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**LegCo Panel on Environmental Affairs**

**Minutes of the special meeting  
held on Friday, 1 December 2000 at 10:00 am  
in Conference Room A of the Legislative Council Building**

- Members Present** : Prof Hon NG Ching-fai (Chairman)  
Hon Cyd HO Sau-lan (Deputy Chairman)  
Ir Dr Hon Raymond HO Chung-tai, JP  
Hon Bernard CHAN  
Hon WONG Yung-kan  
Hon Mrs Miriam LAU Kin-yeet, JP  
Hon Emily LAU Wai-hing, JP  
Hon CHOY So-yuk  
Hon LAW Chi-kwong, JP  
Hon Abraham SHEK Lai-him, JP  
Hon Henry WU King-cheong, BBS  
Hon Tommy CHEUNG Yu-yan, JP  
Hon Michael MAK Kwok-fung  
Hon Albert CHAN Wai-yip  
Hon LAU Ping-cheung
- Members Attending** : Hon CHAN Yuen-han  
Hon Mrs Sophie LEUNG LAU Yau-fun, SBS, JP
- Members Absent** : Hon Martin LEE Chu-ming, SC, JP  
Hon Eric LI Ka-cheung, JP  
Dr Hon LO Wing-lok
- Public Officers Attending** : Mr Kim SALKELD  
Deputy Secretary for the Environment and Food

Mr Donald TONG  
Principal Assistant Secretary for the Environment and Food

**Attendance by :** International Review Panel  
**Invitation**

Professor Donald R F HARLEMAN (Chairman)

Professor Leonard K H CHENG

Dr Albert KOENIG

Professor Dr Eng Sebastiano PELIZZA

Professor QIAN Yi

Professor Rudolf S S WU

**Clerk in :** Mrs Constance LI  
**Attendance** Chief Assistant Secretary (2) 5

**Staff in :** Ms Joanne MAK  
**Attendance** Senior Assistant Secretary (2) 2

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**I. Briefing by the International Review Panel (IRP) on its report on the Strategic Sewage Disposal Scheme (SSDS)**  
(LC Papers No. CB(2) 382/00-01(01) - (02) and CB(2) 408/00-01(01))

The Chairman welcomed members of the IRP and representatives of the Administration to the meeting.

Presentation by Professor Donald R F HARLEMAN, Chairman of IRP

*Recommendations of IRP*

2. At the Chairman's invitation, Professor Donald R F HARLEMAN gave a PowerPoint presentation on IRP's report on the review of SSDS. He said that IRP strongly recommended that Stage I of SSDS should be completed as soon as possible and that IRP envisaged no further serious problem with the remaining Stage I works as the ground conditions were already known. IRP was also of the view that the Chemically Enhanced Primary Treatment (CEPT) plant at the Stonecutters Island (SCI) was the world's largest and most efficient plant for pollutant removal in effluent, achieving about 90% of disinfected effluent which

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could normally be obtained with a conventional secondary biological plant. It was therefore not necessary for Hong Kong to go for further secondary treatment of the Stage I flows as recommended five years ago. Only tertiary treatment for removal of ammonia or other forms of nitrogen would be recommended if any further treatment was required.

3. Professor HARLEMAN explained that in the analysis of the generic ocean outfall, it was important to consider the environmental and economic trade-off between a lower level of wastewater (CEPT) treatment with a long, high dilution outfall and a higher level of wastewater treatment with short, low dilution outfall(s).

*Comments on the EIA options*

4. Professor HARLEMAN said that the Environmental Impact Assessment (EIA) study on SSDS had recommended options which involved treatment of the remaining stages of SSDS flows at the present (CEPT) level at SCI, and transfer of the treated effluent through a long tunnel to Lamma Island for disinfection. The treated and disinfected effluent would be discharged to waters southeast of Lamma Island. He noted that the EIA study had also looked at the option of setting up facilities at Lamma Quarry to provide secondary and tertiary (biological removal) treatment to the sewage. However, such additional treatment would increase the cost from \$82 billion to \$94 billion, and the option had been rejected in the EIA final analysis which was in favour of subjecting all SSDS catchment flows to CEPT treatment and disinfection.

