DEPARTMENT OF ENVIRONMENT MALAYSIA

VISION
Environmental Conservation for the Well-being of the People

MISSION
To ensure sustainable development in the process of nation building

FUNCTION
To administer and enforce the Environmental Quality Act 1974, and Section IV of the Economic Exclusive Zone Act 1984
INTRODUCTION

• Malaysia has not inherited such a frightening legacy of contaminated land as in other developed countries.
• Many sites such as motor workshops, petrol stations, fuel depots, railway yards, landfills, industrial sites and ex-mining land can be potential contaminated sites.
• Little work carried out in identifying contaminated sites.
• A study on ‘Criteria and Standard for Managing and Restoring Contaminated Land in Malaysia’ was commissioned under Night Malaysia Plan.
• Contaminated land is slowly gaining importance in Malaysia.
WHY LAND CONTAMINATION IS A CONCERN?

- Groundwater is a precious natural resource.
  - Used to be: groundwater = drinking water
  - Now, groundwater ≠ drinking water
- Land is considered one of the limited resources — contaminated land depletes our land resources for other usages
- Land contamination normally goes unnoticed.
- Severe land contamination will have significant impacts on human health and the environment
- Significant liability issues associated with land contamination — unlike wastewater discharge or air emission, land contamination stays long after chemicals releases.
Environmental Quality Act (EQA) being gazette in 14 March 1974 & came into force on 15 April 1975.

Objective - To prevent, abate, control pollution and to enhance the quality of the environment, and for purpose connected therewith.

Rationale - To address possible impact on human health as a result of increasing industrialisation process in the early seventies & To establish a comprehensive legal framework to deal with environmental problems.

Application - EQA is applicable to the whole of Malaysia
○ **Approach**
  
  • Remedial through Enforcement of EQA.
  
  • Preventive such as:-
    
    ▫ land use planning;
    
    ▫ Environmental input to resource & regional planning; and
    
    ▫ Environmental Impact Assessment.

○ **Control Pollution through:-**
  
  • Standards
  
  • Written permission
  
  • Licensing
Section 24 of the Environmental Quality Act 1974 states that;

(1) No person shall, unless licensed, pollute or cause or permit to be polluted any soil or surface of any land in contravention of the acceptable conditions specified under section 21.

(2) Not withstanding the generality of subsection (1), a person shall be deemed to pollute any soil or surface of any land if –

(a) he places in or on any soil or in any place where it may gain access to any soil any matter whether liquid, solid, or gaseous; or

(b) he establishes on any land a refuse dump, garbage pit, soil and rock disposal site, sludge deposit site, waste injection well or otherwise used land for the disposal of or a repository for solid or liquid wastes so as to be obnoxious or offensive to human beings or interfere with underground water or detrimental to any beneficial use of the soil or the surface of the land.
Compounding of offence shall not exceed RM 2,000

Any person who contravenes this section shall be guilty of an offence and shall be liable to a fine not exceeding one hundred thousand ringgit or to imprisonment for a period of not exceeding five years or both and to a further fine not exceeding one thousand ringgit a day for every day that is continued after a notice by the Director General to cease the act specified therein has been served.
Section 31 – require of a premises to install pollution control equipment, conduct a study on environmental risk, and maintain a monitoring program;

Section 34B - No person may deposit or dispose of scheduled wastes except at prescribed premises;

Environmental Quality (Scheduled Wastes) Regulations 2005;

✓ Scheduled Wastes code SW408 – Contaminated soil, debris or matter resulting from cleaning-up of a spill of chemical, mineral oil or scheduled wastes.

✓ Require specific way to adequate treat and dispose of the waste.
Contaminated Land means a site at which a substances occur at concentration:

- Above the concentration at which the substance is normally present in or on the land in the same locality and pose or are likely to pose an immediate or long term hazard to human health or the environment; or

- Exceed concentration specified in the Site Screening Levels (SSLs).
Framework applies to:-

1. Any land that are currently being used or were previously used, to perform potential polluting activities
   - Polluting activities define as any activities involving manufacture, store, use, handle and dispose of chemicals and hazardous waste.
   - Activities with the potential to cause soil and groundwater contamination.

