

For discussion on
20 March 2002

Legislative Council Panel on Economic Services

Financial Implication of the Decommissioning of Cheoy Lee Shipyard at Penny's Bay

This paper explains the financial implication of the decommissioning of Cheoy Lee Shipyard (CLS) at Penny's Bay, as requested by Members of the Panel.

Objective

2. The primary objective of the decommissioning project is to return the CLS site to a condition suitable for development and use by the community. Government is committed to taking all the steps necessary to rehabilitate the site and render it suitable for future use. All potentially harmful contaminants at CLS will be thoroughly removed, treated and disposed of in an environmentally acceptable manner.

Background

3. CLS was located on the north and eastern shores of Penny's Bay with a site area of about 19 hectares (location map at [Annex A](#)). It commenced operation in 1964 which included boat manufacture, repair and maintenance. The CLS site was returned to Government on voluntary surrender in April 2001 and is required for the construction of the necessary infrastructure (including the Penny's Bay Section of Chok Ko Wan Link Road and Road P2) in support of Hong Kong Disneyland.

Environmental Impact Assessment (EIA)

4. Under item 17, Part II of Schedule 2 of the EIA Ordinance, the decommissioning of a shipyard is a designated project requiring an environmental permit (EP) from the Director of Environmental Protection (DEP)¹. Before an EP can be obtained, an EIA study has to be carried out and the EIA report approved by DEP. The EIA study for the decommissioning of CLS was completed by Civil Engineering Department in December 2001. The EIA report was submitted to DEP on 14 December 2001.

5. Considering that the EIA report has met the requirements of the prescribed EIA study brief and the Technical Memorandum on EIA Process, DEP decided on 9 February 2002 that the report was suitable for public inspection. The public inspection period which commenced on 21 February 2002 will last until 22 March 2002.

Land Contamination

6. The EIA study has fully analysed the conditions of the CLS site and examined all possible environmental impacts. The study has revealed the existence of hazardous substances in the soil at the site and has recommended a comprehensive and effective remediation and clean up plan which is in line with international practice.

7. A total of about 87,000 m³ of soil has been found to contain different types of contaminants :

- (a) About 48,000m³ (55%) of the soil is contaminated with metals only. The soil will be excavated and solidified on-site using cement²;

¹ As a thermal desorption plant is proposed at To Kau Wan (see paragraph 7(c) below), the decommissioning of CLS is also a designated project under item G4, Part I of Schedule 2 of the EIA Ordinance concerning waste disposal facility.

² Cement solidification is a process in which cement is added to the contaminated soil to immobilise the metal contaminants inside the soil matrix.

- (b) Another 9,000 m³ (10%) is contaminated with a combination of total petroleum hydrocarbons (TPH), semi-volatile organic compounds (SVOCs) and metals. The soil will be excavated and treated off-site at To Kau Wan (TKW) (please refer to Annex A for location of TKW) by biopiling³, followed by cement solidification to immobilise the remaining metals in the soil;
- (c) The remaining 30,000 m³ (35%), found mainly in the south-eastern portion of the site, is contaminated predominantly with a combination of dioxins / metals / TPH / SVOCs. The soil will be excavated and treated off-site at a thermal desorption⁴ plant to be set up at TKW. About 600 m³ of organic oily residue will be generated from the thermal desorption process. They will be collected and despatched in batches for incineration at the Chemical Waste Treatment Centre (CWTC) in Tsing Yi. The soil after thermal desorption will be solidified by adding cement to immobilise the remaining metals in the soil.

8. A summary of the key findings and recommendations of the EIA report is at Annex B.

Financial Implication

9. The decommissioning project comprises mainly demolition and removal of all existing buildings and structures on the CLS site, excavation and treatment of contaminated soil and implementation of appropriate mitigation measures to avoid / minimise any adverse environmental impacts arising from the decommissioning. The estimated cost of the decommissioning project is \$450 million in money-of-the-day prices. A breakdown of the estimated cost is as follows :

³ Biopiling is a biodegradation process making use of micro-organisms to disintegrate TPH /SVOCs in the soil.

⁴ Thermal desorption is an enclosed separation process in which indirect heat is applied to the contaminated soil. Upon indirect heating, the contaminants (including dioxins) will be evaporated into gaseous phase, trapped and subsequently condensed for further treatment.