5. Professor HARLEMAN said that IRP was of the view that discharge of CEPT effluent into waters south of Lamma Island was neither a viable nor a sustainable option. IRP found that the water quality there was very close to, and in many cases exceeded, the existing water quality standards in terms of ammonia and dissolved oxygen. As the EIA study showed that the ambient levels of inorganic nitrogen were typically high and dissolved oxygen typically low in southern waters during the wet season, IRP believed that disposal of additional effluent into this area would not be environmentally acceptable in the long term.

6. Professor HARLEMAN further said that the substantial investment close to \$40 billion was another reason for rejecting the proposed SSDS Stage II option (i.e. constructing a 17-kilometre long ocean outfall at southeast Lamma Island and discharging effluent through it to waters south of Lamma Island). He said that if Hong Kong opted for the long ocean outfall but decided some years later that additional treatment should be provided for the sewage, it would incur much higher costs apart from first investing in the long ocean outfall. IRP considered that the long ocean outfall was not really justified, and that Hong Kong should go for an innovative, space-saving tertiary treatment. A decentralized treatment system providing better quality effluent and using shorter outfalls was preferred by IRP.

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*Four options proposed by IRP*

7. Professor HARLEMAN introduced the four options recommended by IRP, all of them rejected the long ocean outfall in the present SSDS plan and involved Biological Aerated Filters (BAF) to remove ammonia. Professor HARLEMAN said that the tertiary treatment technology of BAF had come to maturity particularly in Western Europe (such as France, England, Norway and Germany) in the past five years. He stressed that the merit of the technology was space-saving, and that the limited remaining space in SCI would be sufficient for BAF facilities.

8. Professor HARLEMAN pointed out that all the four IRP options recommended the use of short local outfalls at different locations, and all were designed to meet local water quality objectives by means of tertiary biological treatment. In addition, three of the four options represented varying degrees of decentralized treatment, with separate facilities for Stages III and IV flows. The four IRP options (i.e. options 5a, 5b, 5c and 5d in the IRP report) were summarized below -

- (a) Option 5a provided a fully centralized system to treat all SSDS flows. Stages III and IV flows collected on Hong Kong Island were transferred across the harbour to SCI to receive treatment at the level of CEPT plus BAF with disinfection if necessary.
- (b) Option 5b provided a degree of decentralization in which all of the Hong Kong Island flows of Stages III and IV were collected and transferred to Lamma Island Quarry where a new CEPT plus tertiary biological (BAF) plant would be located. Two treatment plants would be required : the Stage I treatment plant at SCI and a new one together with a new short outfall at Lamma Island.
- (c) Option 5c provided a high level of decentralization. CEPT plus BAF treatment would be provided for Stages I and III flows at SCI and effluent would be discharged at SCI outfall. Separate treatment of Stage IV flows would be provided at a new, compact and enclosed CEPT plus BAF plant located on the southwest side of Hong Kong Island. Effluent would be discharged through a new, short outfall adjacent to the new plant.
- (d) Option 5d provided the highest level of decentralization in that Stage I flows would continue to be treated at SCI and Stages III and IV flows would be treated at two new, compact plants located on Hong Kong Island.

9. Professor HARLEMAN invited members' attention to Table 3 of the Executive Summary of the IRP's report on a comparison of the costs and benefits of the proposed SSDS Stage II option and the four IRP options. He pointed out

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that the present costs (i.e. year 2000 prices) of the first three IRP options were in the range of \$36 billion to \$37.6 billion. The fourth IRP option which involved two additional plants on Hong Kong Island was projected to cost \$43.1 billion, which was mid-way between the cost of SSDS Stage II option (i.e.\$46 billion) and the first three IRP options.

10. Professor HARLEMAN said that IRP considered that there would not be significant differences in the environmental impact among the four IRP options. However, IRP suggested that additional studies should be carried out to fine tune the distinctions between these options. IRP also questioned that the peak design flows projected in the EIA for Stages I and III/IV were unnecessarily high. In addition, IRP recommended that pilot plant tests of BAF technology be carried out at SCI to ascertain the feasibility, as well as the size, cost and suitable location of the required BAF facilities.

