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for information

WASTE MANAGEMENT STRATEGY FOR HONG KONG

STRATEGIC PLANNING - OVERALL PERSPECTIVE

1.1 Historically, most of the waste generated in Hong Kong was either landfilled, incinerated, or discharged untreated into our waters. Disposal was done at the 13 old landfills which did not have the required pollution control devices installed, and at the old urban incinerators which were of the 1960's design. A limited quantity of waste was also composted at a composting plant at Chai Wan. However, it became evident in the 1980's that the existing disposal sites were grossly inadequate for the increasing waste quantities. This problem was exacerbated by urban development encroaching upon these disposal sites and the changing public attitude on waste management. Realising the pressing need, strategies for managing municipal and other waste were developed in the 1980s and eventually published in the Waste Disposal Plan (WDP) in 1989.

1.2 The Waste Disposal Plan contains strategies covering various waste types that fall within the ambit of the Waste Disposal Ordinance, with details on their collection and disposal methods as well as proposed disposal sites. In the initial phase, the Plan advocates the development of secured waste disposal systems that would adequately meet the needs of Hong Kong. This system centred around three large state-of-the-art strategic landfills in remote parts of the New Territories, served by a network of Refuse Transfer Stations (RTS) sited in the urban areas (Annex I). This landfill-RTS system offers a cost-effective and environmentally acceptable disposal option, compared to the old landfills and urban incinerators. The WDP also specifies that future development of new incinerators should incorporate advanced pollution control equipment and be located in remote areas.

1.3 As a result of the development of the new facilities (Annex II), all major out-dated facilities were phased out gradually, the last one being the Kwai Chung Incinerator which was closed in mid 1997. We have thus moved one step closer to a cleaner environment. We are now geared to enter into the next phase of our overall strategy. As landfill space would be filled up eventually, the only sustainable method to tackle the growing waste quantities (Annex III) is waste reduction, which has become the focus of waste management in the 1990s. We are formulating a Waste Reduction Plan that comprises waste avoidance and recovery, building on the existing recycling system and introducing bulk waste reduction technologies (such as waste to energy incinerators), so as to minimise the future demand for landfill space.

STRATEGIC MANAGEMENT PLANS FOR SPECIFIC WASTE TYPES

2.1 In formulating the waste management strategies, we need to take into account the growth in population, commercial and industrial activities, major development schemes such as port development, urban renewal programmes and other large scale reclamation. We have been running a waste monitoring programme since 1981 to gather information related to the design needs of the waste management system. Through this programme, we established the geographic distribution of solid waste and their major constituents, as well as identify the socio-economic parameters that can be used for forecasting future waste management needs. The information collected has been used in the development of the 1989 Waste Disposal Plan and subsequent fine-tuning and development of waste reduction and disposal strategies.

Municipal Solid Waste

2.2 Municipal Solid Waste (MSW) includes household, commercial and industrial waste. For a densely populated city like Hong Kong, it is of utmost importance that we provide a long term secured disposal outlet for the MSW we generate. This is necessary to protect the well being of the people as well as providing a firm foundation for further initiatives like waste recycling and minimisation to proceed. Our long term strategy for managing such waste is by landfilling. This strategy was adopted after considering many factors. The cost of landfilling is a few orders of magnitudes lower than incineration, which was one of the main alternatives considered at that time. A large portion of the waste was construction waste, which could not be incinerated. The hilly terrain and high population density at urban areas precluded urban incinerators to be built. A strategy, based on three large regional state-of-the-art landfills served by a network of urban Refuse Transfer Stations (RTS) was therefore put into place. MSW is delivered to the RTSs by ordinary refuse collection vehicles, and then compacted, containerised and transported in bulk to the landfills. As compared to transporting waste in small refuse collection vehicles, refuse transfer in containers to landfills is more environmentally friendly and more cost effective. Over the last eight years since the publication of the Waste Disposal Plan, we have actively pursued this strategy. At present, five RTSs are in operation at Kowloon Bay, Island East, Shatin, Island West and West Kowloon, transferring up to 5,000 tpd of solid municipal wastes to the three strategic landfills at South East New Territories, West New Territories and North East New Territories. Four other RTSs are at different stages of planning and development.

