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CB(1) 422/07-08(01)

10 December 2007

Legislative Council Secretariat  
 Legislative Council Building  
 8 Jackson Road  
 Central  
 Hong Kong  
 (Attn : Ms Becky Yu)

Dear Ms Yu,

**352DS – Harbour Area Treatment Scheme, stage 2A –  
 construction of advance disinfection facilities at  
Stonecutters Island sewage treatment works**

**Supplementary information  
 to Panel on Environmental Affairs**

I refer to your letter of 26 November 2007 conveying the Panel's request for additional information concerning the advance disinfection facilities (ADF) for the Harbour Area Treatment Scheme (HATS).

I am pleased to attach the Administration's response which will also form an enclosure of the paper to be discussed at the coming Public Works Subcommittee meeting on 20 December 2007.

I should be grateful if you would circulate this information to Panel Members.

Yours sincerely,

(Raymond FAN)  
 for Director of Environmental Protection

**352DS – Harbour Area Treatment Scheme, stage 2A – construction of advance disinfection facilities at Stonecutters Island sewage treatment works**

**Supplementary information  
to Panel on Environmental Affairs**

**INTRODUCTION**

In considering the paper on the above project on 26 November 2007, the Legislative Council Panel on Environmental Affairs requested the Administration to provide the following –

- (a) The timeframes within which the advance disinfection facilities at SCISTW and the local sewerage programmes for the unsewered areas in the Tsuen Wan area are expected to be completed.
- (b) The information on technologies, such as nanotechnology, which the Administration has considered before deciding on the use of chlorination/dechlorination for disinfection under HATS. In addition, the effectiveness and cost differences of these technologies.
- (c) The breakdown of the project cost of \$110 million, the recurrent cost and the daily amount of chlorine to be used. To also advise whether there is a mechanism under which the chlorination/dechlorination process can be stopped and the latest progress of HATS stage 2B.
- (d) An undertaking that the Administration will closely monitor the marine ecology before and after the application of chlorination/dechlorination process.
- (e) The Administration's plan on treatment of sludge.

**THE ADMINISTRATION'S RESPONSE**

***Completion dates of the advance disinfection facilities at SCISTW and local sewerage programmes in the Tsuen Wan unsewered areas***

2. The relevant projects which will improve the water quality at the Tsuen Wan beaches, and their current target completion dates, are as shown in the following table.

<b>Project</b>	<b>Target completion date</b>
Advance disinfection facilities at Stonecutters Island Sewage Treatment Works (352DS)	October 2009
Ting Kau sewerage stage 2 (52DS)	December 2009
Sham Tseng sewerage stage 3 (126DS)	December 2009

### ***Disinfection technologies considered and relative costs***

3. Before deciding on the use of chlorination/dechlorination for disinfection under HATS, we have conducted a detailed study of other disinfection technologies that are available for water and wastewater disinfection, including some emerging technologies. They included UV radiation and 10 other disinfection technologies listed below:

- Peroxone (Peroxide/Ozone)
- Ozonation
- Chlorine dioxide
- Potassium permanganate
- Chloramines
- Peracetic acid
- Bromine chloride
- Combined disinfectants
- Microfiltration
- Potassium ferrate

4. While some of the 10 disinfection processes listed above appear to be effective for sewage effluents on a laboratory scale, most of them have seldom been adopted for plant-scale use, even in small to medium-sized sewage treatment plants, due to one or more of the following reasons: high capital and operation costs, large footprint requirements, and being unproven in full scale applications. The lack of the large-scale application of these alternative technologies in effluent disinfection made them unattractive options for further consideration for HATS.

5. We short-listed UV radiation and chlorination/dechlorination for more detailed assessment. The factors examined included reliability and whether the technologies were proven in mega-scale application, flexibility in operation and design, footprint requirement and land availability, implementation programme, and cost effectiveness. We finally selected chlorination/ dechlorination for HATS.

