For discussion
on 25 February 2002

Legislative Council
Panel on Environmental Affairs

Long Term Management of Low-Level Radioactive Waste

Purpose

This paper seeks Members' views on and support for the Government's plan regarding the long-term management of low-level radioactive waste (LLRW) in Hong Kong.

Background

2. Currently, 55 cubic metres of LLRW are stored in a disused air-raid tunnel at Queen's Road East. The wastes, mostly generated in the 1960s and 1970s, have very low level of radioactivity and are properly packaged in accordance with international safety standards. The Government has also been closely monitoring the radiation levels in the vicinity of the tunnel and found that they are within the normal background radiation levels of Hong Kong. While the LLRW does not pose any danger or health hazards to the neighbourhood, the Government considers that in the long run, the LLRW should be stored at a purpose-built facility as the tunnel was not built for storing LLRW.

3. After a thorough site search, the Government planned in the 1990s to build a long-term storage facility for LLRW at Siu A Chau (SAC). SAC is an uninhabited island southwest of Lantau Island, with an area of about 70 hectares. The proposed facility would occupy a site of about 0.6 hectares, and would have an initial storage capacity of 70 cubic metres of LLRW. With minor modifications, the capacity can be easily expanded to 140 cubic metres to accommodate not only the existing LLRW but future LLRW[1] arising in the next 100 years.

[1] Records in recent years indicate that an average of 0.3 cubic metres of LLRW is generated each year, mostly from medical, educational and research institutions.

4. The then Legislative Council (LegCo) Panel on Environmental Affairs and the then Islands District Board were consulted in 1995 and both supported the construction of the SAC facility. The Advisory Council on the Environment (ACE) also endorsed the Environmental Impact and Safety Assessment study report for the proposed facility in 1995. Tenders for the LLRW storage facility were invited in 1995 but was cancelled in 1997 as the tender price of the only valid bid far exceeded the Government's estimate at that time. The then Provisional LegCo subsequently suggested that the Government should explore the option of transferring the LLRW to a Mainland facility (the Mainland option).

Revised Proposal for the Siu A Chau Option

5. While exploring the Mainland option, we also reviewed the contract specifications for the SAC option. By removing items not essential for the storage function, we have revised the estimate of the capital cost to around HK$ 89 million at September 2001 prices. We expect that the facility would be operated by a specialist contractor under a Design-Build-Operate contract. The estimated annual recurrent cost for operating the facility is HK$ 2.8 million.

The Mainland Option

6. As requested by the then Provisional LegCo, we started to explore the feasibility of the Mainland option in 1998. After examining the nature of our LLRW and facilities in the Mainland, the Guangdong City Radioactive Waste Storage Facility (GD City Facility) was identified as the appropriate reception facility for storing our LLRW.

7. The GD City Facility was commissioned in December 2001. It is located in Beilong, about 4 km northeast of the Guangdong Nuclear Power Station in Daya Bay. It has a storage capacity of 600 cubic metres, and is used for storing municipal LLRW generated from the province. According to the Guangdong Environmental Protection Bureau (GDEPB), the Mainland option would cost RMB¥ 316 million (approximately HK$ 298 million) which covers cross-boundary

transportation from Wanchai to the GD City Facility, storage and ultimate disposal of our existing LLRW. GDEPB has also agreed to accept our future LLRW for storage and disposal but the associated costs have to be determined when such a need arises.

Comparison

8. Having examined the technical and operational details, we consider that both the SAC and the Mainland options are feasible and are in compliance with the international standards for such facilities. A summary of the technical considerations is at Annex. A comparison between the two options is as follows :

(a) Flexibility

Compared with the Mainland option, having our own long-term storage facility at SAC would allow the Government more flexibility and enable us to respond more readily in managing our future LLRW. As for the Mainland option, we have to agree with the GDPEB the associated costs for storage and disposal of our future LLRW when such a need arises.

(b) Cost

The SAC option is less costly. The Mainland option would cost approximately HK$ 298 million for storage plus ultimate disposal of the existing LLRW. We are aware that the cost of the two options cannot be compared directly as they have very different basis. To facilitate a like-to-like comparison, we have adjusted the cost of the SAC option using the same timeframe for calculating the storage fee and the same ultimate disposal cost of the Mainland option. This would result in the SAC option costing HK$ 212 million for handling the existing LLRW i.e. HK$ 86 million less than the Mainland option. In addition, the SAC option will be able to take care of our future LLRW with minimal additional cost.

