



## Overview of Brownfields in Malaysia

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### INTRODUCTION

The presence of contaminated and derelict land or "brownfields" is a subject of concern in numerous developed countries, especially countries that are experiencing scarcity of uncontaminated land (greenfields) available for development. A recently amended section of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), a related legislation in the United States, stipulates that the term "brownfield site" means real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Brownfield sites present particular challenges to national and regional policy makers in terms of bringing the land back into beneficial use and cleaning up contaminated land and groundwater [6]. As developed countries begin to experience the scarcity of greenfields, they must initiate reclamation plans for contaminated land to enable sustainable industrial and socio-economic developments. This paper reviews selected practices in redevelopment of brownfields in Malaysia against the background of the Malaysian Environmental Quality Act (EQA).

### Brownfields in Malaysia

In the past two decades, Malaysia has progressed rapidly from having an economy based on agriculture and commodities to one based on industrial manufacturing. Unfortunately, Malaysia's tremendous economic growth which is spurred by robust manufacturing industries has induced adverse environmental repercussions that frequently accompany extensive industrial developments. This has brought about undesired air, water, noise and land contamination in the country. In recent

years, the Department of Environment (DOE), Malaysia has focused primarily on air and water pollution to address the public's apprehension on these apparent health hazards. On the other hand, contaminated land issues in Malaysia have so far, attracted scant attention from both the authorities and the public. As specific legislations governing contaminated land are virtually non-existent in Malaysia, manufacturing-based companies are not obligated to clean-up contaminated sites located within their facilities in contrast to land remediation situations in the United States where site polluters are required by law to bear the clean-up cost.

In Malaysia, contaminated and derelict land can be found at places such as ex-mining sites, motor workshops, petrol stations, oil depots, former railway yards, bus depots, abandoned rubber factories, landfills, industrial sites and sites with underground storage tanks. Past industrial activities ranging from petroleum refining to metal plating have left hectares of land contaminated with organic and inorganic chemicals that render the land unusable for future development. The task of determining the location of these sites is particularly daunting since there is no reliable inventory in the country to indicate their distribution [9]. Therefore, it can be arguably stated that the amount of contaminated sites in Malaysia is arbitrary at the present moment. Some of these contaminated sites are currently abandoned and/or underutilised and highly detrimental to the public in aspects of economic, social, public health and the environment. These detrimental effects include:

- increase in unemployment rate in areas surrounding contaminated sites as new developmental plans are hindered due to scarcity of available sites;

- atypical emigration of local district population from the vicinity of abandoned brownfields due to increasing paucity of habitable land and employment opportunities;
- potential health hazards to the public due to contact with wind-blown soil contaminants as well as widespread contamination of potable groundwater; and
- loss of ecological value in surrounding areas of contaminated sites which results in disruptions in the ecosystem stability and loss of aesthetic values due to inhibition of vegetation growth as a result of elevated levels of contaminants in soils.

A brownfield redevelopment project consists of several activities such as site assessment, cleanup and post-cleanup monitoring which necessitate costs that are more often than not, prohibitive to the project proponent, be it a governmental agency or a private organisation. In many instances, clean-ups are done merely because land leases had expired and agreements that bind the leases require contaminated sites to be returned in their initial state [10]. Consequently, efforts to redevelop brownfields in the country are often undermined. Barring these complications, there are still, however, some redevelopment initiatives in Malaysia that have achieved some degree of success and they are highlighted in the following.

