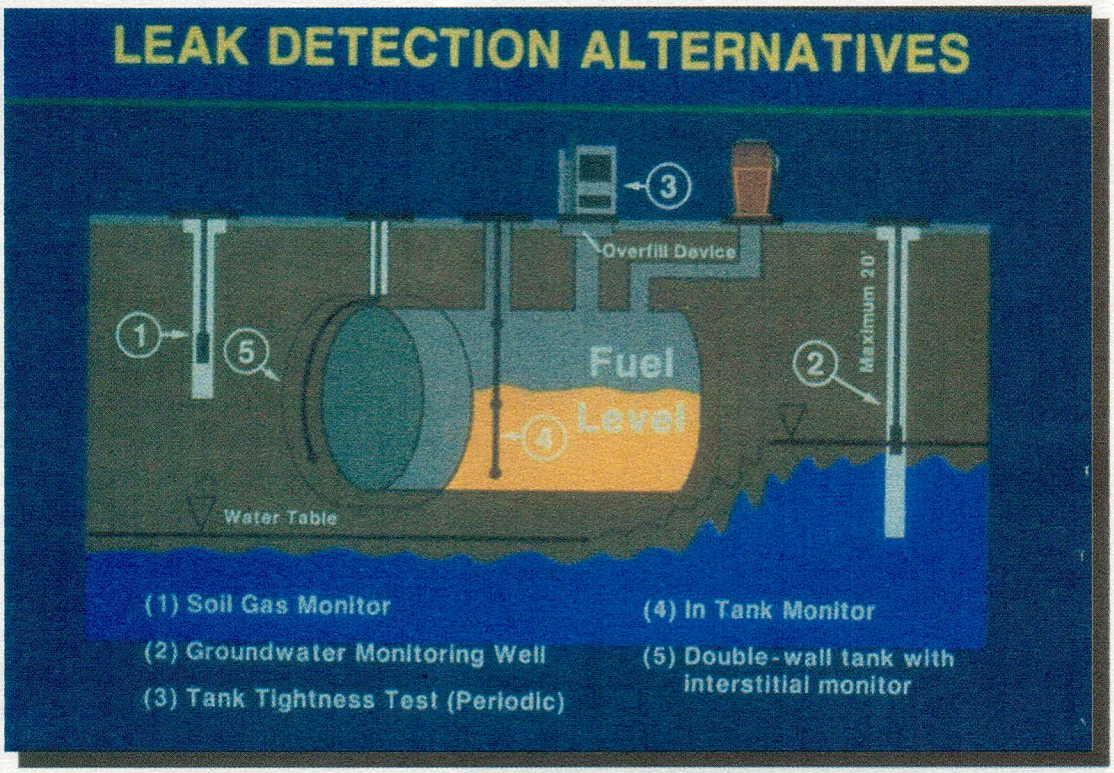
If these USTs experienced leakage, they can significantly alter and contaminate local ground water. Through the process of advection, the gasoline contaminant plume can spread out and posibbly contaminating hundred miles of aquifer. This poses a serious threat to people who rely on ground water as drinking water supply. These are the several method of leakage detection and monitoring system to check the tanks and surrounding soil for possible spill or leaks that have been practised by owner or operator of USTs:-

i. Inventory Control

Inventory volume measurement for regulated substance input, withdrawing, and the amount still remaining in the tank are recorded each day.

ii. Manual Tank Gauging

Tank liquid level measurement are taken at the



Leak detection

begining and ending of working hour during which no liquid is added or recorded from the tank.

iii. Tank Tightness Testing

Two Type of tightness testing are conducted. One is the pressure test for tank and the piping systems, and two are the hydrostatic test for tank.

iv. Automatic Tank Gauging

Equipment for automatic tank gauging that tests for the loss of product and conducts inventory control. It is not commonly practised in Malaysia.

v. Vapour Monitoring

Testing or monitoring for vapours within the soil of the excavation zone. Not in practised in Malaysia.

vi. Ground Water Monitoring

Testing or monitoring of liquid on the ground water from monitoring well.

Clean up operation after leak UST have been detected. Leak UST will be taken out and also the contaminated soil and ground water before remedies action are being taken.

Remediation Technique.

