For information 6 March 2012

Legislative Council Panel on Security Daya Bay Contingency Plan and Exercise Preparation

Background

With a view to protecting the health and safety of the people of Hong Kong, the Government has drawn up the Daya Bay Contingency Plan (DBCP) to provide for the emergency measures to be taken in Hong Kong in the unlikely event of an accident at the nuclear power stations at Daya Bay which results in the release of radioactive material off-site. Following the nuclear accident in Fukushima, Japan in 2011, the HKSAR Government has launched a comprehensive review on the DBCP to ensure that it progresses with time and continue to provide sufficient and adequate protection to the Hong Kong population. Following the report to Members on 6 December 2011 (*Annex 1*) which set out the review findings and enhancement proposals, we have revised the DBCP with due regard to Members' valuable views. We are also making preparations for conducting an exercise based on the revised DBCP to test the response and capabilities of the bureaux and departments (B&D) concerned.

Review Outcome

2. As reported to Members in November 2011, we have set up an Expert Advisory Panel¹ to tap the views of local experts in nuclear science and engineering, atmospheric science, radiation, medicine and related fields on the review of the DBCP and necessary enhancements. We have also taken into account the lessons learned from the Fukushima nuclear accident, and studied the prevailing standards set by international organisations such as the International Atomic Energy Agency (IAEA) and World Health Organisation (WHO), as well as the practices of advanced countries² including the United States, Canada, the United Kingdom and France in nuclear contingency planning.

3. The review has been completed. We have revised the DBCP on the basis of the proposed enhancements set out in the Panel paper at *Annex 1*. The full text of the revised DBCP (*Annex 2*) has been uploaded to a newly established dedicated website³. Salient points are set out below.

¹ The membership of the Expert Advisory Panel is at Annex A to LegCo paper CB(2)224/11-12(01).

² Annex C to LegCo paper CB(2)224/11-12(01).

³ The dedicated DBCP website (<u>www.dbcp.gov.hk</u>), used for public education in normal times, will provide onestop up-to-date information to the public during emergencies. It will also be a portal to other websites providing

Radiation Monitoring and Accident Consequence Assessment

4. Hong Kong Observatory (HKO) operates an environmental radiation monitoring programme to monitor the ambient environmental radiation level in Hong Kong, by analyzing different samples collected all over Hong Kong and operating real-time Radiation Monitoring Network. Water Supplies Department (WSD) runs two identical on-line water contamination monitoring systems to provide real-time monitoring of raw water imported from Guangdong Province and checks water samples collected from different sources, including local catchment, impounding reservoirs, water treatment works and consumer taps. Food and Environmental Hygiene Department (FEHD) collects samples from food, live food animals and poultry imported from the Mainland for radiation All such efforts will be enhanced in the event of a nuclear monitoring. emergency, including activation of special radiation monitoring arrangements, taking readings of ambient gamma dose-rate, collecting air particulates and radioiodine samples, etc. HKO will also make flexible use of the land mobile survey routes in coordination with the Aerial Radiation Monitoring System. То enhance the radiation monitoring work in Hong Kong, HKO has established two new radiation monitoring stations at Chek Lap Kok and Cape D'Aguilar for a more comprehensive coverage of the atmospheric radiation monitoring throughout the territory. In case of a nuclear emergency, the Government will enhance the radiation monitoring of marine water (to include public beaches and Fish Culture Zones).

5. Besides, HKO has put in place the Accident Consequence Assessment System to simulate and assess the possible radiological consequences of a release. This computer-based system can ingest latest meteorological information as well as information on the magnitude of the radiological release to model the transport and dispersion of the released radioactive materials and predict the radiation dose to the public in various parts of the territory. With the availability of appropriate information on the accident and source terms, the assessment could be made available within a couple of hours. To enhance its capabilities, HKO has upgraded its Accident Consequence Assessment System software adopting the latest technology and algorithm for deployment to cover nuclear accidents at Daya Bay as well as other places in the vicinity of Hong Kong.

Plume Countermeasures

6.