Furthermore, under the Mainland option, the cost would be a lump sum payment. This removes the possibility of any future cost reduction through efficiency gains or technological advancement in

handling LLRW. The SAC option involves a recurrent operation cost, which will be settled on a monthly basis and may be adjusted to reflect future changes in technologies in handling LLRW. The upfront cost of the Mainland option to the Government would also be much higher i.e. HK$ 298 million vis-a-vis HK$ 89 million for the SAC option.

(c) Ultimate Disposal

The Mainland option would take care of both the storage and ultimate disposal of our LLRW. The SAC facility is only a long-term storage facility. Like many other economies, we would need to consider in future the question of ultimate disposal, taking into account the latest technological developments and international practices.

(d) Time

The Mainland option should enable us to relocate our existing LLRW earlier than the SAC option as the GD City Facility is already in operation. The GDEPB estimated that it might take roughly nine months to seek the necessary approvals and coordinate logistical arrangements to effect the Mainland option assuming that everything would proceed smoothly. The SAC option would require a longer lead time of around 26 months, as relocation could only take place after completion of the construction of a new facility at a remote island.

Recommendation

9. We consider that the SAC option would better meet our needs as a purpose-built facility within Hong Kong would offer us more flexibility and enable us to respond more readily in our long-term management of LLRW. These would outweigh the benefit of the Mainland option which would allow us to relocate the existing LLRW earlier. Both the total cost and the upfront cost of the SAC option would also be lower. While the SAC option does not provide ultimate disposal of LLRW, it should be noted that most economies are currently building long-term facilities to store their LLRW pending the

development of ultimate disposal methods. Taking into account all these factors, we recommend construction of a purpose-built LLRW storage facility at SAC.

Way Forward

10. To expedite completion of the SAC facility for early relocation of the LLRW, we plan to initiate the tender exercise as soon as possible. Subject to the tendering outcome fully meeting the Government's requirements, we will then invite the Public Works Subcommittee and the Finance Committee to consider the relevant funding application. We expect the SAC facility to be commissioned around mid 2004.

11. We will soon brief the Wanchai District Council, Islands District Council, ACE and the Hong Kong Radiation Board on our recommendation.

Environmental Implications

12. The Environmental Impact and Safety Assessment study on the proposed SAC facility, completed in 1995, concluded that there would not be unacceptable impacts. The ACE has endorsed the study in 1995. All findings and recommendations will be incorporated in the tender specifications.

Advice Sought

13. Members are invited to comment on the proposal above.

Environment & Food Bureau
February 2002

Annex

Summary of the Technical Considerations

Technical considerations	Main-land option	Siu A Chau option	Remarks
Regulatory Control	✓	✓	- There are comprehensive regulatory control regime on the management of LLRW in both places; - Both control regimes are in line with the recommended principles of the International Atomic Energy Agency, International Commission on Radiological Protection and other international authorities.
General design Features	✓	✓	- Both facilities are or will be designed up to the standards required by the respective authorities.
Site Selection	✓	✓	- Both sites have gone through careful and vigorous selection processes.
Environmental Impact and Safety Assessment (EISA)	✓	✓	- Mainland experts have conducted an EISA for the facility adjacent to GD City Facility and built for handling low to medium-level wastes from the Guangdong Nuclear Power Station. The EISA concluded that it would not cause unacceptable impacts. GDEPB considered that the assessment results should apply to the GD City Facility. The facility has been checked and accepted by the SEPA. - SEPA has instructed that a specific EISA would need to be conducted to confirm whether there will be additional impacts caused by the transfer operation. - The EISA of the proposed Siu A Chau facility concluded that it would not cause any unacceptable impacts to HK.
Operation and Management	✓	✓	- Operational manuals/plans of both options cover the technical details necessary for a purpose-built waste storage facility.
Environmental Monitoring	✓	✓	- There are specific environmental monitoring programmes in both options. - GDEPB would provide regular monitoring reports to HK if the Mainland option is selected.
Collection and transportation	✓	✓	- Licensed collectors would be responsible for the collection and transportation of wastes under both options.
Radiological Safety	✓	✓	- Safety measures under both options are in line with the guidelines set out by the International Atomic Energy Agency, International Commission on Radiological Protection, World Health Organization and International Labour Organization.

Note: ✓ stands for acceptable.