環境保護署總部的信頭

**Letterhead of Hong Kong Government Environmental Protection Department Headquarters**

OUR REF: Annex 2 to EP72/S1/4
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4 November 1998

Mr. Peter H.Y. Wong,
c/o Deloitte Touche Tohmatsu
50/F Hopewell Centre
183 Queen's Road East
Hong Kong

Dear Mr. Wong,

Re : Strategic Sewage Disposal Scheme EIA

This is in response to your letter of 13 October setting out your proposals for an alternative approach to dealing with the treatment and disposal of the sewage generated in the urban areas of Kowloon and Hong Kong Island.

The proposal was, of course, debated at some length during the special ACE meeting on the SSDS EIA held on 22 October and we, and our consultants, provided oral responses to each of the issues raised in your paper. Even so, in order to keep our records straight, and in order to meet your own request (made at the meeting on 22 October) for a written reply, our formal response is enclosed herewith. If you have any further queries, or feel that there is anything we have not adequately covered, please let me know.

As you have also sent your proposal to the LegCo Environmental Affairs Panel I have taken the liberty of copying my reply to them as well, to ensure that all are kept informed as to the EPD view.

Yours sincerely,

(M.J. BROOM)
for Director of Environmental Protection

c.c. Clerk to the LegCo EA Panel

SSDS EIA
Response to proposals put forward by
Mr. P. Wong, Chairman of ACE

In response to the findings of Phase I of the SSDS EIA, Mr. Peter Wong has proposed that Hong Kong should pursue a long outfall (in the Lema Channel) but with a lower level of treatment than chemically enhanced primary, which is the minimum level currently planned.

In putting forward this proposal Mr. Wong has in mind the possibility of using the resources saved to help reduce the inputs from the mainland which may impact upon Hong Kong. He also assumes that a lower quality of effluent discharged to the Lema Channel would have no measurable impact. The need to reduce sludge disposal costs is stressed, which suggest the proposal is to downgrade the treatment level to simple screening, where the sewage is passed through fine screens to remove gross solids only.

The assumption regarding the lack of impact is based on a number of arguments broadly as follows:

(i) the amount of toxic substances in Hong Kong's sewage has recently been greatly reduced and will continue to decline such that there is no toxic threat;

(ii) a discharge of essentially organic sewage in the Lema Channel would be rapidly rendered harmless through the processes of dispersion and dilution;

(iii) the discharge of an undisinfected effluent would pose no risk to marine mammals (because there are none there); and

(iv) a good precedent for such a proposal is provided in Melbourne where untreated sewage is discharged to Port Phillip Bay and the organic material is recycled and eventually harvested as fish.

**The technical issues**

On (i), we agree that Hong Kong's sewage contains few toxic substances and that such substances are continuing to decline. The risk assessment carried out for the EIA demonstrated clearly that even now, no risk is posed by toxic substances.

On (ii), we have not done any water quality modelling work to assess the impact of a lower quality discharge. It is likely that nutrients would not be a problem, but there would certainly be a very large "mixing zone" of very high bacterial levels within which the relevant mainland water quality objective of 2,000 faecal coliform/L of water would not be met. It is most unlikely that mainland officials would agree to this. Furthermore, if preliminary treatment were adopted, there could be problems with sedimentation of sewage solids on the sea bed

(which could deprive the sediments, and the bottom layer of water, of oxygen) and the formation of a visible slick.

On (iii), the consultants' proposal to disinfect has been made on the basis of the precautionary principle. Although our fieldwork has included surveys in the Lema Channel and has not identified any significant marine mammal population there, it is quite possible that the finless porpoise and other difficult-to-detect cetaceans inhabit the area. Establishing whether this is or is not the case would require extensive specialised survey work. Nevertheless it would be possible to plan on a precautionary basis, but carry out further survey work, if other difficulties relating to an outfall in the Lema Channel (such as the geological conditions) could be overcome.

On (iv), our information is that no untreated sewage is knowingly discharged into Port Phillip Bay by the municipal authorities. According to our information all the sewage receives biological treatment and much of the effluent is discharged outside the bay into the Bass Strait precisely to avoid eutrophication problems. Some of the sewage however is fed into a series of vast lagoons where the organic material is broken down. We understand the lagoons at the end of this process part of a managed wetland which supports significant fish life. Some of the final effluent is used for irrigation. It seems there is no question of the untreated sewage being fed into the enclosed waters of Port Phillip Bay as a means of increasing fish production.

