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for information

Tri-butyltin(TBT) Pollution Control At Shipyards and Dockyards in Hong Kong

Introduction

At the meeting of the ACE EIA sub-committee on 9 September Members considered an EIA for the relocation of a floating dockyard. The central issue identified by the EIA was the possible impact of TBT-contaminated wastes and wastewater discharged into the environment. Members requested information on the control arrangements for discharges from other TBT-using dockyards.

2. This paper is produced in response to this request and summarises the current position on the approach to control of TBT-contaminated wastes and wastewater. It also covers the basic approach when dealing with potentially TBT-contaminated sediments, which was raised under Any Other Business at the full ACE meeting on 30 September.

Background

3. TBT is a pesticide known to be highly toxic to aquatic life. Marine organisms such as microscopic algae, snails, oysters, shrimps and crabs have been shown to be affected at very low (parts per billion) concentrations of TBT.

4. TBT is used worldwide as an active ingredient in marine antifouling paints which are designed to leach TBT at a certain rate (up to 10 $\mu\text{g}/\text{cm}^2/\text{day}$) to prevent biofouling, especially marine growth on hulls of vessels.

5. High levels of TBT are found in certain areas around the Hong Kong coastline, especially in sediments in typhoon shelters, shipyards and dockyards. Contaminated wastes and wastewater arising from shipyards and dockyards are important potential sources of TBT pollution. Concerns relate mainly to the possible improper disposal of TBT-containing wastes and wastewater generated during routine vessel servicing activities - the removal and re-application of TBT paints, in particular high pressure washing, grit blasting, scraping, hammering and re-painting.

Current TBT Control Strategy in Hong Kong

6. There are potentially two main sources of TBT contamination of the marine environment namely

- (i) leaching from the hulls of vessels to which TBT anti-fouling paint has been applied;
- (ii) discharges or deposits of TBT-contaminated wastes and wastewater generated during hull stripping and cleaning at dockyards.

7. As regards (i), the use of TBT-containing paints in Hong Kong is regulated by the Agriculture and Fisheries Department under the Pesticides Ordinance (Chapter 133). All TBT paint users are required to obtain a pesticide permit from the Director of Agriculture and Fisheries. The permit controls the import, supply, packaging, labelling and use of TBT-containing paints. Storage of paint is controlled under the Dangerous Goods Ordinance (Chapter 295). The application of TBT-containing paints on vessels less than 25 m in length, with the exception of aluminum-hulled vessels, is prohibited in the territory. Nevertheless the arrival and departure each day of many ocean-going vessels, each releasing TBT from the hull surface, is undoubtedly a significant and continuing source of contamination of local waters.

8. As regards (ii), our approach which is in line with international practice is aimed at minimising the generation and release of TBT-contaminated wastes and wastewaters from shipyards and dockyards into the marine environment, rather than attempting to impose a standard which at this stage we do not consider practicable. We are in the process of drawing up guidelines on good operational practices in hull cleaning and painting, and management of wastes and wastewater. These good operational practices will probably include, for example, the need to contain and re-use washwater as far as possible, and to design a suitable drainage system equipped with filtration devices which will remove a minimum of 70% of TBT paint flakes and other suspended solids prior to discharge. They will also include the need for monitoring the degree of TBT-contamination of washwater during hull cleaning. The good operational practices will be listed as conditions in any WPCO licences issued and their implementation will be enforced through regular site visits.

Present Situation vis-a-vis Control of Dockyards

9. There are currently 20 dockyards/shipyard known to use TBT paints (see Table 1). Amongst those, four dockyards/shipyard are licensed under the WPCO and applications for a licence in respect of seven others are being processed. Licences for the two on-shore shipyards do not contain TBT control requirements as they were issued prior to our better understanding of the TBT issue. Licences for the two HUD floating docks (*United* and *Taikoo*) have provisions for TBT control including good housekeeping practices and TBT monitoring during hull cleaning. All other dockyards which are not yet licensed under the WPCO will be required to submit applications for licensing before the end of 1996. For dockyards that fail to submit applications by the deadline, regular site visits will be made to ensure they are not making any illegal discharges.