11. Professor HARLEMAN said that IRP would like to continue its involvement to provide a continued overview and evaluation of the proposed additional studies. IRP therefore requested that its terms be extended beyond April 2001. IRP also recommended a "fast-track" EIA study be conducted for the four IRP options and then a detailed EIA be undertaken for the chosen option. Professor HARLEMAN further suggested that for cost saving, Hong Kong might consider the "design, build and operate" approach for the implementation of the sewage treatment system. He said that the approach was now widely used in Europe to reduce red-tapes and to achieve cost-effectiveness because competition would bring about efficiency.

*Public concerns and response by IRP*

12. Professor HARLEMAN said that in May 2000, IRP had received about 24 representations on the SSDS. IRP had also attended an open forum to gauge public views which included the following concerns -

- (a) building a long ocean outfall to discharge effluent in the waters south of Lamma Island might cause further delays of the SSDS project given the experience of the Stage I tunnelling works;
- (b) the impact of discharging CEPT effluent to sea waters on water quality standards and marine environment should be carefully studied and that there was a need for additional tertiary biological treatment for SSDS wastewater;
- (c) the merits and demerits of having a centralized wastewater treatment system as against a decentralised system should be further examined; and

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- (d) it was necessary to enhance cooperation with the People's Republic of China (PRC) to improve Pearl River water quality.

13. In concluding his presentation, Professor HARLEMAN stressed that IRP was of the view that "dilution is not the solution to pollution". In view of the exceptionally high efficiency of the CEPT plant in SCI, IRP recommended skipping secondary treatment and providing tertiary treatment using the compact BAF technology which had evolved in the last five years.

Discussion

*Deep tunnelling*

14. In view of the subsidence problem in Tseung Kwan O, Mr LAW Chi-kwong questioned whether the deep tunnels to be built in the north of Hong Kong Island as proposed in the IRP options would cause significant groundwater drawdown and pose a threat to the residents there. He recalled that in 1976, the Government had banned all development projects in north Hong Kong Island to prevent landslides.

15. Professor Dr Eng Sebastiano PELIZZA responded that the major problems pertaining to the deep tunnelling works for Stage I were due to the crossing of faults. He said that the drainage of underground water did not affect the stability of the rock mass on the surface. Professor PELIZZA was confident that the use of modern technology could overcome the problem of drainage of underground water. He also recommended the use of a new tunnel boring machine and instant impermeable tunnel lining to achieve total control of the water inflow problem. He further suggested using machines to create a counter pressure inside the tunnel at a level slightly higher than the hydrostatic pressure of water outside the tunnel, in order to prevent the water from seeping into the tunnel.

16. Mr LAW Chi-kwong further asked whether the new technology had proven stable for deep tunnelling works, as the SSDS tunnels were more than 100 metres below the surface. He was concerned about the safety of the people working inside the tunnel if the pressure inside was even higher than the hydrostatic pressure outside. Professor PELIZZA said that the instant tunnel lining could be applied right away while the new technique of counter pressure could be further explored.

*The BAF technology*

17. Ir Dr Raymond HO said that he welcomed IRP's recommendations that a highly centralised treatment system might not be the best approach for Hong Kong. He also sought the following clarification on the use of BAF -

- (a) whether extra space would be required for adoption of the BAF technology;

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- (b) whether the existing SCI sewage treatment plant would require large-scale modifications in order to provide BAF treatment; and
- (c) as the BAF was a new technology and the pilot plant recommended by IRP might take some years to complete, whether the findings of the pilot test would affect the final choice of technique for SSDS Stages III and IV.

18. Professor HARLEMAN clarified that centralised treatment was recommended in two of the IRP's options while the other two options involved the provision of additional sewage treatment plant(s). He added that BAF was a mature technology and that similar biological treatment was already applied in the New Territories. He said that BAF was currently provided at a number of advanced sewage treatment plants in Oslo, Paris, Monaco, Birmingham, England and Germany. Given the small investment for the pilot plant tests of BAF technology, he would recommend that pilot test be conducted at SCI to confirm the efficiency and space requirement of the BAF facility.

