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(ACE 61/94)  
for information

## Quarterly Report on Contaminated Mud Disposal at East of Sha Chau (April 1994 to June 1994)

### 1. INTRODUCTION

This quarterly report summarises the environmental monitoring work carried out between April 1994 and June 1994 at the contaminated mud pits, east of Sha Chau. The purpose of the report is to appraise PEPL of any significant findings. If the monitoring results indicate any adverse trends, or if site investigation reveals any procedure likely to result in environmental damage, then suitable mitigation measures will be presented for PEPL's information.

As far as possible, any results and information presented are correct at the time of reporting, but caution is advised in their interpretation. Further information and test results will be reported when available in subsequent quarterly reports.

### 2. PROGRESS OF CONTAMINATED MUD DISPOSAL

Pit II consists of 4 small pits, namely, Pit II(a), Pit II(b), Pit II(c) and Pit II(d). Under the Pit Management Scheme, Pit II(a) and Pit II(b) were filled up with contaminated mud on 8.11.93 and 22.4.94 respectively. Disposal of contaminated mud in Pit II(c) commenced on 23.4.94 and it was 18% filled up to June 1994.

### 3. MONITORING WORK UNDERTAKEN DURING THE QUARTER

The monitoring schedules for the quarter are presented in the attached Tables in Appendix A. Few problems were encountered during the monitoring work, although adverse weather affected some of the monitoring works.

The location of the monitoring stations are shown in Appendix B.

#### 3.1 Cumulative Impact Monitoring

This part of the programme is designed to be undertaken on a long term basis with as little change as possible in station locations and monitoring methodology over time and includes the following elements :

- (a) Sediment sampling at 37 stations, bi-monthly. Analysis of metals, pH, Eh, organic carbon content, organic contaminants (PAH and PCB) and particle size distribution.
- (b) Water quality monitoring at 1 station, weekly for a full tidal cycle (24+ hours). Analysis of turbidity, suspended solids, dissolved oxygen, temperature and salinity.
- (c) Trawling for fish & invertebrate species at 6 stations, monthly. Analysis of species abundance and diversity. Samples collected for the analysis of tissues metal content in selected species of commercial importance.
- (d) Collection of benthic grab samples at 10 stations, monthly. Analysis of macroinfaunal species abundance and diversity.

- (e) Analysis of at least 18 tissues samples monthly (from 3 species at 6 trawl stations) for content of metals.
- (f) Bio-monitoring of the uptakes of metals by the indicator species, green-lipped mussel, biannually.

### 3.2 Pit-specific Compliance Monitoring Programme.

The pit-specific compliance monitoring involves short-term monitoring around each active pit during the operational period (including the capping phase). This part of the programme involves specific near-field monitoring and consists of the following elements :

- (a) Sediment sampling at 8 stations around each active pit monthly (bi-weekly during the capping phase). Analysis of metal contaminants, pH, Eh and organic carbon content.
- (b) Water quality monitoring at 4 stations around each operational pit weekly for a full tidal cycle and in addition, water column profiling around the pits. Analysis of current velocity, turbidity, suspended solids, dissolved oxygen, temperature and salinity.
- (c) Source material collection from barges delivering contaminated mud monthly. Analysis for metal concentration, organic contaminants (PAH and PCB) and E. Coli. However, no source material samples were collected in this quarter due to logistic difficulties encountered by the monitoring consultants.

## 4. RESULTS AND SIGNIFICANT TRENDS

### 4.1 Water Quality

The water quality monitoring data have revealed no unusual features. General level of suspended solids was low; however, high suspended solids concentrations were recorded for short periods, occasionally associated with a drop in dissolved oxygen level. Further details are being sought which may indicate whether increased turbidity was due to capping of Pit II, disposal activity, or natural re-suspension.

### 4.2 Sediment Quality

Locally elevated metal levels in zinc, lead and copper were found adjacent to the pits in the quarter but the monitoring results so far have not identified any obvious increasing trend in the contamination of sediment around the contaminated mud pits. The likely cause of such isolated incidence of sediment contamination is not known.

### 4.3 Aquatic Biota

Analysis of the species abundance of aquatic biota samples has been completed and generally has revealed no unusual features.

#### 4.4 Ecotoxicology

The results revealed that the concentrations of most metals in muscle tissue of selected species of commercial value caught at the disposal area were generally low. However, for the samples analyzed till June 1994, the majority of them showed chromium concentrations above the Food Adulteration Regulations (FAR) Limit. In addition, mercury concentrations of these samples appeared to have increased but it should be noted that these mercury concentrations were well below the FAR limit. Proposal will be prepared by the monitoring consultants to find out the possible causes of the elevated metal levels in the aquatic biota in a regional context.

#### 5. INVESTIGATION OF THE CAP OF PIT I

A proposal was being prepared by FMC to investigate the integrity of the capping layer of Pit I. Cored samples would be taken from the capping layer and sent for contamination testing.

#### 6. PROSECUTION AND ILLEGAL MARINE DUMPING STATISTICS

The statistics provided by EPD are shown in Appendix C.

#### 7. GENERAL CONCLUSIONS

The monitoring results from the quarter revealed no measured direct adverse impacts from the dumping activity on water quality. Results for sediment chemical analysis around the active disposal pits had indicated some samples containing elevated levels of some metals. Resampling during the scheduled fieldwork, however, indicated a decline to background levels, presumably due to dilution effects with natural sedimentation and mixing with cleaner sediment. In general, the contaminated surface sediments were confined within the pits and there is no evidence to suggest loss of contaminated sediment from the pits.

For biota monitoring, no adverse effects on biota were measured at the monitoring stations and the results so far indicated no adverse trend.

The consultants are continuing their monitoring works at east of Sha Chau and further findings will be reported in the next quarterly report.