

By Hand and by fax
2594 6031

8 December 2006

Dr Sarah Liao
Secretary for the Environment, Transport and Works
Environment, Transport and Works Bureau
10/F Citibank Tower, Central

Dear Dr. Liao

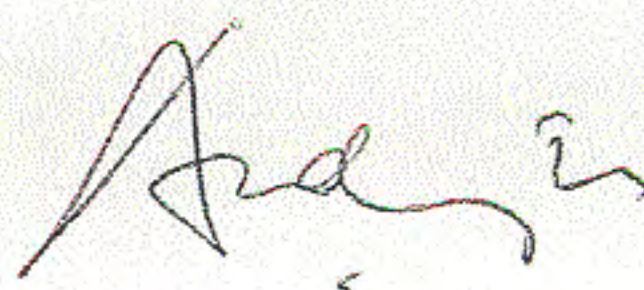
HATS Stage 2

The WWF Hong Kong has submitted a briefing paper on the Harbour Area Treatment Scheme (HATS) Stage 2, upon request by the members of the Panel on Environmental Affairs.

Written by a panel of experts, the paper is of the view that if secondary treatment is postponed indefinitely, as proposed by the administration, Hong Kong would be much inferior to the world and national standards in sewage management.

While we are working towards *primary* sewage treatment, Shenzhen and Zhuhai had already implemented *tertiary* treatment required by national standards. It is further argued that the chlorination treatment under HATS Stage 2 is not cost-effective, and by-products can be extremely toxic and harmful to humans and the environment.

The paper is attached for your reference. I would be grateful if the administration would provide a paper to address those concerns, as the issue is scheduled for discussion at the Panel meeting in January 2007.



Audrey Eu
Member, Legislative Council





WWF for a living planet

HATS STAGE 2

BRIEFING PAPER TO LEGCO PANEL ON ENVIRONMENTAL AFFAIRS

1 BACKGROUND

- 1.1 *Secondary (biological) treatment of sewage is the norm in developed countries*

Secondary (or biological) treatment of sewage is now the norm in developed countries and is fast becoming the norm in developing countries, including China (see below).

- 1.2 *Experts recommended in 2000 that we should upgrade to secondary treatment*

In 2000, a panel of international experts set up by Government (the International Review Panel) concluded and recommended that the Stonecutter Island Sewage Treatment Works (SCISTW) should be upgraded to secondary treatment.

- 1.3 *Secondary treatment was the initial policy direction until ETWB suddenly changed tack, sub-dividing the project into two stages, HATS 2A and 2B*

Secondary treatment of sewage was the initial policy direction of the Government for HATS Stage 2. However, presumably due to precarious government finances and a weak economy at the time, and fearing that there would not be support in Legco or in the community for the cost of secondary treatment, the ETWB under Sarah Liao suddenly changed tack and in 2004 proposed sub-dividing HATS Stage 2 into Stage 2A and Stage 2B.

- 1.4 *2A would provide "primary" treatment; 2B (secondary treatment) would be postponed*

Stage 2A would provide *primary* treatment of sewage from the harbour area not already treated by Stage 1. Secondary treatment under Stage 2B would be postponed to an indeterminate date.

- 1.5 *The proposal to disinfect the primary effluent by chlorination was driven by political considerations*

In view of the anticipated increase in outflow of primary treated effluent from the SCISTW as a result of HATS Stage 2A, and its effect on water quality in the Tsuen Wan area, in particular its seven bathing beaches, it was further proposed that primary treated effluent should be disinfected through chlorination. The chlorine disinfection proposal was primarily driven by the desire to re-open the seven bathing beaches, in order to ensure the support of the local communities for the HATS Stage 2 extension of sewage treatment in the SCISTW.

- 1.6 *The chlorination proposal and delay of secondary treatment have caused dismay in many circles*

These proposals – to postpone secondary treatment indefinitely, and to chlorinate the primary treated effluent – have caused consternation among sewage treatment experts as well as those sections of the community who had been led to expect that sewage treatment in Hong Kong would finally and belatedly catch up with standards in the developed world.

2 CHINA VERSUS HONG KONG

2.1 *PRC standards for sewage treatment have been established and are higher than Hong Kong's*

China has now adopted consistent effluent discharge standards nationally, whereas Hong Kong has yet to do so. Furthermore, under recent regulations, every new sewage plant in China has to offer secondary treatment; additional disinfection is required if discharging into Grade II waters and even more stringent treatment if discharging in to Grade I receiving waters such as the Pearl River estuary. Existing plants have to be upgraded by 2006. It is anticipated, therefore, that an overwhelming proportion of all sewage in China will be given secondary treatment soon. Hong Kong will be the exception. (Note: all sewage in Macau receives secondary treatment.)