19. Dr Albert KOENIG presented photographs of a few examples of overseas wastewater treatment plants to illustrate the use of BAF technology in other countries. He said that although wastewater treatment plants using the BAF technology had been constructed in the past 15 years, the technology had become more common only in the past five years. Compared with the conventional treatment processes, BAF technology took much less space, and it could be used above or under buildings. Citing the example of the wastewater treatment plant in Monaco using BAF, he said that the plant was so compact that it was accommodated together with a large restaurant inside the same building. However, such a treatment plant cost more money than a conventional treatment plant because measures had to be put in place to control the odour and emissions. He said that the newest and largest BAF treatment plant was in Paris and the plant handled the sewage of about 800 000 people. The plant was very expensive as it incorporated many new facilities. As regards the BAF plant in Germany, it occupied only about one-fifth of the area required by a conventional plant.

20. Dr KOENIG said that BAF technology was recommended for Hong Kong as it would improve the dissolved oxygen problem of the Harbour. He said that the following factors had made it possible to apply BAF technology in SCI -

- (a) as the peak flows were less than that of the original assumption, it was not necessary to expand the CEPT plant for Stages III and IV sewage; and
- (b) the use of sea water for toilet flushing in Hong Kong had much enhanced the efficiency of CEPT. As a result, less pollution load was left for biological treatment and less footprint was needed. It

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had therefore become possible to put in place a tertiary treatment plant in SCI.

21. On the space requirements for BAF, Ir Dr Raymond HO asked if it would be possible to set up BAF facilities in vacant industrial buildings in urban areas or even inside caverns in Hong Kong. Dr Albert KOENIG responded that even though BAF facilities were very compact, the BAF facility required to treat the huge amount of Hong Kong sewage would still need to take up a large area of space. Dr KOENIG said that the Oslo treatment plant which was set up in caverns occupied about 5 hectares of land for treating the sewage of 600 000 population. To treat the sewage of about 1 million people in North Point, the sewage treatment plant would need about 4 hectares of land and there was no industrial building or cavern which could be of that size in Hong Kong. Moreover, to construct caverns for such purpose would cost much more than providing a treatment plant on reclaimed land. He added that the reason for the Scandinavians to put some of their treatment plants in caverns was only to prevent the snow and ice in winter from affecting the operation of the treatment plants.

22. Ir Dr Raymond HO asked whether it was feasible to provide aeration inside the 16 tunnels under SSDS Stage I to reduce the sewage loading to be transferred to the sewage treatment plant in SCI, so that less space in SCI would be required for BAF treatment. Professor HARLEMAN responded that the sewage treatment plant in SCI was already very efficient and could now remove on average 75% of organic carbon BOD. He said that attempts to further increase its efficiency by providing aeration in many miles of deep tunnels would be extremely non-productive.

23. Ir Dr Raymond HO asked whether aeration had been used in sewage tunnels in any other cities. Dr KOENIG responded that even for the 42-kilometre underground sewer for the wastewater treatment plant in Oslo, it did not need any kind of aeration. Dr KOENIG said that if any measure was required to control the quality of sewage, usually one would do it by ways other than aeration. The main reason was to avoid the bad odour emission from the sewage staying in the tunnel for a long time without oxygen. As the tunnels in Hong Kong were much shorter and the maximum travel time was six hours only, there should be no need for special or costly measures to control the quality. Professor HARLEMAN added that given that the tunnels in Hong Kong were as deep as 150 metres underground, one would have to compress the air to very high pressure in order to inject it into the deep tunnels. He considered that aeration would be impractical for the deep tunnels in Hong Kong.

24. Ir Dr Raymond HO further asked whether the BAF technology had been used in the United States (US). Professor HARLEMAN replied that BAF was also being considered by the US which currently used more conventional nutrient removal technology for wastewater treatment. In this connection, Dr HO questioned why IRP did not recommend Hong Kong to follow the example of the



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US by using the established technology rather than the "state-of-the-art" technology such as BAF for wastewater treatment. Professor HARLEMAN responded that EIA had already considered and rightly rejected the option of using established technology of a secondary activated sludge plant. He pointed out that the EIA options III and IV had proposed a secondary activated sludge plant plus a conventional biological nutrient removal plant. However, the costs involved would be approximately \$80 billion and about 24 to 28 hectares of land would be required for the plants. IRP was of the view that the established technology of traditional secondary treatment was not cost-effective for Hong Kong.