10. Because of the impracticability of controlling the level of dissolved TBT in discharges we do not propose to establish a standard at present. Rather we propose to monitor the effectiveness of the operational practices employed by monitoring TBT in the discharges, and to keep these practices under continual review.

11. In addition to the WPCO licence control described above, controls will also be exercised, where appropriate, under the Waste Disposal (Chemical Waste) (General) Regulations. Under these regulations shipyard and dockyard operators who are TBT-paint users are also required to register with the Director of Environmental Protection as chemical waste producers. This ensures appropriate control of the packaging, labelling, storage, transport and disposal of waste TBT-containing paints and paint containers.

Management of TBT-Contaminated Sediments

12. At present, marine sediments in Hong Kong are classified as contaminated if the concentration of any one of seven metals (Cd, Cr, Cu, Hg, Ni, Pb and Zn) exceeds certain specified criteria. The general strategy is to leave such sediments in place, if at all possible. However, if they have to be dredged for any reason, they are disposed of at special pits east of Sha Chau.

13. The criteria for classifying sediments as contaminated are now under review as part of a series of studies being carried out by the Civil Engineering Department. This review work will consider, *inter alia*, whether TBT and other trace toxic organic chemicals should be added to the criteria. The review will be completed in December, 1996.

14. In the interim, decisions on the management of TBT-contaminated sediments are being and will continue to be made on a case by case basis. In general, in cases where we have no data but serious contamination of sediments by TBT (but not by criteria metals) is thought likely, we will require analysis for TBT to be carried out. We will also require tests to be conducted to determine whether and to what extent the TBT will be released into the water during dredging. From the test data we will form a judgement based on an assessment of the likely concentration of TBT in the water and a comparison of that concentration with concentrations known to produce biological effects. If the water column concentrations are such that they would produce acute effects, the sediments would be required to be dumped in the contaminated mud pits. In practice, in the great majority of cases, sediments likely to be contaminated by TBT are likely also to exceed one or more of the metals criteria and would therefore be disposed of at East Sha Chau.

Environmental Protection Department.
November, 1996.

Table 1 : WPCO Status of Dockyards and Shipyards with permits to use TBT - paints

Name of Premises	Location	WPCO Licencing Date		TBT Monitoring	Good Operational Practices Notes
		Issue	Expire		
HUD Floating Dock "United"	North Lantau	31/08/1995	31/08/1997	Yes	Yes
HUD Floating Dock "Taikoo"	North Lantau	28/08/1996	31/08/2001	Yes	Yes
Yiu Lian Floating Docks #2-5(4 Docks)	North Lantau	Nil		--	--
Yiu Lian Dockyard	North Lantau	30/12/1994	31/12/1996	--	--
Leung Wan Kee Shipyard	Tsing Yi North	Nil		--	--
Hong Kong Shipyard	Tsing Yi North	27/06/1995	30/06/1997	--	--
HUD Floating "Whampoa"	Tsing Yi North	Application under processing			
Yiu Lian Floating Dock #1	Tsing Yi North	Nil		--	--
Cheoy Lee Shipyards Ltd.	Lai Chi Kok	Nil*		--	--
A. Fai Engineering & Shiprepairers Ltd.	Lai Chi Kok	Application under processing			
CTS - Parkview Shipyard Ltd.	Lai Chi Kok	Application under processing			
H. K. Macau Hydrofoil Co. Ltd.	Lai Chi Kok	Application under processing			
Far East Hydrofoil Co. Ltd.	Lai Chi Kok & Stonecutters Island	Application under processing			
Wang Tak Engineering & Shipbuilding Co. Ltd.	Stonecutters Island	Application under processing			
Gov't Dockyard Marine Dept.	Stonecutters Island	Application under processing			
Yau Wing Co. Ltd.	Yau Tong Bay	Nil		--	--
Mesco Ltd.	Aberdeen	Nil		--	--

* Claimed to have no wastewater generated in the premises.