

# **EXECUTIVE SUMMARY**

- 1.1** The inherent hazards of clinical waste generated from hospitals and clinics are pathogens and sharps. To reduce the risk to waste handlers and the public, clinical waste requires segregation, collection and proper treatment prior to disposal. While efforts have been made by the hospitals and clinics to reduce the quantity of clinical waste at source through waste segregation, a small quantity still requires special treatment and disposal. The present disposal of clinical waste at the landfills is far from satisfactory and we need to put in place a comprehensive control scheme and environmentally sound disposal arrangement.
- 1.2** The Government has examined various treatment options, and has made reference to the overseas practices before proposing high temperature incineration at the Chemical Waste Treatment Centre (CWTC) as the treatment and disposal option of clinical waste in Hong Kong. To address the concerns of the local residents, the Government has conducted an Environmental Impact Assessment (EIA) which confirms that the high temperature incinerator at the CWTC being fully equipped with pollution abatement systems can completely destroy the biohazardous nature of clinical waste and meet the stringent emission standards. The EIA findings have been consulted with the Advisory Council on the Environment and gained their support.
- 1.3** The proposal to incinerate clinical waste at the CWTC has also been consulted with the Kwai Tsing District Council, and in light of their concerns as well as the objection raised by the Green Peace, and at the request of the LegCo Joint Environmental Affairs and Health Services Panel, the Government has commissioned a review to re-visit the various treatment technologies.
- 1.4** Since the last review carried out by the EPD in 1993-94, alternative treatment technologies (mainly autoclaving, microwave treatment, and chemical disinfection) are becoming more common especially in some US states. However, incineration is still the predominant and most well proven technology adopted in Europe, Australia, and the Asian region such as Japan, Singapore, Malaysia, and Taiwan.
- 1.5** Contrary to the claims made by certain parties, these alternative technologies do generate both air and liquid emissions, and would equally require proper pollution abatement. Uncontrolled emissions of volatile organic compounds are especially problematic, and this would pose serious constraint if the equipment is installed at hospital settings. The use of shredders to enhance the effectiveness of treatment by these systems may also cause occupational health problems, since shredders are easily damaged by hard objects and during maintenance, the workers may get in direct contact with the infectious waste or exposed to microbial aerosols when the equipment is opened. Unlike incineration, there are very few

documented studies to identify and quantify the potential environmental and health hazards of these technologies, and hence they do not attract the same level of public attention and concerns.

- 1.6 Since these technologies are not able to treat clinical waste containing (or contaminated with) pharmaceuticals, cytotoxic drugs (which may be carcinogenic, mutagenic or teratogenic) and chemicals such as ointments in the swabs and dressings (which will end up as VOC emissions), more stringent waste segregation measures would have to be adopted. Human body parts also require separate arrangement for disposal since autoclave, microwave or chemical treatment is not compatible with cultural practices.
- 1.7 Waste segregation would help to reduce the volume of clinical waste requiring treatment, as well as to ensure that pharmaceuticals and chemicals are not mixed with clinical waste before treatment. However, since clinical waste is generated from many different activities within medical establishments, it is inevitable that chemical substances may find their way into the clinical waste stream, and some clinical waste may be contaminated with pharmaceuticals and chemicals. Moreover, it is improper and not practicable to open every package of clinical waste to inspect and confirm the absence of chemical substances. Therefore, treatment by autoclave or microwave technology would generate toxic emissions under such circumstances. In that respect, incineration has definite advantage by offering a fail-safe solution since chemicals present in the clinical waste stream can be completely destroyed by high-temperature incineration, hence there is less need for stringent waste segregation.
- 1.8 Other thermal treatment technologies such as pyrolysis and gasification have also been examined. These technologies are similar to incineration which makes use of the energy content of the waste to achieve thermal destruction, and would equally require an after-burner to completely destroy those fractions which have not been pyrolysed or gasified. Experience on the very few larger scale plants suggests that they require good control on the waste composition in order to provide suitable waste feed for pyrolysis or gasification and to reduce the formation of dioxins during these processes.
- 1.9 It is also noted that many European countries are restricting the landfill disposal of waste containing organic matter in accordance with the new EC Landfill Directive. The role of incineration will become more important as a well-proven technology for bulk waste reduction. Therefore, clinical waste, after treatment by these alternative technologies, may still have to be sent to the Waste to Energy Plants for co-incineration with municipal solid waste.
- 1.10 Based on the above review, while there are certain merits in adopting the emerging alternative treatment technologies, they cannot provide a total solution to deal with ALL kinds of clinical waste, apart from other constraints and unknown risk associated with these technologies. It is therefore recommended to adopt incineration as the treatment method for clinical waste, and the CWTC be modified at the earliest opportunity so as to provide a more environmentally sound disposal method.