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Panel on Security

**Background brief prepared by the Legislative Council Secretariat
for the meeting on 4 July 2012**

Daya Bay Contingency Plan

Purpose

This paper summarizes past discussions of the Panel on Security ("the Panel") on the Daya Bay Contingency Plan ("DBCP") in the event of a nuclear incident at Daya Bay Nuclear Power Station ("DBNPS") and provides information on the conduct of DBCP Exercise 2012.

Background

Daya Bay Nuclear Power Station

2. DBNPS, which comprises Guangdong Nuclear Power Station ("GNPS") and Lingao Nuclear Power Station ("LNPS"), is located at Daya Bay about 50 km north-east of the Hong Kong city centre. GNPS and LNPS commenced operation in 1994 and 2000 respectively.

3. GNPS comprises two French-designed pressurized water reactors. Each reactor is protected by three barriers to prevent the release of radioactive material from the core. The design of the pressurized water reactors at LNPS is similar to those at GNPS. The International Atomic Energy Agency ("IAEA"), established under the auspices of the United Nations, conducted safety reviews on GNPS both before and after it commenced operation to confirm that the nuclear station would be operated in strict compliance with international safety standards.

International Nuclear Event Scale

4. The International Nuclear Event Scale ("INES") was drawn up by IAEA as an internationally recognized standard for facilitating better understanding by the public, media and the nuclear industry of the degree of significance of nuclear-related events. Under INES, international nuclear events are classified from Level 0 to Level 7. Any event that comes within the classification of INES is considered a Licensing Operational Event. Level 0 is known as "below scale" event, which implies that the event has no safety significance. Levels 1 to 3 events are regarded as "incidents", which have very little or no impact on the environment. Levels 4 to 7 are regarded as "accidents", representing various degrees of radiological impact. All incidents and accidents have to be verified, reported, analyzed and rectified so as to prevent any recurrence in the future. Events falling outside the classification of INES are matters which do not have any relevance to safety. The INES classification takes into account many factors, including any degradation of safety protection measures, integrity of radiological barriers and control devices, as well as impact on the public and the environment.

Deliberations of the Panel

5. Issues relating to DBCP were discussed at the Panel meetings on 19 March, 7 June and 6 December 2011 and 3 April 2012.

Review of DBCP

6. The Panel noted that after the Fukushima Daiichi nuclear power plant accident ("Fukushima incident") in March 2011, the Administration was conducting a review on DBCP. The review covered various aspects, including its application, the latest international nuclear safety standards and contingency measures, the notification mechanism for nuclear incidents, radiation monitoring assessment in Hong Kong, contingency preparations, and measures and actions to be taken upon activation of the contingency plan.

7. Members pointed out that comprehensive tests on DBCP were conducted in November 1990, May 1993, December 1996 and February 2001 under the observation of IAEA or other international experts. However, such tests on DBCP had not been conducted since February 2001. As the next comprehensive test would not be held until 2012, members called on the Administration to advance the test to 2011.

8. According to the Administration, the Security Bureau had set up a dedicated team to steer and coordinate efforts across the Government for reviewing DBCP and interfacing with departmental efforts. Reference would be made to the latest international practice as published by IAEA and other international organizations. It was expected that the review of DBCP would be completed by end of 2011 and a large-scale and comprehensive inter-departmental exercise would be conducted in early 2012 in the light of the revised contingency plan to test the preparedness and response capability of various departments.

9. Noting that the Japanese authorities had expanded full countermeasures from areas within a zone of 20 km radius around the Fukushima Daiichi nuclear power station to those within a zone of 30 km radius from the nuclear power station, members sought information on whether the Administration would consider adopting similar measures in Hong Kong and enlarging the area to those within a zone of 30 km radius from Daya Bay.

10. According to the Administration, it was reviewing the coverage of full countermeasures around DBNPS. In Hong Kong, Ping Chau fell within the zone of 20 km radius from DBNPS, whereas Tai Long Wan, High Island Reservoir, Grass Island, Hoi Ha, Lai Chi Wo and Wong Shek Pier fell within the zone of 30 km, and the population involved was approximately 1 000. The Administration would closely monitor the development in the Ministerial Conference on Nuclear Safety to be held by IAEA from 20 to 24 June 2011. The Conference was aimed at making a preliminary assessment of the Fukushima incident, identifying areas of global nuclear safety framework for review and identifying possible future actions.

11. Members sought information on whether members of the public were made aware of the existing DBCP and whether the Administration would consider launching future exercises involving participation of members of the public on a regular basis.

12. The Administration advised members that DBCP had been uploaded onto the home page of the Security Bureau. In the past, only the few residents of Ping Chau were covered in the evacuation arrangements and they were not involved in past exercises. The Administration would suitably involve relevant members of public in the exercise to be carried out in early 2012, assess the outcome for further review and set out the direction for carrying out future exercises, including the frequency and the extent of public participation in future exercises.