*Costs of the IRP options*

25. Mr Tommy CHEUNG expressed concern about the implications of the investment in SSDS on the sewage charges. He said that with only 25% of the SCI capacity being utilized at the moment, sewage charges at the rate of \$1.2 per unit of water were imposed on users. Mr CHEUNG wanted to know how much sewage charges would be imposed on users when SCI was put into full operation treating also Stages III and IV flows. He requested the Administration to provide a breakdown of the capital and recurrent costs for providing treatment for Stages I, III and IV flows. He also asked whether it would be more cost-effective to privatise the operation of the SSDS sewage treatment plants. In this connection, he asked if the Administration could provide a comparison between the operating costs for the operation of SSDS to be handled by Government departments and by private companies.

26. Professor Leonard K H CHENG responded that IRP was to examine the social cost for the subsequent stages of SSDS. It would be outside the purview of IRP to look at how much should be charged to Hong Kong people for sewage treatment as this should be determined by Government, depending on the percentage of costs it wanted to recover from users.

27. Professor CHENG said that the capital cost per unit of capacity (cubic metre per day) for the IRP options was between \$9,000 to \$9,500, as compared to an average cost of \$16,000 for the existing non-SSDS sewage treatment plants in the New Territories and south Hong Kong Island. The full operating and maintenance (O&M) cost per cubic metre of sewage treated for SSDS would be about \$1.9 to \$2.3, whereas that for the non-SSDS treatment plants was \$2.4 on the average. He concluded that the unit cost of SSDS was not really expensive.

28. Professor CHENG also clarified the amount of capital investment for the four IRP options. Referring to Tables 1 and 2 of the "Executive Summary" of the Report of IRP, he pointed out that the estimated total capital costs of the four IRP options (inclusive of a CEPT-BAF plant and a sludge incinerator) were \$7 billion, \$9.3 billion, \$7.7 billion and \$9.8 billion respectively. These costs had taken into account the annual recurrent costs plus depreciation over a 58-year-period after commencement of operation. The total capital costs of the four IRP options

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together with Stages III and IV would be \$14.8 billion, \$15.5 billion, \$14.3 billion and \$14.9 billion respectively. He added that there would be economic benefits for the earlier completion of the SSDS project due to early clean-up of the Victoria Harbour. The net benefit would be at least \$1.5 billion per annum, and this should be subtracted from the capital and recurrent costs of the four IRP options.

29. Professor CHENG added that the capital cost of \$8.2 billion (money-of-the-day price) for Stage I should not be included in the total capital costs of the four IRP options. He informed members that the annual recurrent cost for SSDS Stage I was about \$468 million.

30. Deputy Secretary for the Environment and Food (DS(EF)) explained that sewage charges were derived from the annual operating and maintenance cost of treating sewage in all treatment systems in the territory, which included both SSDS and non-SSDS projects. DS(EF) further said that Government had in the last financial year subsidised about 50% of the sewage treatment costs. While the level of sewage charge levied was about 50% of that required for full cost recovery, the level of trade effluent surcharge rate was close to the full cost level.

31. DS(EF) further said that by 2002-03, the Stage I system would have come into full operation and most of the current sewage master plans would be completed. The total operating cost of SSDS Stage I would then be around \$500 million, and the non-SSDS cost about \$1.3 billion.

32. DS(EF) said that the Administration would examine the impact of the future plans for sewage treatment on the sewage charges. He said that it would be a long term forecast as the impact of the capital investments in SSDS Stages III/IV would not show up until well into the next decade.

33. Mr Tommy CHEUNG said that he disagreed with the figures provided by the Administration and he would seek further clarification at a later stage.

