

## CHAPTER I

### INTRODUCTION



From old days, human's ways of life have continuously affected the environment be it in the form of air pollution, water pollution, deforestation or even waste disposal. But in those days, our nature, which was still healthy, can cope with the problems by itself without any severe impact on human being. Nowadays, population growth, high technology products, synthesized and transformed goods from natural products etc. are threatening the nature with the critical situation and difficult problems to solve.

Waste's composition of some chemical compounds have slightly to highly hazards to human, living organisms and environment. Especially, heavy metals are harmful to human beings. Although, it is widely known that Minamata disease is caused by mercury toxicity or Itai-itai disease by cadmium contamination, these two metals are still released and uncontrolled to the environment in many forms of wastes ubiquitously. The disposal of waste, which consist of various forms of heavy metals, is one and the most frequently found source of contaminants releasing to the environment.

Mercury, cadmium and manganese are the most hazardous heavy metals which are parts of various industrious products which serve the daily needs of populations. Their

uses are numerous and will name here just a few e.g. fluorescent lights, dry-cell batteries, paints, pigments, button dry-cell batteries, pesticides, electronic appliances or chemicals for laboratory and industry uses. Demands are increasing daily up to the consumer's needs. Almost of consumers do not realize that these products consists of harmful components, "where it will be" and "to whom it may harm" when such products become of no uses and disposed never occurred to them. Even the Bangkok Metropolitan Administration (BMA), the only official agency for waste disposal in Bangkok Metropolis, still disposes the waste by using "open dumping" as its major technique for disposal, without any special technique for hazardous waste disposal. This practice will only accelerate the rapid mass leaking of heavy metals from harmful wastes to the environment. The liquid compounds -which water from natural decomposition process, or from waste's moisture and precipitation play as eluent- can discharge to the public waterway and adjacent lowland without any obstruction. The contaminated leachate may bring hazardous substances to people in downstream areas through the effect of flow direction, accumulation in living organisms and biomagnification in the food-chain.

It is, therefore, thought worthwhile to do research focusing on the level of environmental contamination of mercury, cadmium and manganese both in situ and in the surrounding areas. The results obtained from the study of the surroundings will indicate both the distribution and the level of contamination of heavy metals in such areas around

the disposal site. It is hopeful that the responsible authority can make use of this study in solving the problems of the contamination of the environment with heavy metals by waste disposal.

### 1.1 Objectives

1. To study the leachate contamination of mercury, cadmium and manganese from solid waste disposal sites of BMA.

2. To study the mercury, cadmium and manganese contaminations on public waterways and lowland, which play the role of drainage receptors, and their distribution.

3. To determine the correlation between the level of contamination with distance variation and other related parameters.

### 1.2 Scopes of work

Based on the assumption that many heavy metals-contained wastes have been discarded and disposed at the disposal site, and those heavy metals, which are toxic to living organisms, can be leached to the public waterway. This research emphasized on some toxic and common-used heavy metals. Mercury, cadmium and manganese were selected for the study. The determination of mercury, cadmium and manganese contamination were obtained from Bangkok Metropolitan Administration's solid waste disposal sites at On-nuch and Nong

Kham. The term of determination is the level of selected heavy metals contamination in specific areas. The observation was carried out for 4 consecutive months, two months for each site and 11 times of observation for each month. The samples were analyzed in laboratory using appropriate and well known standard methods. The obtained data and results were determined in terms of statistics to find the significant level of contamination and the correlation between each related parameter.

### 1.3 Expected results

The study indicated the level of water contaminations leached from solid waste disposal sites. Some factors which may influence the level of leaching and contamination were shown. These results may be served as guidelines for further solid waste disposal planning, especially for hazardous waste disposal, to prevent or minimizing the environmental contamination caused by public services which owned by the government.

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