(a)	Demolition of buildings and structures ⁵	\$10M
(b)	Decontamination works	
	(i) Excavation and on-site treatment of soil contaminated with metals only and associated cost	\$66M
	(ii) Excavation and off-site treatment at TKW of soil contaminated with TPH, SVOCs and metals and associated cost	\$22
	(iii) Excavation and off-site treatment at thermal desorption plant at TKW for soil contaminated with dioxins / metals / TPH / SVOCs and associated cost	352
	Total	\$450M

The above works will form part of our submission to Finance Committee, seeking funding approval for “Infrastructure for Penny’s Bay Development, Package 3” in May/June 2002.

10. As shown in the above table, a very substantial portion (\$352 million or 78%) of the decommissioning cost is attributed to the treatment of dioxin-contaminated soil. Treatment of dioxin-contaminated materials is very expensive as it involves various operations and procedures. These include excavation and transportation of the dioxin-contaminated soil, site preparation at TKW, setting up of a thermal desorption plant at TKW, operation of the thermal desorption plant, storage facilities, cement solidification for soil after thermal desorption, incineration of residue at CWTC and implementation of monitoring and safety control measures. As dioxins are extremely persistent compounds and are not broken down easily, the dioxin treatment technologies which have a proven record of performance and have been used internationally are thermal treatment technologies which are energy intensive and hence incur higher operating costs.

⁵ Demolition works also include removal of asbestos in the roofing of the shipyard buildings. We have already sought Finance Committee’s funding approval for the asbestos removal works under “Infrastructure for Penny’s Bay Development, Package 2” in June 2001. The cost of the removal works is \$17 million.

Previous Estimate in November 1999

11. While the original estimated cost of decontaminating the CLS site was roughly assessed to be \$22 million in November 1999⁶, this estimate was worked out before the EIA study and with reference to the decommissioning of Kai Tak Airport and the then available information relating to the land uses and operation of CLS (e.g. on-site observation, interview with some shipyard personnel, etc.).

12. The substantial rise in the decommissioning cost is mainly attributed to the presence of dioxins in the soil, effective and thorough treatment of which is very expensive. The likely cause of dioxins in CLS is open burning of plastic materials⁷ on site. Whilst metals, TPH and SVOCs are commonly found in shipyards during the decommissioning process, we have not encountered dioxins in previous shipyard decommissioning projects. The limited contamination assessments carried out in February 2000⁸ and December 2000⁹ also did not reveal the extent of the contamination problem in CLS.

13. A more accurate estimate became available only when the actual level of contamination and types of contaminants existing in CLS could be assessed during the detailed site investigation¹⁰ carried out after April 2001 when the site had been returned to Government. Now that we have thoroughly assessed the level of contamination at CLS, we are committed to taking all the steps necessary to

⁶ We sought Finance Committee's in principle approval for the overall infrastructure package of the HKD project on 26 November 1999. \$22 million was earmarked for the decommissioning of CLS.

⁷ Dioxins are mainly generated in trace quantities as by-products from various burning, combustion and chemical processes, including incineration of chlorinated organic substances and chlorinated waste.

⁸ During the Northshore Lantau Development Feasibility Study (NLDFS) EIA study, a limited soil sampling and analysis was conducted along a stream bed discharging from the southeastern boundary of the CLS site in early February 2000. While the results of the analysis indicated that there were low levels of TPH and metals, no concentration of SVOCs was detected. Based on this analysis, the EIA report on NLDFS considered that the contamination at CLS should be limited in extent.

⁹ Upon repeated requests by the Administration, limited site access for an advanced site investigation was permitted by the CLS operator in December 2000. Soil and groundwater samples were collected at 13 boreholes. Testing results indicated that soil contamination by heavy metals or TPH occurred at some sampling locations at surface level only. TPH and heavy metals were detected in groundwater samples but none exceeded established levels.

¹⁰ A total of 440 boreholes were excavated to collect soil samples. Another 56 groundwater monitoring wells were installed to test the groundwater. A total of 17,220 laboratory tests on the soil and groundwater samples were carried out.

rehabilitate the site, excavate and treat the hazardous substances to render the site suitable for future use. In this connection, the EIA report has recommended a comprehensive and effective remediation and clean up plan for the site. The decontamination methods and control measures recommended in the report are technically advanced and internationally accepted. The proposed thermal desorption process in particular is in line with international practice and the best practical method to treat the dioxin-contaminated soil in the CLS case.

Conclusion

14. The nature of this decommissioning project is primarily of environmental improvement. Contaminated materials will be thoroughly excavated and removed from the site once and for all. The contaminated soil will be treated in accordance with stringent international standards. The soil after treatment will become clean inert materials suitable for use as public fill. The site will also be returned to a condition suitable for development and use by the community.

Tourism Commission
Economic Services Bureau
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