*The proposed SSDS Stage II option*

34. Miss Emily LAU requested IRP to explain why the present SSDS Stage II option was now considered by IRP "neither viable nor sustainable". She recalled that this option was recommended by the former IRP and endorsed by the Administration in 1995. She wondered whether the change of stance by IRP was due to new developments in these five years. She wanted to know whether any tunnels or works in Stage I would be wasted if the EIA option was abandoned eventually. She considered that the LegCo Public Accounts Committee might have to look at the matter of responsibility given that the unusual ground subsidence in Tseung Kwan O could have been caused by the construction of the Stage I tunnels.

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35. Professor HARLEMAN said that he and Professor QIAN Yi were members of the former IRP five years ago. He explained that the present SSDS Stage II option was not the decision of the former IRP as it had only proposed further EIA studies to be conducted for a comparison of the viability of different locations of the proposed ocean outfall and the different level of treatment. The main task of the former IRP was to examine what kind of treatment should be provided as the first stage at the sewage treatment plant in SCI. He said that Government's plan at that time was to build a conventional primary treatment plant and to use lime for disinfection. The former IRP felt very strongly that this was not a viable option and suggested strongly that the SCI plant be changed into a CEPT plant. As a result of the IRP's suggestion which was accepted by Government, the plant was only built to two-thirds of the size of a conventional plant because of the greater efficiency of CEPT process.

36. Professor HARLEMAN further said that the former IRP had suggested an EIA study be conducted for the proposed outfall at southeast Lamma, because it was uncertain at that time that SCI would have sufficient space for additional treatment. He said that there had been many changes in the past years. Firstly, the new technology of BAF, which was very compact, had become mature with sufficient construction and operating experience in Western Europe; IRP was now comfortable to recommend it for Hong Kong. Secondly, the CEPT plant at SCI was more efficient than was expected five years ago. It was no longer necessary to expand the SCI facility to handle the additional Stages III/IV flows if it was decided to have concentrated treatment at SCI. As there was still space available at SCI for providing a higher level of treatment using BAF, IRP considered that there was no need to build the 17-kilometre long ocean outfall as originally proposed.

37. Professor HARLEMAN added that although IRP rejected the recommendations of the EIA study, the study was important as it had generated a lot of useful information which was needed to go forward with the IRP options if Government decided to do so. He also assured members that no money was wasted in Stage I because all the tunnels to be completed next year would be used to convey the Stage I wastewater from Kowloon and eastern Hong Kong Island to SCI for CEPT treatment.

38. Professor QIAN Yi also said that the former IRP had only proposed to carry out an EIA on the suitable level of treatment required and to compare the pros and cons of outfalls at different locations. The former IRP had not concluded that the construction of a long ocean outfall in the south of Lamma Island to discharge effluent was the best option. Moreover, the former IRP had also recommended exploring the possibility of using BAF even though it was relatively new at that time.

39. In response to Miss Emily LAU's further enquiry, Dr KOENIG clarified that even if the former IRP decided from the very beginning that the 17-kilometre

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ocean outfall was unnecessary, the tunnels that had been built for Stage I were still needed. DS(EF) explained that there were only two options in 1995. The choice was between a longer outfall with lower level of treatment, and a shorter outfall with a higher level of treatment. The rationale of the new IRP's recommendations was that, given the higher efficiency of the CEPT plant than was expected, it might not be necessary to build an additional CEPT plant for Stages III/IV flows and the space in SCI could be used to provide higher level of treatment. With the higher level of treatment, the 17-kilometre long ocean outfall might no longer be necessary.

40. Miss CHOY So-yuk welcomed IRP's report which had provided more objective and realistic recommendations. She expressed disappointment that the Administration did not take heed of the strong reservations expressed by LegCo Members and professionals in 1995 about the deep tunnels and a long ocean outfall south of Lamma Island. Since the new IRP now found the long ocean outfall option neither viable nor sustainable, Miss CHOY asked whether the level of treatment recommended by the EIA was already known to be inadequate in 1995.