2.2 *National standards require tertiary treatment of sewage in Shenzhen and Zhuhai*

The waters around Shenzhen and Zhuhai are Grade I: they are therefore required under law to apply not only secondary treatment to their sewage but also tertiary treatment (removal of Nitrogen and Phosphorus) followed by disinfection. Most rivers and seas in China are graded at least Grade II, requiring secondary treatment and disinfection at a minimum.

2.3 *Hong Kong is not only failing to meet international and PRC standards, but going backwards*

In contrast, Hong Kong seems to be taking retrograde steps in its sewage treatment. Whereas the sewage plants serving the New Towns offer secondary treatment, those now being planned will offer primary treatment only, e.g. SCISTW and the Pillar Point sewage treatment plant.

3 DISINFECTION BY CHLORINATION: THE PROBLEMS

3.1 *Chlorine disinfection is outdated and being phased out around the world*

Very few sewage plants around the world offer chlorine disinfection of primary treated effluent. To the extent that they do exist, they are seen as outdated and are being phased out where possible.

3.2 *Chlorine disinfection is more usual for secondary treated effluent, on a much smaller scale*

Chlorine disinfection is still quite common for secondary treated effluent. However, since secondary treated effluent is already much cleaner, the scale of chlorine disinfection required is much smaller.

3.3 *Hong Kong will be one of the largest buyers of chlorine in the world*

The proposed chlorine disinfection facility at the STISTW will be by far the largest such facility in the world. It will be four times larger than the next largest facility in Vancouver. The anticipated requirement for chlorine will make the Drainage Services Department (DSD) one of the largest single buyers of chlorine in the world – about 100,000 tons of industrial bleach per year, costing about HK\$100 million and representing 8.9% of the total USA demand for industrial bleach. The fact that Hong Kong is now committing to such outdated technology on such a large scale is very puzzling to local and international sewage treatment experts.

- 3.4 *Chlorine by-products can be extremely toxic, and harmful to humans and the environment*

Chlorination is out of favour in the world of sewage treatment because the Total Residual Chlorine (TRC) and the creation of by-products (such as THM and HAA) are harmful to human health and detrimental to the environment. TRC is extremely toxic to marine organisms. THM and HAA are less toxic to aquatic life but are mostly of concern for human health: THMs are suspected carcinogens and are strictly monitored in drinking water.

- 3.5 *The harmful effects of chlorination will be mitigated by de-chlorination, but nowhere has this been attempted on a scale contemplated for Hong Kong: control of risks on this scale is untested*

In order to mitigate the creation of harmful by-products, it is proposed that the chlorination process will be followed by de-chlorination. However, the success of this requires accurate monitoring and delicate control of dosage of the large amounts of chemicals involved. Nowhere has this been attempted on the scale being proposed at the STISTW. An EIA on chlorine disinfection has recently been completed, which tested for by-product formation of chlorination/de-chlorination. However, the bench scale tests conducted in the EIA are not equivalent to the large scale processes of the final facility. Chlorination of primary treated effluent will require high dosages; the chlorination/de-chlorination process will therefore be difficult to control, creating risks of discharge of high levels of residual chlorine.

- 3.6 *Long-term effects on the marine environment are of grave concern*

The long-term effects on the marine environment and marine organisms of the harmful by-products of chlorination, a fairly well researched area in the scientific community, are of grave concern to WWF. In the EIA, toxicity tests were carried out on five representative local species, but it is questionable whether the limited scope of these tests can gauge the long-term reproductive and multi-generational effects on species or other indirect impacts on complex marine ecosystems. (Organisms were exposed for only 48 hours and the effects multiplied by a factor of 10 to predict prolonged exposure.)

4 A FLAWED AND WASTEFUL SOLUTION

- 4.1 *Chlorine disinfection will not even achieve its primary purpose of re-opening the seven bathing beaches*

Chlorine disinfection was proposed as a solution to re-open seven bathing beaches in the Tsuen Wan area, beaches which were in any case experiencing low and declining public usage because of the growing background pollution of our western waters. At a recent DSD briefing, a chart was shown which indicated that even with HATS 2A fully operational, water quality at the seven beaches would not be good enough for re-opening – this information was not disclosed to the public during the consultation process in 2004.