2. Any land that will involve in a change of land use from polluting activities to non polluting activities
1. **Polluter Pay Principle**
   - Define the responsibility for performing a site assessment and remediation.
   - Polluter can be the land owner or land occupier or any polluter of any land.

2. **Risk-Based Approach**
   - Highlights potential current and future risk associated with the presence of contaminants in the soil and groundwater matrix.
   - Recommended corrective actions to mitigate or control incremental risk to the level acceptable from the human health and ecological perspectives.
LAND TRANSACTIONS

- It is the duty of the seller or owner of a land property to disclose all soil and groundwater information related to the subject land.
- It is the responsibility of the buyer of a land property to perform soil and groundwater assessment as part of the due diligence process prior to the transaction.
All consultants or individual involved in the assessment and remediation of the contaminated land management shall fulfill the qualification requirements and registered with the DOE.

All consulting firms performing any activities under the contaminated land management framework shall be registered with the DOE.
Three (3) series of guidelines were developed and published under the Ninth Malaysia Plan (2006-2010) a study on the ‘Criteria and Standards for Managing and Restoring Contaminated Land in Malaysia’.

Contaminated Land Assessment Criteria

- Prescribed in the ‘Contaminated Land Management and Control Guidelines No. 1: Malaysian Recommended Site Screening Levels for Contaminated Land’
- US EPA Regional Screening Levels has been referred to as Site Screening Levels (SSLs)
- Exceeding SSLs indicates potential subsurface contamination
- Be noted that SSLs are not the national cleanup standards, it is use in the process of identifying and defining areas, contaminants, and conditions at a particular site.
- Responsible parties need to justify clean up target levels known as Site Specific Target Levels (SSTLs) that are protective of human health and ecological well being
- SSTLs can be derived through scientifically defensible risk assessment approach.
# SITE SCREENING LEVELS (SSLs)

| Contaminant           | CAS No.     | Analyte   | Key | Residential Soil | Key | Residential Air | Key | Industrial Soil | Key | Industrial Air | Key | Tapwater      | Key |
|-----------------------|-------------|-----------|-----|------------------|-----|-----------------|-----|-----------------|-----|-----------------|-----|--------------|-----|--------------|-----|
|                       |             |           |     | mg/kg            |     | ug/m³           |     | ug/m³           |     | ug/m³           |     | ug/L          |     |
| Acephate              | 30560-19-1  | 5.6E+01   | c** | 2.0E+03          | c   | 7.7E+00         | c   |
| Acetaldehyde          | 75-07-0     | 1.1E+01   | c** | 5.3E+02          | c** | 2.2E+00         | c** |
| Acetochlor            | 34256-82-1  | 1.2E+03   | n   | 1.2E+04          | n   | 7.3E+02         | n   |
| Acetone               | 67-64-1     | 6.1E+04   | n   | 6.1E+05          | nms | 2.2E+04         | n   |
| Acetone Cyanohydrin   | 75-86-5     | 2.0E+02   | n   | 2.1E+03          | n   | 5.8E+01         | n   |
| Acetonitrile          | 75-05-8     | 8.7E+02   | n   | 3.7E+03          | n   | 1.3E+02         | n   |
| Acetophenone          | 98-86-2     | 7.8E+03   | ns  | 1.0E+05          | nms | 3.7E+03         | n   |
| Acrolein              | 107-02-8    | 1.6E-01   | n   | 6.8E-01          | n   | 4.2E-02         | n   |
| Acrylamide            | 79-06-1     | 1.1E-01   | c   | 3.8E+00          | c   | 1.5E-02         | c   |
| Acrylic Acid          | 79-10-7     | 3.0E+04   | n   | 2.9E+05          | nm  | 1.8E+04         | n   |
| Acrylonitrile         | 107-13-1    | 2.4E-01   | c*  | 1.2E+01          | c*  | 4.5E-02         | c*  |
| Adiponitrile          | 111-69-3    | 8.5E+06   | nm  | 3.6E+07          | nm  | 1.2E+00         | c   |
| Alachlor              | 15972-60-8  | 8.7E+00   | c   | 3.1E+02          | c   | 1.2E+00         | c   |
| ALAR                  | 1596-84-5   | 9.2E+03   | n   | 9.2E+04          | n   | 5.5E+03         | n   |
| Aldicarb              | 116-06-3    | 6.1E+01   | n   | 6.2E+02          | N   | 3.7E+01         | n   |
SITE INVESTIGATION & ASSESSMENT