Remedial work has to be done once leakage is detected before the contaminants spread further. And to minimize the effect of the pollutant, several techniques have been developed:-

a. Bio-degradation

This technique using micro-organisms to degrade the organic components to CO^2 and water. Oxygen and nutrients might have been injected to promote the degradation rate.

b. Vapour Phase Extraction

Vapour phase extraction is used for removal of volatile organic from the unsaturated zone. Slotted pipes are placed in the soil and a vacuum is applied to volatilize the organic compound. When volatilized, a pressure gradient will ensure that the organic compound are transported to the extraction wells. As the side effect the increased in air flow through the soil might be able to increase the natural biological degradation of the organic.

c. Bio-venting

Bio-venting is a microbiological degradation process. Like in soil vapour extraction (SVE) both injection and extraction wells are intalled but an addition to the SVE technique air, moisture and nutrients may be added to stimulate a biological degradation of the organic.

d. Air Sparging

Air sparging is a physical and/or microbiological degradation process. The proces is carried out by driving large quatities of air into the saturated zone. This tech-

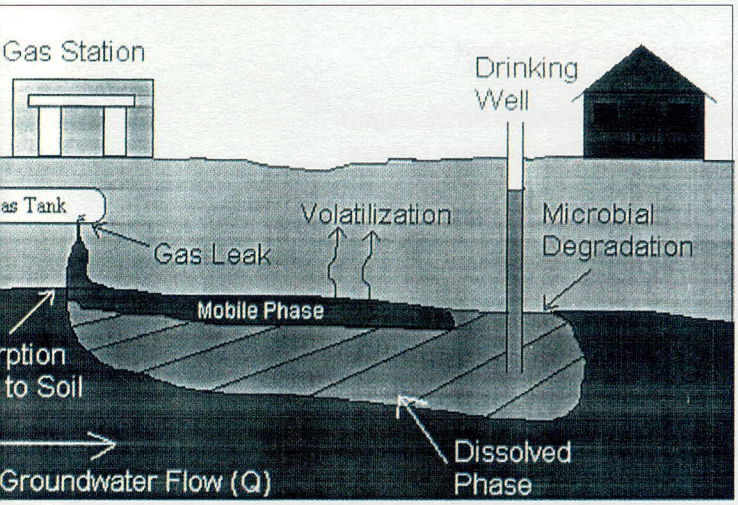
nique enables an aerobics degradation of organics.

e. Activated Carbon Treatment

This treatment is used after ground water has been pumped out of the aquifer. The contaminated water is passed through the actived carbon unit where the organic are adsorbed and collected.

f. Air Stripping

Air stripping is a pump and treat method that uses a counter current flow of upward air-solvent gas and downward water-solvent liquid to physically strip the contaminant out of the water.



Leakage of UST with have effect on the ground water

Preventive Measures

To overcome the leakage and overspill problems, several preventive steps were taken during design, installation and operation of USTs.

a. USTs are made of double layers steel to overcome the corrosion and coated with anti-rust material.

b. Using alternative to the steel tanks, fibreglass tanks are used which are more resistance to corrosion.

c. Lining the excavation zone with impermeable membrane lining.

d. Anchoring the tanks to minimise the effect of ground movement.

e. Installing a 'common' check valve to the tanks and a 'safety' check valve near the dispenser.

f. Installing an overspill reservoir to contain the spill gasoline during delivery.

Conclusion

Most gas stations are using at least one of the afore mentioned methods for leak detection and monitoring. If all gas stations were to use these methods strictly and correctly than the likelihood of ground water being contaminated would be greatly reduced. Early prevention, detection and remedial actions can save a lot of effort, money and time and foremost the quality of the ground water.

IMPAK

CALENDAR of EVENTS

Date	Place	Events
April		
8 - 13	Bangi	***Kursus Pengurusan Dan Penguatkuasaan Buangan Terjadual***
15 - 16	Putrajaya	***Mesyuarat Pengarah-pengarah Jabatan Alam Sekitar Bil. 1/2002***
23 - 24	Port Dickson	***Seminar GIS Untuk Pegawai-pegawai Jabatan Alam Sekitar***
May		
7 - 13	Johor Bahru	***Kursus 'Stack Sampling'***
20 - 24	Bangi	***Kursus Kejuruteraan Air Buangan (Wastewater Engineering Course)***
23	Putrajaya	***Mesyuarat MEXCOE***
27 - 6 June	Jakarta	***Prep-Meeting On Rio +10 Sustainable Development Conference 2002***
June		
3 - 14	Bonn	***Meeting of Subsidiary Bodies to UNFCCC***
10	Kuala Lumpur	***ASEAN Ministerial Meeting On Haze (AMMH)***
10 - 12	Kuala Lumpur	***World Fire Hazards : International Conference & Exhibition***
17 - 21	Geneva	***6th Session INC Stockholm Convention***
17 - 22	Bangi	***Kursus Penguatkuasaan Praktikal (Teknik Penguatkuasaan Untuk Pemeriksaan Di Tapak)***