6. Regarding the detailed cost comparison, the chlorination/ dechlorination option has been assessed to have a cost advantage of about 45% over the UV radiation option. This translates to a cost saving of about \$600 million based upon a 15-year life-cycle cost comparison.

7. Regarding nanotechnologies, we are aware that there are research programmes being conducted in universities and other research institutions. However, the applications are still at the research and early development stage and as far as we know have never been used for scaled-up sewage treatment even in any small to medium-sized sewage treatment plants. They are therefore not sufficiently developed to be considered for application to HATS.

### ***Cost breakdown***

#### **Capital cost**

8. The capital cost breakdown for the project is given in the following table.

	<b>\$ million</b>	
(a) Advance disinfection facilities	87.7	
(b) Environmental mitigation measures	0.3	
(c) Consultants' fees for	10.3	
(i) contract administration	1.0	
(ii) site supervision	9.3	
(d) Contingencies	9.8	
	<hr/>	
Sub-total	108.1	(in September 2007 prices)
(e) Provision for price adjustment	1.8	
	<hr/>	
Total	109.9	(in MOD prices)
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### Recurrent cost

9. The estimated annual recurrent cost breakdown for the project is as follows:

	<b>\$ million</b>
Light and Power	1
Chemical	82
Maintenance	1
Environmental Monitoring	4
<b>Total</b>	<hr/> <b>88</b>

### *Daily chlorine consumption and associated cost*

10. At the anticipated chlorine dosage rate of 11 to 15 mg/L, the daily consumption of sodium hypochlorite solution for disinfecting the chemically-enhanced primary treatment effluent from the Stonecutters Island Sewage Treatment Works is estimated to be about 19.7 tonnes of chlorine equivalent.

11. The additional operating cost for providing disinfection to the CEPT effluent from SCISTW using sodium hypochlorite and sodium bisulphite solutions would be about \$0.15/m<sup>3</sup> of sewage treated.

### ***Monitoring of marine ecology and the chlorination/ dechlorination process***

12. We will carry out a comprehensive control and monitoring programme which includes a rigorous operating process to monitor and control the chemical dosages and the total residual chlorine (TRC) content in the effluent after dechlorination. A baseline monitoring programme and compliance monitoring programme will also be conducted before and after commissioning of the advance disinfection facilities respectively.

13. To monitor the possible marine ecological risk resulting from the project, we will conduct environmental monitoring for pre- and post-commissioning phases which will include a Whole Effluent Toxicity Test on five species on a quarterly basis, and sediment quality monitoring and surveys of the sea-bed ecology at eight monitoring stations on a half-yearly basis.

14. All the monitoring results will be reported to the EIA Subcommittee of ACE on a quarterly basis and uploaded to a designated website for public inspection.

15. Should exceedance of discharge limits be identified during the monitoring, or should toxicity in the receiving environment be found to be greater than that predicted under the EIA, we will carry out an immediate investigation as to the cause and take the necessary measures to rectify the problem.

### ***Progress of HATS Stage 2B Preparatory Work***

16. The main elements of the preparatory work for HATS stage 2B are the continued monitoring of the trends in the planning parameters for HATS and the commissioning of work to firm up on the co-use to be pursued at the identified site for the biological sewage treatment works. For the land co-use study, we have commenced the selection of consultants with a view to completing the statutory planning procedures for amending the zoning plan by 2010. For the planning parameters we have stepped up monitoring of the water quality trends through targeted field surveys. We continue to carry out annual updates on the key parameters concerning population growth and sewage flow forecasts.

### ***Plan for Treatment of Sludge***

17. The present practice of disposing of dewatered sewage sludge by landfilling is not sustainable. The Administration therefore proposes to build a dedicated Sludge Treatment Facility (STF) with a capacity of 2,000 tonnes per day to handle dewatered sewage sludge from the SCISTW and other regional sewage treatment works. We propose to adopt incineration technology for the STF, which will be equipped with advanced pollution abatement and emission control facilities to ensure full compliance with stringent international environmental standards.

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