

## The 5th Brownfield Asia 2011: International Conference on Remediation and Management of Contaminated Land - Focus on Asia



by Ir. Ng Hon Seng and Ir. Santha  
Kumaran a/l Enusan Krishnan

ENVIRONMENTAL ENGINEERING TECHNICAL DIVISION

**THE** Environmental Technical Division successfully organised the 5th Brownfield International Conference from 12 to 15 July 2011. On the final day of the conference, a post-conference workshop focusing on the application of the Malaysian contaminated land management guidelines was conducted in collaboration with AECOM. It was held at the Tan Sri Prof. Chin Fung Kee Auditorium where more than 40 attendees comprising practitioners and researchers from the industry took part. Most of the participants attended the main conference as well.

The aim of the workshop was to help the conference participants gain more practical knowledge on brownfield applications around Asian countries. Besides Shell Malaysia and other local experts, there were also speakers from Taiwan and Japan to share their practical knowledge on new technologies in developing brownfield.

The main goal of this workshop was to provide an in depth understanding on the newly published contaminated land management and control guidelines by the Department of Environment (DOE) and its application in the industry. On the first day of the conference, Datin Hajjah Hanili binti Ghazali, from the DOE, presented her paper on the introduction of the Guidelines for Contaminated Land Management and Control in Malaysia.

At the end of her presentation, she gave away the latest publication of the guideline in three volumes, namely, "Site Screening Levels", "Assessing and Reporting" and "Remediation of Contaminated Sites". Puan Ijan Khushaida Mohd Jan, also from DOE, provided further explanation on the guidelines during the post-conference workshop. She was the first speaker of the day.

Here are some of the topics that were covered:

- What is contaminated land?
- Overview of CLM Framework in Malaysia
- General guiding principles
- Land categories
- Polluter's responsibilities
- Land transactions
- Contaminated Land Management (CLM) Framework
- Site Screening Levels (SSLs)
- Site Specific Target Levels
- Site Investigation and Assessment
- Conceptual Site Model (CSM)
- Site Assessment Activities
- Baseline Environmental Site Assessment (BESA)
- Remediation
- Contaminated Land Closure Report

In addition to DOE's discussion on the newly published contaminated land management and control guidelines, some of the highlights of the workshop included the experiences shared by various industrial players such as AECOM, Shell and Panasonic. They discussed the differences in their current practices against the recommended practices under the newly published guidelines and their initiatives in aligning and complying with the practices recommended by the guidelines.

The next speaker was Mr. Ng Hong Seng, the country manager for AECOM, who presented on the topic of "Human Health Risk Assessment and its Application in CLM Framework and Due Diligence as part of CLM Process". He concluded his speech with a recommendation



for remediation using a real case study. One of the sub-topics was "What is Site Screening Levels and the Use of it" which he spoke about in detail.

We also had the privilege to hear from Japanese and Taiwanese experts on their management of brownfield remediation. En. Zulaizam Masduki from Panasonic Environmental System and Engineering Co., LTD (PESENG) presented on "Contaminated Land Management Issues Related to Semiconductor Factory" on behalf of Mr. Shintani Takeshi. He said that, during the 1980s, some of their factories were found to be contaminating the soil within the factories. Since then, soil contamination investigation had been carried out at all Panasonic factories. He pointed out that the method used was and is in line with the Japanese standard. He shared the five key points of the risk minimising policy which were placed under the management's supervision.

The five key points are:

- Completing surveys
- Initiating remedial measures
- Digging inspection wells
- No diffusion of pollution
- Operational management

He went on to talk about that their management of remediation as well as future plans for the Malaysian factories.

Similarly Dr Ken Tse, who is the Technical Director of Remediation, Consulting & Engineering China, shared his experience on contaminated land management in Taiwan. He explained the following in depth:

- Situation prior to the enforcement of Taiwan regulations
- Soil and Groundwater Remediation Act and other legislation
- Types of major contamination
- Case studies of selected projects

Mr. Tai Tang Oh presented a paper on "Risk Based Management of Potentially Contaminated Land - Shell's Perspective" and, finally, Dr Chin from ALS Technichem, an expert in laboratory work, talked about QA/QC in Soil and Groundwater Analysis. She also elaborated on the techniques and methods of identifying contaminants.

In conclusion, the workshop was enriched by the sharing from local and international experts such as AECOM, Shell, Panasonic and ALS Technichem on various technical challenges, case studies and remediation technologies related to contaminated land management. The workshop achieved its goal of providing a platform for the exchange of technical knowledge and industry experience amongst practitioners and researchers. ■

## Site Visit to Petronas Melaka Refinery Plant

ENVIRONMENTAL ENGINEERING TECHNICAL DIVISION



by Ir. Santha Kumaran a/l  
Enusan Krishnan

**THE** 5th Brownfield Conference organised a site visit to the Petronas Melaka Refinery Plant on 14 July 2011. It is located at Mukim Sungai Udang and Mukim Tangga Batu. The Petronas Melaka Refinery Plant is among one of the critical installations for the national petroleum company as it supplies 80% of Petronas' domestic products. A total of 40 participants took part in this technical site visit.

During this trip, the staff of the Petronas Melaka Refinery Plant shared their experiences in soil remediation management of the decommissioning of two land treatment facilities. Cik Nur Nishat bt Shaikh Dawood, from the Environment Department at Petronas Bangi, presented her team's research work in detail.