2.3 Having secured the waste disposal facilities, we are now ready to move to the next stage of our strategy. As highlighted in the WDP, resource recovery, incineration and landfilling all have a role to play in the management of MSW. Waste to energy incineration facility will be developed. Development of waste minimisation, resource recovery and recycling is also an integral part of the waste disposal strategy. Private sector participation will be encouraged and supported as far as possible provided that the operation is financially and economically viable.

Construction Waste

2.4 Along with the rapid pace of urban development in the 1990s, we recognise that the quantity of construction waste would escalate and take up a significant portion of our valuable landfill space. Construction waste mostly consists of inert materials, which are suitable for reuse, for example, in land reclamation, or as recycled aggregates. In our management strategy, we emphasise segregation of construction waste at source; setting up appropriate sorting facilities; and the provision of more outlets for using the inert materials as public fill (for reclamation). We identify public fill and barging points at strategic locations, while extending the opening hours and relaxing the acceptance criteria to avoid the reusable inert materials entering the landfills. The successful implementation of these measures in stages starting from the early 1990s has brought the quantity of construction waste intake at landfills down to about one quarter of the total amount generated since mid 1996. The remaining 75% are reused at public fills.

2.5 The Civil Engineering Department has recently commissioned a consultancy study to review the public filling (formerly known as public dumping) strategy and programme. The study is now being finalised and the Draft Final Report has recommended the following key measures to further improve the management of construction waste:

- Setting up of sorting facilities to segregate inert materials for reuse
- Provision of buffer storage areas to facilitate the use of construction waste in reclamation projects
- Provision of public fill barging points at strategic locations
- Additional research work on the use of construction waste to produce recycled aggregates
- Further development of codes of practice and technical circulars to facilitate on-site segregation and sorting of construction waste, and their disposal, and waste
- reduction through better design and site management.

Based on these recommendations and the feedback received from the consultation exercise on the draft Waste Reduction Plan, we will finalise our long-term strategy on construction waste management and reduction and incorporate it into our Waste Reduction Plan.

Dredged sediment and excavated material

2.6 The strategy for the management of sediment dredged from the river and seabed and material excavated on land was developed in the early 1990s. Marine dumping grounds at South Cheung Chau and East Ninepin are assigned for the disposal of clean dredged sediment. Exhausted marine borrow areas at South Tsing Yi and North Lantau, from which sand had been extracted for reclamation, can also be used for this purpose. However, dredged sediments, which are contaminated by high concentration of heavy metals or organic pollutants, need to be contained and isolated. They are deposited in special containment pits in East Sha Chau, north of Lantau Island, and are isolated permanently from the marine environment by putting capping layers on top of the pits.

Difficult Waste

Sewage Sludge and Water Works Sludge

2.7 Marine disposal of sewage and water works sludge has completely ceased in 1996, in compliance with the London Dumping Convention. At present, about 300 tonnes per day of dewatered sewage and water works sludge are disposed of at the landfills. Landfilling of dewatered sludge is a widely accepted practice throughout the world. As the quantity of sludge disposed of at present is relatively small compared with the quantity of MSW, this practice is considered acceptable. However, it is estimated that when the Strategic Sewage Disposal Scheme is fully commissioned in 2006, the total quantity of sewage and waterworks sludge generated in the territory will amount to 2000 wet tonnes per day, constituting a substantial amount of waste to be landfilled. In order to preserve valuable landfill space, a review of the sludge disposal strategy is necessary. We have recently commissioned a study to investigate the options and to formulate a sludge management strategy for the whole territory by late 1998. Technical options that would be considered include drying, incineration and enhanced dewatering.

