

Views on Sludge Treatment Facilities for the HKSAR

For Legislative Council Panel on Environmental Affairs

by Ir LEE Ping-kuen,

Chairman of Environmental Division, the Hong Kong Institution of Engineers

Introduction

In the past, when the population density was low, the domestic sewage generated in Hong Kong was mainly disposed of to the sea and the harbour by making use of the tidal effect for coastal areas or through soil seepage in the inland regions. With the growth of population, Hong Kong has to implement sewage treatment works to tackle the increased sewage volume in order to maintain a hygienic living environment. Currently Hong Kong has a population over 7 millions and produces about 2.6 million cubic metres of sewage every day. The collection, delivery, treatment and disposal of large quantity of domestic sewage are important and challenging tasks to the Hong Kong SAR Government.

Current Sludge Treatment and Disposal Situation

With the commission of the Harbour Area Treatment Scheme (HATS) Stage 1 in 2001, sewage generated in most parts of Kowloon and the eastern part of Hong Kong Island is now collected and conveyed to the Stonecutters Island Sewage Treatment Works (STW). Since then the water quality of the Victoria Harbour has been improved. With the increasing population of Hong Kong and our expectation for a better water quality of the Victoria Harbour, further enhancement and treatment of the sewage at the Stonecutters Island STW are required.

The Government is implementing the HATS Stage 2A to enhance the treatment process of the existing Stonecutters Island STW together with conveying the sewage from the western part of the Hong Kong Island to the Stonecutters Island STW. The Government is also planning HATS Stage 2B to install secondary treatment of the collected sewage at the Stonecutters Island STW in order to further improve the effluent quality from the STW.

Besides the Stonecutters Island STW, there are ten regional STWs. They are at Shatin, Pillar Point, San Wai, Tai Po, Siu Ho Wan, Shek Wu Hui, Yuen Long, Sai Kung, Sham Tseng and Stanley serving major parts of Hong Kong.

Sludge is the by-product of sewage treatment. On average, 0.5 kg of sludge will be generated from each cubic metre of sewage treated. The amount of sludge generated depends on the quantity of sewage treated. Sludge is currently mechanically dewatered at individual STWs before disposal. The dewatered sludge still has high water content up to 70 to 80% by weight and is difficult to handle and dispose of.

Since the cessation of marine disposal of waste in 1996, the sludge generated in STWs has been disposed of at the three landfills in Hong Kong by land and marine transport. At landfills, the sludge is co-disposed with municipal solid waste and construction waste in a ratio of 1:10. The ratio has been adopted in considering the geotechnical stability of the landfills as well as in terms of operation safety.

There is a grave concern that the existing three landfills in Hong Kong will only last until early to mid 2010 decade. There is an urgent need to prolong the landfill life by reducing the rate of disposal of waste at landfills. In addition, disposal of biodegradable waste such as domestic waste

and sludge at landfill is not an international trend. Over 70% of sewage sludge in Japan is incinerated and there is an increasing use of incineration up to about 40% in European countries including Denmark, Italy, Germany and U.K. Many major US cities continue to use incineration.

Need for the Sludge Treatment Facilities

At present Hong Kong produces about 800 tonnes of sludge per day (tpd) of which more than 75% are from the Stonecutters Island STW. The quantity of sewage sludge will increase significantly when Hong Kong continues to improve its water quality through expanding and upgrading its sewage collection systems and treatment works. With the commissioning of HATS Stage 2A and upgrading of other regional STWs, the projected quantity of sludge will increase to some 1,500 tonnes per day in 2014 and to about 2,000 tonnes per day in 2020.

The existing landfills in Hong Kong are already handling sewage sludge close to their limits. Excessive quantity of sewage sludge will cause landfill stability problem. Therefore increasing the quantity of sewage sludge to be disposed at the existing landfills will compromise public safety and is unacceptable. There are pity examples in nearby cities of landfill failures due to excessive quantity of sludge causing public health problems

It is obvious that disposing sewage sludge at landfills is not a sustainable measure in a high densely populated city like Hong Kong with limited land available for the use of landfills. Hong Kong needs an alternative sludge treatment facility (STF) to handle the projected increase in sewage sludge which is in line with the progress of water quality improvement.

Proposed Sludge Treatment Facilities

In view of the limited space available for the disposal of sewage sludge, sludge incineration is an alternative treatment process to reduce the volume of the sludge before disposal of. The proposed fluidized bed incineration is a well proven state-of-the-art technology adopted by many advance countries such as Japan, European counties, for treatment of sewage sludge. The collected sewage sludge will pass through a fluidized sand bed at 850°C. Its volume will be reduced by about 90%. The remaining 10% sludge in the form of ash will be disposed of at landfills. The proposed STF is suitable for dealing with large quantity of sludge such as that projected in Hong Kong.

The site for the proposed STF is at the ash lagoon in Tsang Tsui near Nim Wan, Tuen Mun. It is situated to the west and is adjacent to the existing WENT Landfill. The site is shielded from Tuen Mun town by the Castle Peak ridge. It is quite remote and is not easily reached and viewed by Hong Kong residents. Sewage sludge generated from STWs will be delivered to the proposed STF by means of using enclosed land or marine transport.

An Environmental Impact Assessment (EIA) for the proposed STF has been carried out. The assessment shows that with the implementation of the proposed mitigation measures, the proposed sludge incinerator at Tsang Tsui will not pose unacceptable impacts to the environment during construction and operation phases in terms of air quality, human health risk, ecology, noise, water pollution, waste management, landscape and visual, and landfill gas hazard. The EIA was endorsed by the Advisory Council for Environment (ACE) and was approved under the EIA Ordinance. It should also be noted that the emission standards of the proposed sludge incinerator will be compatible with those in the European Union. The emissions from the proposed STF will

therefore not expect to pose threat to the general public nor contribute to air pollution rendering the air quality unacceptable.

Views from Engineering Professionals

The Environment Division of the Hong Kong Institution of Engineers has jointly organized with other professional bodies on 14 March 2009, the Technical Seminar on Sludge Treatment Facilities. Views and experience on sludge treatment and disposal were shared and exchanged among over 80 professionals.

We consider that Hong Kong SAR needs the proposed STF infrastructure to dispose of the projected sewage sludge in conjunction with the upgrading and improvement of sewage treatment works. The proposed STF is urgently needed to be commissioned in line with the HATS Stage 2 programme so that the water quality in Hong Kong can be further improved. This is a crucial infrastructure that hinges on the improvement of the environment and living standard of Hong Kong.

End

30 March 2009