41. Professor HARLEMAN responded that IRP was of the view that Hong Kong could do better than just discharging the treated effluent to waters south of Lamma Island and at a lower cost. In order to meet the local water quality standard, the IRP proposed to have increased level of treatment and to discharge it locally. DS(EF) added that the Administration's responsibility was to ensure that all sewage from Kowloon and Hong Kong Island was treated to a standard and discharged at a place that would not cause adverse impact on the environment of Hong Kong. The Administration would ensure that Hong Kong had a standard of sewage treatment that Hong Kong people were ready to accept.

*Sludge handling*

42. Ms Cyd HO noted that IRP had put forward three treatment and disposal options for sludge, namely, agricultural utilization, direct landfilling and landfilling preceded by incineration. Referring to Annex E of the IRP's Report, she requested IRP to explain the problems in agricultural utilisation which appeared to her to be a more acceptable option from an environmental point of view. She also requested IRP to compare the three options in terms of their cost-effectiveness and advise on the scale of sludge incineration that would be required for Hong Kong.

43. Dr KOENIG said that at least 200 square kilometres of farmland would be required to accommodate the sludge produced in Hong Kong. As Hong Kong did not have sufficient farmland to accept all the sludge produced in Hong Kong, the option of agricultural utilization was not suitable for Hong Kong. He considered that even if farmers on the Mainland were willing to accept the sludge with the permission of the Mainland authorities, they might ask for a very high price. In this case, additional cost would be incurred to Hong Kong.

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44. Dr KOENIG further explained that since sludge contained a lot of water, it would take a lot of space and would require additional costs for drying if the sludge was used for landfilling. He was therefore of the view that incineration was more desirable as it could reduce the amount of materials going to landfills, and the inert residue also had minimal environmental impact.

45. Ms Cyd HO asked whether it was cost-effective to recover the energy content of the sludge in the process of incineration as useful electric energy. Dr KOENIG responded that many overseas large-scale incinerator plants he visited used this energy for the operation of the wastewater treatment plants.

46. On Ms Cyd HO's concern about harmful emissions from the incinerator, Dr KOENIG said that new incineration plant could be an enclosed one which did not cause any nuisance or health hazards to the environment. He pointed out that there was a municipal solid waste incinerator next to the sewage treatment plant in Monaco for incineration of the dewatered sludge. Dr KOENIG added that emissions from an incinerator at SCI or Lamma Island would be far less than the vehicular emissions in Hong Kong. He said that the environmental impact of the incineration process was only minimal and should not be a concern.

47. Responding to Miss CHOY So-yuk's enquiry as to whether dioxin would be emitted during incineration, Dr KOENIG said that he was not sure whether the small amount of emissions from incineration could be measured or not. He said that the incinerators in Germany could remove dioxin by filtering. Dr KOENIG added that he had not conducted studies on dioxin emission from sludge incineration, but he noted that Hong Kong Government had commissioned a study on dioxin emissions in Hong Kong.

*Concerns on the quality of Hong Kong waters*

48. Mr WONG Yung-kan expressed concern that IRP's recommendation of discharging effluent in the Victoria Harbour might lead to further deterioration of the water quality of Hong Kong. He asked what progress had been made in the liaison between Hong Kong and Guangdong Province in tackling the water pollution problem in the Pearl River Delta.

49. Professor Rudolf S S WU said that a lower standard of water quality was required for the Victoria Harbour because the water there was used mainly for flushing, industrial uses and shipping. However, a higher standard of water quality had been set for waters south of Lamma Island as it was a fish spawning and nursery area. The current IRP's recommendation of providing a higher level of treatment to the sewage and discharging it to water adjacent to the Victoria Harbour was more acceptable than discharging it in South Lamma from an environmental point of view. IRP also recommended that an EIA study should be conducted on the four IRP options to ascertain which would be the most environmentally acceptable option for Hong Kong. He pointed out that at present

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there was already about 10% of the sewage, which was not treated through the SSDS, was discharged into the Victoria Harbour. It would be necessary to introduce local control measures to reduce the EColi level in the Harbour.