**Risk assessment**

The proposal suggests that the current SSDS options may carry a significant risk of failure. We do not agree. If we pursue an option involving only CEPT, which is a physical system, the main risk would be of a pump failure. Such a risk can be reduced to a minimum by providing back-up pumps and power systems. Even if the back-up systems were to fail the worst that could happen would be that the sewage was allowed to discharge at the sea wall. This would produce a situation not greatly different from the one that exists at present. Any such risk would in any case still exist if the treatment level were downgraded to preliminary or simple primary.

If we pursue an option involving biological treatment the risk of failure would increase somewhat because biological systems are more susceptible to shock loadings. However the centralisation of the flows to a single works would itself provide stability and hence some protection against such loadings. Furthermore, since a biological works would be downstream of, and physically separated from, the CEPT works on Stonecutters Island a failure of the biological works would, at worst, mean discharge of a CEPT-grade effluent.

**The mainland dimension**

Any proposal for downgrading the level of sewage treatment and discharging into mainland waters must take into account mainland standards and the likely reaction of mainland authorities. The agreement to work on the basis of chemically enhanced primary treatment as the minimum treatment level was

reached at Joint Liaison Group level. Any proposal now to downgrade the treatment level would almost certainly not be well-received, especially as it would mean a breach of the relevant mainland bacterial standard over a wide area.

It may be that as a long-term goal a Lema Channel discharge could be pursued if the community was prepared to re-allocate the resources thus saved to assisting with the treatment of polluting flows in Shenzhen and Guangdong. However this would need to be pursued through the Hong Kong - Guangdong Environmental Protection Liaison Group and would need to take into account the following technical issues:

(i) with regard to nutrient pollution from the Pearl River, it is likely that a major contribution is run-off from the land, especially from wide-spread use of chemical fertilisers; it is therefore not clear that upgrading all the domestic sewage treatment facilities in the Pearl River basin would necessarily result in a significant reduction in nutrient concentration in local waters; and

(ii) with regard to polluting loads from Shenzhen and their impact on Deep Bay, it must be borne in mind that according to current projections, within 2 years Shenzhen will either be treating biologically, or exporting to the Pearl River, approximately 75% of the projected flows; any proposal for Hong Kong to deal with those flows would have to consider the cost-effectiveness of doing so, both for Shenzhen and for Hong Kong.

**The cost advantages**

The extent of the cost savings will depend on whether preliminary treatment (where the sewage is passed through screens to remove gross solids only) or primary treatment (where a proportion of solids settle out in sedimentation tanks) is adopted.

Clearly a proposal to discharge sewage which has received only preliminary treatment would result in significant cost savings compared with the current SSDS EIA options. However if conventional primary treatment were pursued the cost advantages would be very small. In fact there would be an increase in capital cost (because of the need to build an additional treatment plant as Stonecutters Island cannot handle all the flows without chemical addition). There would be a saving of about HK$200m per annum achieved as a result of not using disinfection. Our rough estimates of the costs are as follows:

| | CEPT<br>+ disinfection<br>+ sludge incineration | CEPT<br>+ sludge incineration | Primary<br>+ sludge incineration |
|---|---|---|---|
| Capital | $11.8b | $10.9b | $12.6b |
| Operation | $0.87b/yr | $0.67b/yr | $0.67b/yr |

**Conclusion**

While the proposal is theoretically feasible we feel that it is not a practical proposition at this stage. The principal advantage is that it will save some money. The disadvantages are:

(i) the mainland side will likely be opposed, partly because it would represent a very significant departure from the earlier JLG agreement and partly because of the fact that the proposal would not comply with the mainland WQO for bacteria;

(ii) it is doubtful that any meaningful compensatory arrangement for dealing with pollution loads from the mainland could be arrived at within a realistic timeframe; and

(iii) the impacts are unknown but may be considerable for a screened discharge; we do not want further delays while we investigate them.

Our preference is to keep the option in mind and review the position when we have hard information about the impacts of the option eventually selected from amongst those considered in the EIA. If there is no detectable impact a downgrade may be possible, and mechanisms for utilising any redundant treatment capacity could be further considered at that time.

Water Policy and Planning Group
Environmental Protection Department
November 1998