13. Concern was raised over the situation in Hong Kong that unlike other places, Hong Kong residents had nowhere to evacuate in the event of a nuclear accident at DBNPS. Query was also raised as to whether the Administration could draw useful reference from foreign countries where residents could evacuate to other places of those countries when revising DBCP. According to the Administration, it would have regard to the particular circumstances of Hong Kong when reviewing DBCP.

14. There was a suggestion that DBCP should cover the entire territory of Hong Kong regardless of the distance from DBNPS. As it was an international practice to adopt countermeasures against ingestion of contaminated food, water or milk within a zone of 20 km to 50 km from the nuclear power station, the revised DBCP should focus more on education of the public on the ingestion countermeasures rather than evacuation. The Administration advised members that DBCP covered the entire territory of Hong Kong and appropriate enhancements would be considered in the review.

15. Members noted that officers from the Security Bureau and other relevant government departments joined the Chinese delegation as members to attend the Ministerial Conference on Nuclear Safety organized by IAEA in Vienna from 20 to 24 June 2011. In the light of the Fukushima incident, IAEA called for Member States' universal application of the IAEA Safety Standards as international benchmark for protecting people and the environment from harmful effects of radiation. Relevant safety standards, in particular those pertaining to multiple severe hazards and effective preparedness, should be reviewed and strengthened. At the General Conference of IAEA held in September 2011, an Action Plan on Nuclear Safety was endorsed, which set out, among other things, the requirement to review and strengthen IAEA safety standards and improve their implementation.

Framework proposals to enhance DBCP

16. Concern was raised over the findings and enhancement proposals of the comprehensive review of DBCP, in particular the maintenance of a 20 km radius for Emergency Planning Zone ("EPZ")¹ following the Fukushima incident. According to the Administration, the prevailing 20km-EPZ1 arrangement in DBCP had been critically reviewed with renewed and up-to-date risk considerations and parameters in the ongoing review exercise. The detailed pre-planning of protective actions to a reasonable extent would provide a useful basis in expanding the scope to handle an accident with wider implications if happened. Noting that it would only involve an addition of some 1 000 residents if a 30 km radius for EPZ1 was to be adopted, members

urged the Administration to seriously re-consider the area of the coverage of EPZ1.

17. Members expressed concern about the communication with the Mainland authorities regarding the evacuation plan for people in Hong Kong in case of a nuclear emergency and whether there was an urgent evacuation plan for pregnant women, new born babies and their parents. Members were advised of the communication between the Administration and the Mainland authorities about the notification system but not the evacuation plan. In accordance with IAEA's generic criteria, there was no difference of the evacuation plan for adults and that for pregnant women and new born babies and their parents.

18. Information was sought on the ingestion pathway countermeasures for food and water in case of a nuclear emergency. According to the Administration, a range of 85 km covering the whole territory of Hong Kong had been set as EPZ2 with controls over food, live food animals and water imported from areas close to DBNPS, locally produced or supplied. Agreement had been made with the Mainland authorities to implement protective measures for export of food produced within 50 km of DBNPS to Hong Kong so as to guarantee food safety. Regarding the concern over food supply, members were advised that while the Mainland was the most important food source for Hong Kong, especially the fresh food items, only a small proportion of food imported from places in the vicinity of DBNPS. Members were assured that in the unlikely event of a nuclear incident, there would be sufficient and stable supply of live and fresh food to Hong Kong.

19. Concern was also raised as to whether nuclear energy would continue to be used upon the expiry of the service life of the nuclear power stations at Daya Bay. According to the Administration, a review would be conducted on the kinds of energy to be used in Hong Kong with reference to international standards and those of other countries which were being reviewed following the Fukushima incident.

Water supply to Hong Kong

20. Noting that the source of water in Hong Kong mainly came from Dongjiang (ranging from 70% to 80%) and rainwater collected from catchments in Hong Kong (ranging from 20% to 30%), members expressed concern about the supply of water to Hong Kong and the possible contamination of all sources of water in the event of a nuclear accident at DBNPS. There was a possibility that in case of raining, the wind would carry the plume over the Shenzhen Reservoir (through which water from Dongjiang would be delivered to Hong

Kong), the High Island Reservoir and the Plover Cove Reservoir and the depositing of the radioactive substances in these reservoirs would result in contamination of all sources of water supply to Hong Kong.

21. According to the Administration, given the different geographic locations of Dongjiang, the High Island Reservoir and the Plover Cove Reservoir and the specific requirements of the meteorological conditions, it would be impossible that these main sources of water would be contaminated at the same time. The radiation level of Dongjiang water was in effect closely monitored by the relevant Mainland authorities. According to the Consultancy Report of United Kingdom Atomic Energy Authority, the effects on water supply to Hong Kong would be minimal even in the event of a serious nuclear accident at DBNPS. As the water treatment plants in Hong Kong had the capacity to reduce the radiation level in water, the contamination of water in the High Island Reservoir and the Plover Cove Reservoir would not exceed the radiation control standard. Water after treatment would be safe for consumption.