50. Professor QIAN Yi briefed members on the pollution problem in the Pearl River Delta region and the major water pollutants in the area. She said that the problem was largely caused by the fast growth of population, industrial development and poor enforcement of environmental laws and regulations in the region. Nevertheless, with the increasing awareness of the problem by the authority and the people of the Guangdong Province, the following measures had been taken to tackle the problem -

- (a) wastewater treatment facilities would be provided at 119 industrial plants in eight major Guangdong cities by 2010 to control pollution at source;
- (b) 54 municipal wastewater treatment plants with nutrient removal would be built by 2010 to treat 8.31 million cubic metres wastewater per day;
- (c) more stringent control would be imposed on pollutants from the wastes of livestock farms, agricultural wastes and the use of pesticides and chemical fertilizers.

51. Referring to a graphical map on the Total Inorganic Nitrogen in the Hong Kong waters and in the Pearl River Delta, Professor QIAN said that there was no evidence that the pollution problem in Pearl River Delta had an adverse impact on the Hong Kong waters. Nevertheless, she considered that all people should have the responsibility to control pollution and suggested that the following actions be taken by authorities concerned -

- (a) there should be increased cooperation between Hong Kong and Guangdong Province in implementing strategic plans for water pollution control;
- (b) since many enterprises in Guangdong Province were owned by Hong Kong businessmen, they should make joint efforts with the Guangdong Environmental Protection Bureau to put in place cleaner production methods to reduce the industrial pollution in Pearl River Delta; and
- (c) it would be helpful if Hong Kong could provide technical and financial support to the Guangdong Province for water pollution control in Pearl River Delta.

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52. Miss Emily LAU referred to paragraph 34 of the IRP's Report and requested IRP to further elaborate its views on the seriousness of the water pollution problem in the Pearl River Delta and its impact on Hong Kong waters. She expressed concern as to whether efforts made to improve the quality of Hong Kong waters would be futile if the water pollution problem in the Pearl River Delta was not improved.

53. Professor QIAN Yi responded that the water pollution problem in the Pearl River Delta had very limited influence on the water quality of the Victoria Harbour. However, the water pollution problem in the Pearl River Delta would have greater impact on the outshore waters of Hong Kong. She considered that the best way was to enhance cooperation between Hong Kong and the Guangdong Province to control the water pollution problem simultaneously. In this connection, she noted that discussion between both sides had already started.

54. In response to Miss Emily LAU's further question, Professor QIAN said that the influence of the waters of the Pearl River on Hong Kong waters was not as serious as generally thought, possibly due to the effects of ocean currents. She pointed out that the deterioration of the water quality of the Victoria Harbour was mainly caused by local pollution. As this was a complicated issue, Professor QIAN suggested that a study be conducted to examine the impact of water pollution in the Pearl River Delta on Hong Kong waters.

*Viability of the IRP recommendations*

55. Noting that some members of IRP were actually former IRP members, Mr LAU Ping-cheung asked whether the Administration would consider appointing a third party of consultants to check on the design recommended by IRP to ensure that these were the best options for Hong Kong.

56. Professor HARLEMAN responded that IRP's recommendations were based on the known technology in 2000 and new information that was not available a few years ago. He was confident that the recommendations were valid and viable solutions for Hong Kong. Dr KOENIG added that Hong Kong should not further delay cleaning up its harbour and surrounding waters in the hope for better solutions in the future. He said that the BAF was state-of-the-art technology.

57. DS(EF) assured members that the Administration would conduct studies on the pilot plant tests of BAF technology at SCI as recommended by IRP to confirm its effectiveness before proceeding further. The Chairman also pointed out that the purpose of appointing a new IRP was exactly to provide a second opinion on the viability of SSDS. To ensure objectivity of the new IRP, he said that the Administration had appointed new members of high international standing in different fields to provide a more balanced view on the future direction of SSDS.

Action

Conclusion

58. On behalf of the Panel, the Chairman thanked IRP members for their independent and comprehensive review of the SSDS. He said that the IRP's report had provided valuable information for the public to re-think on the future direction of SSDS. He requested the Administration to provide a response to the IRP's report after studying the Report of IRP in detail, for discussion at a future meeting.

Adm

59. The meeting ended at 12:20 pm.

Legislative Council Secretariat

14 March 2001