

Study with reference to the Waste Management Paper No. 26A. This maximum safe rate of gas emission, however, was not derived from borehole monitoring targets. Use of this maximum safe rate of gas emission was accepted by EPD for assessment of potential methane hazards from reclamation sites. This value is adopted as the assessment criteria in the present study.

## 5.3 Description of the Environment

### 5.3.1 Sediment Quality in the WCZs

5.3.1.1 There are five sediment sampling stations (VS3, VS5, VS6, VS9 and VS10) in the Victoria Harbour WCZ. The Western Buffer WCZ covers two sediment monitoring stations (WS1 and WS2) and the Eastern Buffer WCZ covers three sediment monitoring stations (ES1, ES2 and ES4). EPD adopts the sampling method of taking grab samples of the top 10cm layer of sediment for sediment metal analysis.

5.3.1.2 The average copper concentrations between 1995-1999 in the Victoria Harbour WCZ were shown to be high in all the sediment sampling stations. Station VS3 is closest to the SEKD, average levels of cadmium, chromium, lead, mercury, nickel and zinc were low (in the Class A category). However, the levels of copper were consistently high, with an average of over 65mg/kg or within Class C category.

5.3.1.3 Elevated levels of polychlorinated biphenyls (PCBs) and polycyclic aromatic hydrocarbons (PAHs) were detected in the central and western parts of Victoria Harbour. At station VS6, average PCB and PAH concentrations were over 20µg/kg dry solids and 200µg/kg dry solids respectively (*Marine Water Quality in Hong Kong in 1999*). **Drawing Nos. 22936/EN/017 to 019** present the copper, PAH, and PCB levels recorded at EPD's sediment sampling stations within the Victoria Harbour WCZ.

5.3.1.4 In 1999, the levels of cadmium, chromium, lead, mercury, nickel and zinc recorded at the two sampling stations (WS1 and WS2) within the Western Buffer WCZ were low (in the Class A category). The copper levels at both WS1 and WS2 were in the Class B category (between 55 and 64 mg/kg dry weight).

5.3.1.5 In the Eastern Buffer WCZ, the copper levels at ES4 located near Chai Wan were the highest (in the Class C category) in 1999. At ES1, the copper levels were comparatively lower but still classified in the Class B category. Besides, the other heavy metal contents in the sediments collected at the three sampling stations in the Eastern Buffer WCZ were low (in the Class A category).

### 5.3.2 Sediment Quality in Typhoon Shelters

5.3.2.1 The SEKD reclamation will have direct impacts on the existing KTTS and To Kwa Wan Typhoon Shelter (TKWTS). The sediment samples collected in KTTS (VS14) by EPD showed high levels of heavy metals including cadmium, chromium, copper, lead, mercury, nickel and zinc. This was related to the uncontrolled effluent discharges from polluting industries in the past.

5.3.2.2 Sediment collected in TKWTS (VS20) contained high levels (in the Class C Category) of chromium, copper, lead, mercury and zinc. Chromium levels, in particular, were consistently high in the past years, with concentrations of 80mg/kg dry solids and above.

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1 m and 1 air change per day respectively. Therefore, the maximum safe rate of gas emission was calculated as 1.0 m x 0.01 /day (equivalent to m<sup>3</sup> CH<sub>4</sub> / m<sup>2</sup>/day) = 10 L/m<sup>2</sup>/d.

5.3.2.3 Highest PCB levels were recorded in KTTS (VS14) in five consecutive years. The PAHs in the sediments of the two typhoon shelters were in very high levels (>50 µg/kg dry weight).

## 5.4 Assessment Methodology

### 5.4.1 Sediment Chemical Quality Assessment Criteria

5.4.1.1 The proposed reclamation is planned to commence in about 2003. The guidelines specified in the *WBTC No. 3/2000* will therefore be adopted for dredging and disposal of sediments for the whole development.

5.4.1.2 As specified in the *WBTC No. 3/2000*, sediments are classified into three categories based on their contaminant levels with reference to the Chemical Exceedance Levels (CEL). The classification is defined as follows:

Category L Sediment with all contaminant levels not exceeding the Lower Chemical Exceedance Level (LCEL). The material must be dredged, transported and disposed of in a manner, which minimizes the loss of contaminants either into solution or by resuspension.

Category M Sediment with any one or more contaminant levels exceeding the Lower Chemical Exceedance Level (LCEL) and none exceeding the Upper Chemical Exceedance Level (UCEL). The material must be dredged and transported with care, and must be effectively isolated from the environment upon the final disposal unless appropriate biological tests demonstrate that the material will not adversely affect the marine environment.

Category H Sediment with any one or more contaminant levels exceeding the Upper Chemical Exceedance Level (UCEL). The material must be dredged and transported with great care, and must be effectively isolated from the environment upon the final disposal.

5.4.1.3 The sediment quality criteria for the classification of sediment are shown in **Table 5.2**. Sediment can be classified into Category L, Category M or Category H material after carrying out Tier II screening test. There are three types of disposal options. Types 1, 2 and 3 represent open sea disposal, confined marine disposal and special treatment/disposal respectively. Category L material is suitable for open sea disposal. Tier III screening test is required to determine the disposal option (Type 1 open sea disposal or Type 2 confined marine disposal) for Category M material. For Category H material with one or more contaminant levels 10 times higher than the LCEL, Tier III screening test (dilution test) is required to determine whether the sediment is suitable for Type 2 confined marine disposal or Type 3 special treatment/disposal. If contaminant levels are lower than 10 x LCEL, Type 2 confined marine disposal should be adopted.