Assessment of accident consequence

22. Members noted with concern that the Administration had made use of an Accident Consequence Assessment System to assess and simulate the results of the possible radiological consequence of a "S3" type accident occurred at DBNPS with the least amount of release of radioactive materials whereas the contingency plans of some other countries were based on the most serious "S1" type. Queries were raised about the considerations given to using "S3" source term instead of "S1" source term as the basis for DBCP. Some members were of the view that the basis of DBCP should be changed from "S3" source term to "S1" source term so as to address the concerns of members of the public.

23. According to the Administration, DBNPS were French-designed nuclear power stations with very strong containment structure of the pressurized water reactors. As the local monitoring agencies in France had studied the different scenarios of "S1" to "S3" and had given considerations to the type of reactors and the countermeasures required before working out the contingency plan on the basis of "S3" source term, DBCP was also based on "S3" source term. It was believed that the chance of "S1" type accident was very slim. Also, the filtering system inside the pressurized water reactors was able to reduce the "S1" type accident to "S3" type. Experts from France had paid a visit to DBNPS and they were of the view that the countermeasures based on "S3" scenario were practicable.

24. In response to members' enquiries about the resources implications for the contingency plan on the basis of "S1" type accident, the Administration provided the different technical backgrounds and the specific concepts behind the three scenarios. The Administration stressed that consideration should be given to the scientific justifications rather than the financial implications in adopting "S1" source term as the basis for the assessment of accident consequence.

DBCP Exercise 2012

25. At the Panel meeting held on 3 April 2012, the Administration informed members that it was preparing for the inter-departmental exercise with a view to test the response and capabilities of the bureaux and departments involved in the event of a serious off-site accident at DBNPS.

26. The DBCP Exercise 2012 was conducted on 26 and 27 April 2012. The programme for observers is in **Appendix I**. Some members had joined the programme or visited the Exercise Control Centre in the Security Bureau to observe the exercise operation.

27. The Administration will brief the Panel on its review of the DBCP Exercise 2012 at the Panel meeting on 4 July 2012.

Relevant papers

28. A list of the relevant papers on the Legislative Council website is in **Appendix II**.

**Daya Bay Contingency Plan
Exercise 2012**

Programme for Observers

| Time | Location | Activity |
|---------------------------------|---|---|
| 26 April 2012 (Thursday) | | |
| 0900 | Public Entrance, Central Government Offices, Tamar | Visitor registration |
| 0915 – 1030 | Security Bureau, 8/F, East Wing, Central Government Offices | To observe the operation of the Exercise Control Centre and Emergency Monitoring and Support Centre |
| 1230 – 1330 | Tung Ping Chau | To observe the evacuation of residents and visitors on Tung Ping Chau |
| 1430 – 1500 | Ma Liu Shui Public Pier | To observe the discharge arrangements for evacuees, including radiation scanning and decontamination arrangements. |
| 1615 – 1745 | Hong Kong Observatory | To observe the operation of the Monitoring and Assessment Centre |
| 1830 – 1900 | Security Bureau, 8/F, East Wing, Central Government Offices | To update the exercise progress |
| 27 April 2012 (Friday) | | |
| 0845 | Public Entrance, Central Government Offices, Tamar | Assembly for transport |
| 1000 – 1100 | Man Kam To Food Control Office | To observe the radiation monitoring of food and live food animals imported from the Mainland |
| 1315 – 1400 | Man Kam To Boundary Control Point | To observe the operation of health desk for inbound travellers and the radiation monitoring of inbound vehicles and goods |
| 1500 – 1800 | Security Bureau, 8/F, East Wing, Central Government Offices | To update the exercise progress and observe a simulated press conference |

Note 1: Transport and lunches will be arranged for the programme.

Note 2: For those who cannot join the programme, they may visit the Exercise Control Centre in Security Bureau by appointment on 26 and 27 April to observe the exercise operation.

**Relevant papers on
Daya Bay Contingency Plan**

| Committee | Date of meeting | Paper |
|---------------------|------------------------|--|
| Legislative Council | 27.10.1999 | Official Record of Proceedings (Question 12) |
| | 30.6.2010 | Official Record of Proceedings (Question 1) |
| | 7.7.2010 | Official Record of Proceedings (Question 9) |
| Panel on Security | 16.11.2010 (Item I) | Agenda Minutes |
| Legislative Council | 16.3.2011 | Official Record of Proceedings (Urgent Questions 1, 2 and 3) |
| Panel on Security | 19.3.2011 (Item I) | Agenda Minutes |
| Legislative Council | 30.3.2011 | Motion on "Concern about the impact of the earthquake in Japan on Hong Kong" |
| Panel on Security | 7.6.2011 (Item V) | Agenda Minutes |
| | 6.12.2011 (Item VI) | Agenda |
| | 3.4.2012 (Item V) | Agenda |