### BROWNFIELD REDEVELOPMENT INITIATIVES IN MALAYSIA

#### *i. Derelict Agricultural Lands*

There are more than 800,000 hectares of derelict lands in Malaysia in which 630,000 hectares consist of private agriculture plots composed of fertile soil types which have been left idle and become unproductive due to either socio-economic factors or technical reasons [4, 5]. Efforts to revitalise

## FEATURE



Scrap metal yard

derelict lands in Malaysia dated back to 1984 when the Department of Agriculture (DOA) was assigned with the task of spearheading a Scheme called the “*Derelict Land Development Project*” aimed at rehabilitating unused lands and convert them into productive agricultural landuses. The Scheme stipulates that prior to development, the derelict lands must be screened to ensure that they are free from sulfate-based acids and devoid of swamp patches. Backed extensively by the Government, the Scheme has since yielded notable agricultural achievements where approximately 32,000 hectares of derelict lands have been successfully revitalised up to the year 2000 [7]. This success is deemed to be a positive outcome for Malaysia in her endeavors to reduce the number of unused lands and increase the production of agricultural commodities.

### ii. Ex-mining Sites

Malaysia has numerous derelict ex-mining sites which predominantly consist of tin tailings located mainly within the States of Perak, Selangor, Federal Territory and Johor. Tin mining activities in Peninsular Malaysia since 1930s have resulted in ex-mining land covering approximately 113,700 hectares [1]. Generally, the presence of significant amount of toxic metal contaminants such as lead, nickel and zinc as well as idle development have turned these ex-mining sites into undesired properties in

the local realty market. In light of this circumstance, rehabilitation and redevelopment of ex-mining sites which account for about 10% of total ex-mining land in Malaysia have been carried out primarily by private organisations to revitalise and turn these sites into residential townships, recreational areas, farms, orchards and golf courses. An excellent case in point was the rehabilitation of the Sungai Besi mine located at the outskirts of Kuala Lumpur and converted into a thriving golf and recreational resort. Other similar successful ex-mine rehabilitation and redevelopment efforts in Malaysia include the Sunway and Kelana Jaya townships in the state of Selangor which incorporated leisure concepts into their designs.

### iii. Former Landfills

Presently, there are about 230 landfills in Malaysia, each encompasses an area in the range of 20 to 150 acres [8]. Open dumping is practiced widely at local municipal landfills and operators for most of these landfills do not have proper closure plans which incorporate sound environmental protection measures. Unused municipal landfills are mostly abandoned and not properly closed, rendering groundwater contamination a valid likelihood. The extent of subsurface contamination within these landfills is indefinite as research focusing on the hazardous effects of landfilled wastes on

their surrounding environment, particularly on groundwater resources, are rather limited. An indication of landfill subsurface contamination was only recently known in the year 2001 through determination of groundwater contamination levels. Recently, the Government is taking initiatives to rehabilitate closed landfills and convert them into practical landuses in the form of residential as well as recreational. For example, several new residential locations in Bukit Jalil and Kelana Jaya which are located at the fringes of Kuala Lumpur as well as recreational park at Jasin in the state of Malacca [3, 11] are located within former landfills. The constructional support adequacy of the base of these locations is, however, still a subject of intense debate among stakeholders and the Government, as the public is still apprehensive on the long-term integrity and robustness of the location which would undermine public safety features.

## GROUNDWATER ISSUES IN RELATION TO CONTAMINATED LAND

There is an apparent link between contaminated land and groundwater issues in the global environmental perspective as contaminants generally come in contact with groundwater via vertical percolation of rainfall through contaminated soils. Environmental safeguarding of this water resource prior to the turn of the century was rather inadequate as the Government provided more attention in protecting surface water which was the main source of water supply in Malaysia. Presently, even though there is an abundance of groundwater storage and recharge within Peninsular Malaysia, only less than 5% of current water supply is developed from groundwater resources (Rahman, 2001) with exception of the northern State of Kelantan where public water supply is predominantly sourced from groundwater. However, water supply deficit in recent years which culminated in the Selangor and Kuala Lumpur water crisis in 1998 due to severe droughts had prompted the Government to exploit and protect this alternative water resource. Pursuant to this, DOE was entrusted with the task of initiating a national groundwater

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monitoring programme in 1997. The first phase of the programme had been successfully implemented in which 79 monitoring wells were installed at 47 sites within Peninsular Malaysia forming a national network of groundwater monitoring that targeted areas susceptible to contamination. The second phase which included development of monitoring network in the eastern States of Sabah and Sarawak was completed in 2002. The timely initiation of this programme is a proactive indication of the Government's initiative to facilitate identification of severely contaminated areas prior to remedial actions.