- 4.2 *The stated objective of the chlorine disinfection facility is fatally flawed* In other words, the Government is now proposing the world's largest chlorine disinfection facility, costing millions of dollars of public money and with potentially harmful effects on the marine environment, with the objective of re-opening seven little used beaches, an objective that is now not achievable by HATS 2A alone.
- 4.3 *Chlorine disinfection has limited effectiveness. The risk/reward ratio is not optimal* Chlorine disinfection will not remove pathogenic viruses, parasites or heavy metals (substances that are if anything more harmful to the marine environment and bathers), nor does it address the massive nutrient load discharged into the harbour, which disrupts the natural flora and fauna of the harbour and could lead to areas of eutrophication (de-oxygenated dead zones). It could also lead to algal blooms and red tides which pose risks both to bathers and local fisheries (both wild and farmed).
- 4.4 *The true cost of the project is unclear and likely far higher than disclosed. Redundancy when HATS 2B materialises will be a huge cost to the community* When HATS Stage 2B materialises, the huge chlorination facility will become largely redundant. The financial cost of the facility being quoted by Government today is very different (lower) than the cost quoted at the time of the public consultation in 2004. The latest estimate appears unrealistically low in the view of most professionals in the field. We urge members of the Panel to closely examine the true financial costs of the chlorination facility (both in terms of capital investment and future operation and maintenance), the scale of the redundancy in the event of Stage 2B and therefore the value for money of the chlorination facility.
- 4.5 *Given the risks, better no chlorination at all* In view of the risks of harmful impacts of chlorine disinfection on the environment and human health, WWF considers it preferable to abandon chlorine disinfection as a part of HATS 2A, irrespective of the arguments over the timing of HATS 2B.
- 5 HONG KONG DESERVES SECONDARY TREATMENT TODAY**
- 5.1 *Hong Kong needs and deserves world-class sewage treatment – and we can afford it* Proceeding straight to secondary treatment under HATS 2B will certainly be more expensive, but the GDP per capita of Hong Kong is as high as many cities in the developed world – we can certainly afford it. It should be remembered that although Hong Kong has world class infrastructure in many areas (e.g. airport, MTR), it is well behind in the quality of its sewage treatment: in this sense, investment in HATS 2B secondary treatment is simply making up for many years of underinvestment in proper treatment of sewage from the harbour area. Government finances are in good order and the economy is strong; if Hong Kong cannot make these necessary investments in such circumstances, when else is a good time to do so?

- 5.2 *Investing in HATS 2B now solves many problems and delivers a far better and safer solution. It is more expensive, but offers better value-for-money*
- In contrast to primary treatment, secondary treatment makes it feasible to remove viruses and most bacteria and reduce the organic load of the discharge. It would ensure better water quality in the Tsuen Wan area far quicker than the current proposal of Stage 2A + disinfection. In other words it can do much more than primary treatment + disinfection, without any of the harmful side effects.
- 5.3 *Stage 2B can be made operational within the same timescale as the chlorination facility*
- Furthermore, Stage 2B could be built by the time the disinfection facility is planned to be operational. The proposal to build a "temporary facility" of this scale confounds engineering sense.
- 5.4 *It is unacceptable that an advanced city like Hong Kong should move in the opposite direction of China and the developed world*
- In spite of the formidable scale and challenges of China's environmental problems, the country is making a determined and impressive effort to improve the situation. It is unacceptable that Hong Kong, arguably China's most advanced city, moves in the opposite direction of China or indeed of every other country in the developed world.
- 5.5 *We've waited long enough. Let's do the job properly.*
- Hong Kong has waited long enough for world-class sewage treatment to clean up its world famous but polluted harbour. Let's seize the opportunity to fix the problem once and for all.

WWF Hong Kong
20th November 2006

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Primary Treatment:

Solids are first screened to remove large lumps. The screened sewage is pumped into settlement tanks where particles are allowed to settle. This settlement process is encouraged by the addition of chemicals, hence "Chemically Enhanced Primary Treatment" or CEPT. To clarify, the primary treatment proposed for HATS Stage 2A is CEPT. After settlement, the remaining liquid is discharged into the sea and the sludge is collected for separate disposal.

Secondary "Biological" Treatment:

A variety of microorganisms are introduced to the primary treated effluent. These microorganisms ingest the dissolved organic matter in the primary treated effluent.

Tertiary Treatment:

Usually involves removal of nutrients (typically phosphorus and nitrogen which are primarily responsible for algal blooms including red tides) and/or further disinfection of secondary treated effluent by chlorination/de-chlorination or UV technology.