✓ Prescribed in the ‘Contaminated Land Management and Control Guidelines No. 2: Assessing and Reporting Contaminated Sites’

✓ Site assessment activities, i.e.:-
  ■ Initial Assessment (or Phase I ESA)
  ■ Detailed Assessment (or Phase II ESA)
  ■ Risk Assessment
SITE ASSESSMENT ACTIVITIES

✓ Initial Assessment (Phase I ESA)
  ▪ Historical Site Survey/desk top study
  ▪ ‘Walkover’ Assessment (site visits) to identify hazards, receptors etc
  ▪ Formulation of initial Conceptual Site Model (CSM) (preferably diagrammatic for clarity)

✓ Detailed Assessment (Phase II ESA)
  ▪ Carried out after Phase 1 ESA when findings has shown that land is potentially impacted by onsite or offsite activities
    ▪ Intrusive sampling (boreholes, trenches, sampling)
    ▪ Chemical analysis of contaminants
    ▪ Further refinement of CSM
CONCEPTUAL SITE MODEL (CSM)

- **Prevailing Wind Direction**
  - Exposure Point
  - Exposure Point
  - Exposure Point

- **Transport Medium (Air)**
  - Release Mechanisms (Volatilization)

- **Release Mechanism (Spill)**
  - Exposure Medium (Soil)

- **Waste Pile (Source)**

- **Release Mechanism (Site Leaching)**

- **Fish Ingestion/Swimming Exposure Routes**

- **Ingestion Exposure Route**

- **Water Table**

- **Ground-Water Flow**

- **Exposure Medium (Soil)**

- **Exposure Point**

- **Transport Medium (Ground Water)**
For land properties which are not identified with any potential subsurface contamination during the initial assessment, it is recommended to conduct minimum baseline environmental site assessment to establish the background level of subsurface soil and groundwater quality for future reference, this is especially applicable for land properties that will be used for activities of polluting industries.
Risk Assessment

- Land properties which are detected with subsurface contamination at concentrations higher than the Site Screening Levels (SSL)
- Process of estimating potential impact of contaminant on ecosystem or human population under a specific set of conditions
- Allows most significant risks to be identified and addressed and the more significant pathways to be identified, facilitating effective targeting of risk mitigation strategies
Remediation processes would apply for the following scenarios:

- Site(s) with soil and groundwater concentration detected above the SSLs
- Site(s) that are concluded to pose unacceptable risk to human health based on the findings of human health risk assessment performed in accordance with the ‘Contaminated Land Management and Control Guidelines No. 2: Assessing and Reporting Contaminated Sites’
Submit the Closure Report to DOE, consists of:

- **Objective** - to summarize project information into a single, succinct, summary report

- **Documents** what was planned, what was actually completed and what remains outstanding

- **Identifies any post-remediation requirements for the site:**
  - Long-term monitoring
  - Risk management features
  - Permanent site features that need to be protected and maintained

- **Restrictions to site use**
The environmental implication of contaminated land is a potential problem and DOE is now taking initiative to deal with it.

There is a need for Malaysia to develop its own criteria and standards as a means for the protection and enhancement of contaminated land as well as developing technologies to meet local needs.

There is a need to raise general awareness amongst the public and overall capacity amongst professionals.

DOE looks forward to playing an important role, in partnerships with others, in supporting, encouraging and promoting the importance of identifying contaminated land, managing and bringing back these sites into beneficial uses that would eventually contribute to the overall betterment of our environment.
THANK YOU / TERIMA KASIH

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