LETTERHEAD OF THE HONG KONG UNIVERSITY OF SCIENCE & TECHNOLOGY

September 25, 1998

By fax and by mail

Miss Odelia Leung
Clerk to Panel
Legislative Council
Hong Kong Special Administrative Region
PRC

Dear Miss Leung:

Re: Submission to LegCo Panel on Environment Affairs

We are pleased to have the opportunity to coment on "Briefing Document on Option Evaluation and Comparison" on the Strategic Sewage Disposal Scheme - Environmental Impact Assessment Study, September 1998 proposed by the Consultants, Montgomery Watson/Binhai Wastewater Treatment & Disposal (HK) Consultants Ltd. We have also participated in a briefing session held at the U. of Hong Kong on September 23, 1998.

Based on this information and on our keen interest and work experience in related coastal zone management work/marine pollution control here in Hong Kong and elsewhere, as detailed below, we wish to make the following comments:

General

The Consultants have prepared a thorough analysis of the issues and have presented four options for further detailed investigations. We wish that more information would have been provided by the Consultants on the "regional contribution", meaning the effect of pollution from the Pearl River Estuary, and its effect and consequences on Hong Kong.

Specific Issues

1. Choices of Options

Options 1 (CEPT + Disinfection + HK waters outfall) and 2 (CEPT + D + Guangdong waters outfall) are sensible choices. We believe that the relatively small extra costs for a longer outfall (Option 2) is likely to provide some margin of safety. It will however be necessary to investigate the risk of constructing a longer outfall to Lema Channel from seismic considerations.

Based on the facts presented in the Consultants report, there can be no justification for Option 3 (Biol. Treatment, Disinfection, HK Waters outfall) and for Option 4 (same as 3 but with added Nutrient Removal). The much greater expense for Options 3 and 4 with only a slight improvement in predicted water quality makes them a poor investment.

2. Reconsideration of Central Treatment Facilities

There have been reports in the newspapers recently questioning the wisdom of providing a central collection system and treatment facilities at Stonecutter's Island, possibly also at Lamma Island. In part this may be driven by the delays in the construction of the necessary tunnels. We think it very unwise to reopen this issue, both from a practical viewpoint, as well as from a timing viewpoint. The collection system including the tunnels should be completed with utmost speed, and the proposals for treatment as are currently in front of you should be approved, with the provisos that you will determine based on advice you receive from all sources.

3. Dispersion at outfall

We are unclear whether sufficient checks have been carried out to satisfy that the Danish (DHI) model predictions for dispersion at the outfall diffusers are really occurring. This should be clarified, and if necessary, surveys should be carried out.

The concept of 'mixing zone' after the outfall dispersions is a well understood term, but we find the Consultants definition somewhat vague as to its size. How quickly will high levels of pollutants be diminished to acceptable levels?

4. Disinfection

The method of disinfection is not yet specified. The two proposed choices are chlorination/dechlorination and ultraviolet light. No costs comparisons are provided as yet nor comparisons on ease of operation. Others may comment on the toxicity of chlorine to some species of fish and marine invertebrates, which may occur primarily in the mixing zone. We are concerned about the formation of chlorinated compounds which degrade slowly and which can be toxic. Some chlorinated compounds can be carcinogenic. We are concerned that dechlorination may not be sufficiently effective in this respect. The use of UV if it were to be found practical and cost effective, would avoid the problems of chlorinated compounds.

5. Sludge Treatment and Disposal

The treatment and disposal aspects of sewage sludges may not have been included in the Consultants mandate, but it is a very important part of the overall treatment process and a significant cost factor. This should be addressed in Stage II.

5. Worst Case Scenarios

It appears to us that the Consultants water quality data are time averaged and also over depth. This may in some cases be misleading. For example, for dissolved oxygen the fish do not care about the average concentration being above the normal lower limit of 4 mg/1. To survive they need to have a minimum of a certain level, say 3 mg/1 at all times, otherwise fish kills will occur. This should be investigated.