Livestock waste

2.8 Indiscriminate disposal of waste from livestock farms has been one of the causes of pollution of streams in the New Territories. In our strategy, composting of raw livestock manure for subsequent recycling as fertiliser is the primary means of disposal. We encourage farms with effluent produced to install proper in-house wastewater treatment systems by providing technical and financial assistance. We also provide free waste collection and disposal services for farms producing dry livestock waste which is suitable for composting. A 10-year Livestock Waste Control Scheme was put in place in 1987, that included banning all livestock keeping in urban areas and new towns, and enforcing statutory effluent standards for livestock keeping in other areas. The raw livestock manure that we collect is now being

composted at a plant at Shaling. If the amount of waste collected is more than required for making compost, the surplus will be diverted to landfill after conditioning to make it suitable for landfill disposal. As a result, these measures have reduced the pollution load on Hong Kong streams and rivers by more than 85%.

Animal Carcasses

2.9 At present, the two Provisional Municipal Councils collect animal carcasses arising from streets, public kennels, SPCA clinics as well as those generated from abattoirs and rearing activities. The Agriculture and Fisheries Department also collects animal carcasses from government kennels. Some of the carcasses are cremated at Kennedy Town Abattoir, Yuen Long Slaughterhouse and Cheung Chau Slaughterhouse, but the existing cremators are sub-standard and cause air pollution to the local environment. We will build an animal cremator as soon as possible. During the interim, the landfilling method, regarded as a tolerable temporary arrangement, is carried out in a controlled manner with close site supervision on each tipping and covering operation.

Clinical Waste

2.10 Clinical waste is currently collected by the Provisional Municipal Councils and by private waste collectors. It is either incinerated at pathological waste incinerators at hospitals and cremators of the Provisional Municipal Councils, or disposed of at landfills. Although there are existing guidelines from the Hong Kong Medical Association and the Hospital Authority on proper handling of clinical waste at the source of generation, we believe that the collection and disposal of this type of waste needs to be improved. Uncontrolled disposal of clinical waste at landfills can have operational health hazard and other environmental problems, while incinerating clinical waste at the existing outdated incinerators can cause air pollution to the environment.

2.11 We plan to implement an effective control scheme for the proper management of clinical waste to safeguard public health and safety, and provide for the disposal of clinical waste by incineration at the Chemical Waste Treatment Centre. So far, we have produced a consultation document on our proposed clinical waste control scheme and are currently consulting concerned groups on the scheme. During the interim, we have instigated an administrative permit system for better control of the disposal of clinical waste at landfill, while some clinical waste such as human organs, body parts etc. will continue to be incinerated at the existing pathological waste incinerators and the cremators.

Chemical Waste

2.12 The management strategy for chemical waste comprises the provision of a centralised chemical waste treatment centre, as well as legislative controls that cover the storage, collection and disposal of all chemical wastes.

2.13 A Chemical Waste Treatment Centre (CWTC) at Tsing Yi started operation in 1993, treating most of the chemical waste arising in the territory. The legislation on the control of chemical waste was enacted in 1993. A charging scheme for users of the CWTC was implemented in March 1995. This would encourage reduction, re-use and recycling of chemical wastes.

MARPOL Waste

2.14 The MARPOL Convention aims to eliminate pollution of the marine environment by oil and other harmful substances from ships and to minimise discharge of such substances. The CWTC also provides reception facilities for MARPOL Annex I (oil) and Annex II (noxious liquid) wastes from sea-going ships using the Hong Kong Port. A charging scheme for MARPOL waste was implemented in August 1995.

Low-level Radioactive Waste

2.15 The radioactive wastes in Hong Kong are of low-level, mainly generated from hospitals, the commercial sector and educational institutes. There are about 55m³ of historic low-level radioactive wastes stored in disused air-raid tunnels at Queen's Road East, Wanchai. A small amount is still produced in Hong Kong (about 0.2m³ each year). The existing storage facility at Wanchai is located amongst dense residential population and is not an ideal long-term storage site.

2.16 In our strategy, we plan to build a low-level radioactive waste storage facility at Siu A Chau. Upon its completion the waste from the Wanchai Tunnel will be moved to this facility for storage. After a number of years, when the low-level radioactive waste is decayed to a level suitable for disposal at landfills as normal waste, it will be transferred from the facility for final disposal at landfills.

