Strategic Sewage Disposal Scheme (SSDS) Stage II
Environmental Impact Assessment

Comments by

Joseph Hun-wei Lee
Redmond Professor of Civil Engineering
The University of Hong Kong

1. **Ocean Disposal by Long Sea Outfalls**
2. **The Environmental Impact of SSDS**
3. **How Clean is Clean?**

Honorable LegCo Panel members, Ladies and Gentlemen:
I would like to share with you some views on the Environmental Impact Assessment of the SSDS Stage II scheme. These views are based mainly on the briefing document, and my local and international experience as a researcher and expert advisor over the past two decades on hydraulics and water quality.

1. **Ocean Disposal by Long Sea Outfalls**: - In the late 1980s Hong Kong's sewage was discharged through some 30 sea outfalls after primarily very little treatment (Overhead 1). In view of the deteriorating water quality of the harbour, the SSDS (both the 1990 and 1995 versions) was conceived to centralise the collection and treatment of sewage, before discharge through a long sea outfall to the waters south of Hong Kong. In the past eight years I have followed various reports about the SSDS in the media. One polarised view often likens the use of a long sea outfall (to discharge sewage without biological or full treatment) to dumping garbage in the environment, and that the environment cannot be protected or sustained without full secondary treatment. Is this really so?

2. **The Environmental Impact of SSDS**: - If wastewater is discharged indiscriminately into a receiving water, then it is true the effect will be dismal, as this papermill waste discharge by the side of a river shows

(Overhead 2); the harmful pollution belt can be extended for kilometers without any significant reduction in concentration. However, if the wastewater is discharged properly at the bottom of the ocean, by proper choice of location, and making use of the prevailing ocean currents, the pollutant can be efficiently diluted by the turbulent vortices and swirls. By the time the sewage comes up to the ocean surface - a process that takes only a couple of minutes (Overhead 3), the pollutant concentration and impact can be reduced by a hundred times or more - i.e. more or less undiscernable from background levels. To put it simply, the impact to a marine organism will be exposure to higher than background concentrations for a few minutes; this impact can be assessed by bio-toxicity tests. Excepting highly toxic substances which can bio-accumulate, the potential significant impact is then limited to an **initial dilution zone** of the order of 100 m square, the size of a football field. Beyond this initial dilution zone, the waste will further be broken down and assimiliated into the environment by the movement of the tides, wind and wave, solar radiation, and biochemical processes.

The environmental impact of a sea outfall is localised and can be mitigated by careful selection of discharge location.

Research and post-operation environmental monitoring in many countries have shown that the use of the marine environment for the treatment of coastal wastewater can be a viable option. In a 1987 report by the UK Water Research Centre, it is stated that "With well designed sewage out-falls, we believe that discharge of sewage to the sea is not only acceptable but, in many cases, environmentally preferable to alternative methods of disposal". This view is also shared by a group of scientists from the Scripps Institute of Oceanography. Based on 10 years of research (the Southern California Coastal Water Research Project), they conclude that "No, the oceans are not dying (from sewage disposal)". In fact, some hard work was required to find any deleterious effects at all on the plankton of the southern California coastal waters. Additional field observations in other parts of the world, including Florida, Hong Kong, Shanghai, and Australia have also confirmed the scientific basis of sea outfall design.

The use of ocean outfalls can be an environmentally acceptable

option; it is an appropriate technology under the right conditions.

3. **<u>How Clean is Clean?</u>** - Honorable Panel Members, based on the overwhelming scientific evidence, it seems to me the issue is not whether we should or should not use a long sea outfall. The issue is rather what degree of land-based sewage treatment we should provide and where should we dispose of the sewage. Biological secondary treatment removes considerable solids and BOD (Biochemical Oxygen Demand), and it is a good thing if there is a need to do so. It also generates much greater volumes of sludge and incurs much greater (two to three times more) expenses. Wastewater treatment should match the problem, and the incremental environmental benefits must be weighed against the financial and environmental costs.

From this view, the approach adopted in the Phase I of the EIA study is acceptable, in that an internationally accepted procedure has been used. Oceanographic, water quality and marine biology surveys have been carried out, and used with state-of-the-art computer models to predict pollutant concentrations from different sites and options. The adopted criteria is conservative, and one can objectively compare the costs and environmental benefits of different options. The scheme has **built in flexibility** so that we can provide more treatment later if appropriate. While uncertainties remain with the whole issue of eutrophication (nutrient enrichment) and its impact, **the EIA study applied the best possible methodology and provided a list of viable options for further consideration.**

While the debate over marine disposal of sewage will likely continue, the 'Do Nothing' approach is not an option. Ten years ago, sewage was discharged in a distributed way into our Harbour. At present, with the Stage I SSDS scheme, the collected sewage is better treated, but large volumes of sewage enter the harbour at a location of limited water depth. **If an option is not decided after rational debate, the water quality in our harbour will deteriorate, and Hong Kong's environment will suffer.**