6. Regional Considerations

Our comments here go beyond the Consultants mandate, but we believe they are important to your panel for future considerations. For water and air pollution, Hong Kong is not in charge of its own destiny alone. The Pearl River pollutants will under certain climatic conditions have very significant effects on Hong Kong waters, which cannot be changed by extensive treatment of its own pollutants. It makes therefore much more sense for Hong Kong to work with Guangdong authorities to introduce treatment of a similar kind to that considered now for Hong Kong, i.e. chemically assisted primary treatment plus possibly disinfection, to Guangdong wastewaters discharging to the Pearl River. Financing of these works could be done through Hong Kong companies, similar to the way a toll road from Hong Kong to Guangzhou has been done. The overall effect would be far superior for both sides than spending money on Option 3 or 4 by Hong Kong.

HKUST's CCAR and IESD experience

The environmental issues of the Pearl River Estuaries and the adjacent waters has been the research focus of the Center for Coastal and Atmospheric Research (CCAR), and of the Institute of Environment and Sustainable Development (IESD) for several years. We have carried out a series of research and field investigations on this area by using remote sensing, in situ hydrographic observation, chemical/biological sampling and numerical simulation. At this moment we are carrying out one of the top projects in coastal studies of the PRC (Ocean 863) with our counterpart, Zhongshan University, to build a highly sophisticated marine observing system on the Pearl River Estuaries and adjacent waters (PEIOS). PEIOS will continuously observe and record the pollutant flux from the Pearl River and other sources, the meteorological, physical, oceanographic and biochemical parameters in a daily or even hourly base through an automatic network system. PEIOS will tremendously improve our ability of monitoring the marine environment. Consequently, it will lead to a better understanding of many environmental issues. Similar systems have been initiated in the U.S. and European countries in the early 80s, such as CBOS (U.S.) and MERMAID (Germany). PEIOS is desperately needed in an area such as the Pearl River Estuary and Hong Kong waters. In addition, the Pearl River Estuary Pollution Project (PREPP), supported by the Hong Kong government through funding from the Hong Kong Jockey Club Charities Trust is another key project which will start in January 1999 for three years. The aim of PREPP is to estimate the accumulative effects of marine pollution on the ecological system. PREPP involves heavy field investigation and scientific research. Combining PEIOS and PREPP will give us a more complete picture of the marine environment in Hong Kong and Pearl River Estuary area.

The experience, the facilities and the research team of CCAR and IESD are unique in the Hong Kong area. There is no doubt in our minds, we can make our contribution to Stage II of SSDS if we can be more involved in this project in the future in the following aspects:

1. According to our information, the small and medium scale circulation within the Lingdingyang Estuary and in the coastal ocean of Hong Kong has not been fully investigated and studied, which is essential to SSDS project because the transport and dispersion of pollutants highly depend on the stable circulation and dynamic structures.

2. For more than a decade, oceanographers realized that the long-term, or low frequency current is the most important motion for water and pollutant transport in coastal oceans. According to our study, the non-tidal current can be one order of magnitude greater than that of the tidal current in fair weather in Lingdingyang estuary. So far as we know, this important issue has not been realized and understood by many local researchers partially due to lack of long-term observations.

3. Some foreign institutions, which are highly respected by the international community, may not produce locally applicable research due to not being familiar with this region. The Pearl River estuary system is one of the most complicated systems in the world. CCAR and IESD will attempt to develop an integrated numerical model to simulate the Pearl River network system, estuaries and coastal ocean. This will provide a very powerful and unique tool to simulate and predict the pollution through three difference types of water bodies.

We would have liked to present our views at the meeting of the panel on October 5, but unfortunately both us are out of town then. We would welcome the opportunity to interact at another time, if the panel would so wish.

Thank you for the opportunity to provide this input. We hope that approvals, with modifications, can be arrived at speedily. Hong Kong needs proper treatment facilities very urgently. Too many valuable years have been lost already.

Sincerely yours,

Gary Heinke
Director of Institute for Environment
and Sustainable Development

Jay-chung Chen
Director of Centre for Coastal
and Atmospheric Research

c.c.: Chia-Wei Woo
S.D. Kung
Leroy Chang
Otto Lin

GH/JC/al