WASTE REDUCTION

3.1 The amount of waste generated and requiring disposal in Hong Kong has been increasing rapidly. Although we have recently secured three state-of-the-art landfills for the final disposal of our waste, new sites for landfills would be extremely difficult to identify and would be expensive. As pointed out in the Waste Disposal Plan in 1989, the next phase of sustainable waste management is waste reduction. As early as when the first strategic landfill started operation in 1993 and whilst the other

two were still being constructed, we commissioned a study on waste reduction in 1994. Based on the findings of the study and consultation with concerned parties, we published a draft Waste Reduction Plan in 1997 for public consultation. Having received comments from over 100 organisations and individuals, we are now revising the draft Plan aiming at promulgating it by mid-1998.

3.2 The philosophy of the Waste Reduction Plan focuses on conserving the scarce landfill space through waste reduction measures, comprising, in order of desirability : avoid waste; minimise waste; maximise recovery, reuse and recycling of waste, and reduce bulk quantity of waste. Currently, we have a reasonable level of recycling in the commercial and industrial sector. However, the recovery of household waste was less effective, as only 8% of such waste was recovered according to our 1994 figures. We will therefore focus on the domestic sector in order to boost the recovery rate. As the Provisional Municipal Councils are the authority for the collection of household waste, we see that there is scope for them to facilitate the recovery of waste, such as by separate collection of recyclable materials.

3.3 Whilst we recognise the important role that waste-to-energy incineration could play in waste reduction, it is prudent not to rely solely on this technology for waste management. The waste reduction measures should include a wide spectrum of activities ranging from the long term education and publicity programme, to the use of incentives to encourage recovery, charging schemes to discourage waste disposal, and land allocation to assist recycling industries. The success of waste reduction would largely depend on the participation of all sectors of the community, in particular changing the habits and the attitude of the individual towards waste management. Besides promoting waste reduction through education and publicity, we are also setting up task forces with various sectors in the community to spearhead waste reduction initiatives in these sectors.

3.4 Mandatory measures through legislation could be an effective means to reduce waste if our partnership or voluntary approach is not successful. Styrofoam boxes is an example of an area where we may need to consider a mandatory approach in future (see Annex IV).

IMPORT AND EXPORT OF WASTE

4.1 Under the Waste Disposal Ordinance, a permit system has been introduced with effect from 1.9.96 to control the import and export of hazardous and contaminated waste. An important requirement of the control system is that prior notifications and consents from all countries concerned (countries of export, import and transit) are required before the commencement of any proposed shipment of controlled waste. Waste importers and exporters are required to apply for the necessary permits from the Environmental Protection Department.

FUTURE DIRECTION

5.1 The planning horizon of the Waste Disposal Plan is 2001. Since its publication, the planned programmes have been implemented in phases. We are constantly monitoring and evaluating the strategies and programmes, which are adjusted and fine-tuned in the light of changing circumstances and evolving technologies. A major review of the WDP will be undertaken before the turn of the century to evaluate the effectiveness of the plans and programme, and to set new directions as necessary.

5.2 Resource recovery, waste avoidance and minimisation will continue to take top priority in the management of all waste types. We are committed to launch the Waste Reduction Plan in mid 1998. With successful implementation of the proposed waste reduction measures for municipal and construction waste, the remaining life of our existing landfills can be extended from 2012 to 2023. However, the existing waste disposal capacity would be used up eventually and additional long-term waste disposal options need to be identified. Apart from considering the state-of-the-art technology in waste-to-energy incinerators, we will also consider, inter alia, the extension of the existing landfills, and identifying new landfill sites which could be land based or marine based. Regarding siting of waste facilities, we will examine the viability of co-siting the sludge treatment facilities with other solid waste disposal facilities, and also the option of co-incineration.

5.3 The Polluter Pays Principle is the driving force behind the introduction of user charges at waste facilities. At present, no waste disposal charges are imposed on waste collected by the Municipal Councils, or any household waste collected by private waste collectors. The introduction of the user charges will have the benefits of not only helping us to finance the operation of the facilities, but will also help to reduce the quantities of waste when producers realise that waste disposal incurs cost. We will continue to pursue the implementation of the Polluter Pays Principle.