### LEGISLATION AND JURISDICTION

The principal act pertaining to environmental governance in Malaysia is the Environmental Quality Act, 1974 which was amended in 1996 (hereafter referred to as EQA). Numerous regulations concerning water, air and noise pollution are promulgated under the EQA but it lacks specific legislation governing contaminated land (Balamurugan and Victor, 2001). Soil contamination is concisely stated in Section 24 of the EQA and is listed as follows: -

- i. *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.*
- ii. *Notwithstanding the generality of subsection (i), a person shall be deemed to pollute any soil or surface of any land if: -*
  - (a) *he places in or any soil 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 a repository for solid or liquid wastes so as to be obnoxious to human beings or interfere with underground water or be detrimental to any beneficial use of the soil or the surface of the land*

It is essential to note that despite the existence of generic provision for land contamination in the EQA, the provision does not specify any standards for land and groundwater contamination. Therefore, in the absence of these standards, all brownfields in Malaysia may have concealed environmental liability that does not only pose a threat to land occupants but also has the potential to bring detrimental consequences to the owner if DOE decides to strictly enforce the abovementioned provision in the near future [8].

Landuse planning has always been a significant facade of brownfield development efforts in the any country. Past brownfield developments in developed nations had seen that particular emphasis was given for the jurisdictional aspects of land development in order to circumvent any governing disputes. Land use planning in Peninsular Malaysia is undertaken wholly within the provisions of the Town

and Country Planning Act of 1976 (Act 172) and its amendment in 1995 (Act A933). Land use planning is mainly the function of the local and State authorities and constitutionally the Federal Government has a concurrent function in the matter [9]. Therefore, in the case of transboundary land (land that is located between the concerned States must be reached prior to the commencement of any developmental activities.

### CONCLUSIONS

This paper discussed the existing contaminated and derelict land conditions in Malaysia. It should also be noted that similar contaminated land and remediation projects could also be occurring in other countries within the South East Asian region due to their comparable climatic and socio-economic conditions. Significant progress on brownfield development in Malaysia can be made if a legislatively-mandated structure is put in place. Such a structure needs to address the development of a national contaminated land register, a structured research on remediation technology for the different types of land contamination, financial investments to help out with prohibitive costs of brownfield development and finally to increase the general awareness of the



Contaminated land

and Country Planning Act of 1976 (Act 172) and its amendment in 1995 (Act A933). Land use planning is mainly the function of the local and State authorities and constitutionally the Federal Government has a concurrent function in the matter [9]. Therefore, in the case of transboundary land (land that is located between the concerned States), a consensus

regulators, industry and public on issues related to brownfield. It is quite apparent that Malaysia still have a long way to go in attaining the totality of CERCLA in relation to its litigative aspects, and thus addressing the brownfield dilemma. At this relatively early stage of industrial development, it may prove to be crucial in the long run to avert contaminated

land disasters in the future. As such, integration of NGOs' as well as the general public's participation into the local brownfield context is indispensable to encompass all pertinent stakeholders. All things considered, the essence of sustainable development must be integrated into the context of brownfield management in the country where it is essential to preserve available greenfields rather than to rehabilitate contaminated

ones later on at costs that would severely undermine other businesses.

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### ANNOUNCEMENT

#### Brownfield Asia 2006 - International Conference on Remediation and Management of Contaminated Land: Focus on Asia

Venue: Berjaya Times Square Hotel and Convention Centre

Date: 5 - 7 September 2006

Website: [www.iem.org.my/brownfield](http://www.iem.org.my/brownfield)

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