Both the land treatment facilities, with a total acreage of 3.8 acres, were previously used for the treatment of bio-sludge generated from the Effluent Treatment System (ETS) since 1995. However, in 2006, the operation of the land treatment facilities ceased as the management of the Petronas Melaka Refinery Plant decided to treat the bio-

sludge using the Sludge Drying Plant facility and eventually decided to close both sites completely.

The phyto-remediation project (green technology approach) for the decommissioning of the facilities is a three-year joint collaboration research project between Petronas Melaka Refinery Plant and Petronas Research Sdn Bhd (PRSB). The implementation of the phyto-



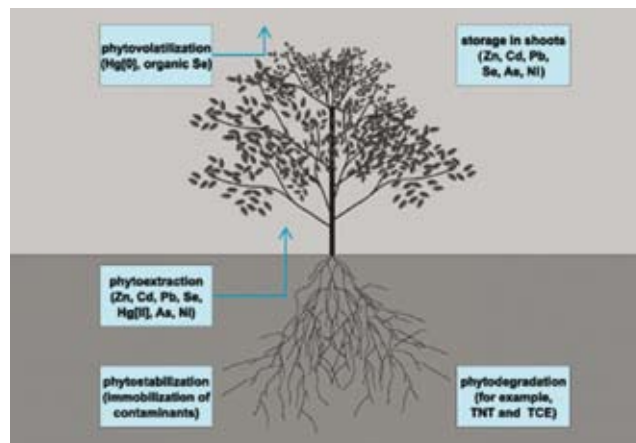
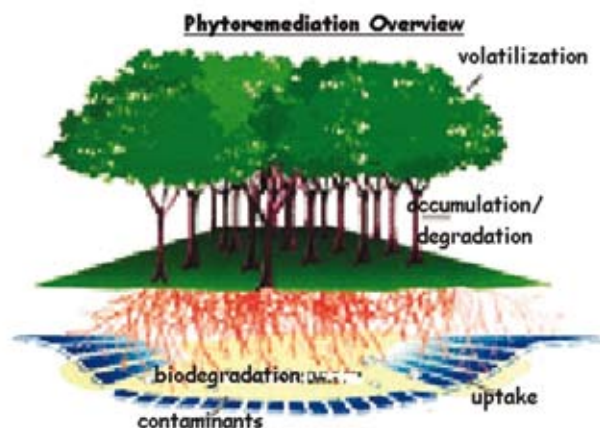


Figure 1: Phytoremediation Overview

remediation project has indeed contributed to a savings of approximately RM20 million compared to the traditional way of sludge disposal, and to the research and development efforts in Malaysia.

Initially, we assumed that the site visit would be just another trip around the remediation area with some general briefing. As it turned out, the staff gave an in-depth presentation of their research work on phytoremediation. After the presentation, which lasted about an hour, we went to the site. The site is actually a vast land with bush-like plants growing everywhere. Surprisingly, these plants are the technology of phytoremediation. For members who were first time visitors to a remediation site, it was a good experience. The conference participants, and especially the foreigners, were pleased as their long journey was well worth the effort. Some of the highlights of the phytoremediation effort are as follows:

- **Phytoremediation:** the use of plants for the in situ treatment of contaminated soils
- Phytoremediation is an emerging technology which uses plants and their associated rhizospheric microorganisms to remove, degrade or contain chemical contaminants located in the soil, sediments, groundwater, surface water and even the atmosphere.
- Phytoremediation has been used to reduce and remedy the hydrocarbon concentrations in soils and groundwater contaminated with weathered crude oils/ refined oil products.
- Plants can be used to treat most classes of contaminants, including petroleum hydrocarbons, chlorinated solvents, pesticides, metals, radio nuclides, explosives and excess nutrients.
- Plant species are selected for phytoremediation based on their potential to evapotranspire groundwater, the degradative enzymes they produce, their growth rates and yield, the depth of their root zone and their ability to bio-accumulate contaminants.
- Phytoremediation - work at sites that are well suited for plant growth. This means that the concentration of pollutants cannot be toxic to the plants.

- The pollution cannot be so deep in the soils or groundwater that plant roots cannot reach it. As a result, phytoremediation may be a good strategy for sites conducive to plant growth with shallow contamination, and may be a good secondary or tertiary phase in a treatment train for highly polluted sites, or it may not be a viable option for a site.
- One way to summarise many of phytoremediation's limitations is that the pollutant must be bio-available to a plant and its root system. If a pollutant is located in a deep aquifer, then plant roots cannot reach it. If a soil pollutant is tightly bound to the organic portion of a soil, then it may not be available to plants or to microorganisms in the rhizosphere. On the other hand, if a pollutant is too water soluble, it will pass by the root system without any uptake.
- Evaluate the effectiveness of phytoremediation as a means of reducing hydrocarbon concentrations in soils and groundwater contaminated with weathered crude oils/refined oil products. ■

Answer for 1Sudoku published on page 24 of this issue.

4	5		7	9	3	1	6	8	2
6	9	1	8	7		2	5	4	3
3	2	8	4	6	5	1	7	9	
5	1	9	2	4	7	3	6	8	
2	8	4	6	1	3	7	9	5	
7	3	6	5	9	8	2	1	4	
8	6	5	7	2	4	9	3	1	
1	7	2	3	8	9	4	5	6	
9	4	3	1	5	6	8	2	7	