The current DBCP was prepared following a consultancy study

essential information, such as radiation monitoring data hosted by Hong Kong Observatory (including measurement results of air samples and the hourly-updated ambient gamma radiation dose rates), water quality and supply information hosted by WSD, food safety information hosted by FEHD, health information hosted by Department of Health, emergency information hosted by Guangdong and other Mainland authorities, and information hosted by international organisations such as IAEA and WHO.

undertaken by the United Kingdom Atomic Energy Authority (UKAEA) on risk assessment and contingency planning with reference to international standards and practices. The DBCP provides for the maximum range of 20 km from the nuclear power stations in Daya Bay as "Emergency Planning Zone (EPZ)1" (Ping Chau as the only landmass in Hong Kong within this zone) with possible evacuation, sheltering or use of thyroid blocking agents ⁴ as plume countermeasures. The Government has made detailed planning on implementation of necessary countermeasures in the zone.

7. We have critically reviewed the risk assessment set out in the UKAEA consultancy and considered new developments which might affect the level of risks of the nuclear power plants at Daya Bay⁵. There are no material or significant changes that justify a fundamental change of the original conclusion or the EPZ arrangements. In addition, we have made use of the next-generation Accident Consequence Assessment System to simulate the consequences of possible serious accidents at the nuclear power stations at Daya Bay⁶, and have taken into account the prevailing international standards⁷ and the practices of advanced countries⁸. The review confirmed that it is scientifically justified and appropriate to maintain a 20 km radius for EPZ1, which is in line with the prevailing IAEA standards and the best practices of advanced countries.

8. Members have enquired about the Administration's preparedness for possible evacuation up to a 30 km radius from Daya Bay. Indeed, other parts of the Government's Emergency Response System, such as the Natural Disaster Contingency Plan, could be made use of to support implementation of the DBCP. In case of a large-scale natural disaster, evacuation is one of the emergency response measures envisaged. Various evacuation operations have been conducted in previous accidents, including one involving some four thousand people owing to torrential rain and landslide in 1994, which far exceeds the number of residents within 30 km from Daya Bay in the area in Hong Kong.

Countermeasures on Food, Live Food Animals and Water

9. The DBCP provides for the range of 85 km as "EPZ2" (covering the

⁴ Radioactive iodine is among the most common fission products released in a nuclear accident. People in close vicinity to the accident site and emergency responders may be exposed to significant levels of radioactive iodine. Thyroid blocking agent, taken before the arrival of the plume or within a few hours of the arrival of the plume, can effectively block the thyroid gland's uptake of radioactive iodine and so reduce the risk of thyroid cancer.

⁵ Annex C to the Panel Paper at Annex 1

⁶ Annex D to the Panel Paper at Annex 1

⁷ The IAEA has maintained its recommendation for an Urgent Protective Zone (UPZ) to plan for evacuation, sheltering and use of thyroid blocking agents. The determination of the exact size is subject to site specific analysis of the risk and practical circumstances. The radius of the UPZ may fall somewhere within a range from 5 to 30 km. See Annex C to LegCo paper CB(2)224/11-12(01).

⁸ Twelve countries have adopted a UPZ ranging from 7 to 20 km (Hungary is an exception which adopts 30 km). Hong Kong's EPZ1 up to 20 km is in line with the most stringent requirements of most countries, and our EPZ2 up to 85km covers the whole of Hong Kong. See Annex C (Appendix) to LegCo paper CB(2)224/11-12(01).

whole territory of Hong Kong) with controls over food, live food animals and water imported from areas close to the nuclear power stations, locally produced or supplied.

10. In the unlikely event of a severe nuclear accident that affects Hong Kong, Agriculture, Fisheries and Conservation Department (AFCD) will monitor primary produce including fish, vegetables, livestock and poultry at farm and wholesale markets.

11. The Mainland is our important food source. Under the DBCP, cooperation arrangements have been made between Hong Kong and the Mainland. During an emergency, the Mainland authorities will monitor food produced within the "Ingestion EPZ", i.e. 50 km range from the nuclear power stations in Daya Bay to stop the export of contaminated food to Hong Kong. FEHD will conduct contamination checks for imported foodstuffs and live food animals at the points of entry, slaughterhouses, wholesale markets and retailers.

12. As regards water supply, WSD monitors incoming raw water through an automated system and samples raw and drinking water from different sources for radiation assessment. In case of an emergency and detection of a contamination, WSD will implement necessary countermeasures including rejection of contaminated water (e.g. temporary suspension of raw water imported from Guangdong Province), arrangement for water to be drawn off preferentially from non-contaminated or least contaminated sources, and adjustment of treatment processes to reduce radioactivity in treated water, etc.

13. In order to ensure that the food monitoring work complies with the international standards, FEHD has agreed with the Mainland authorities that both sides will use the most updated guideline level of the Codex Alimentarius Commission (CAC) under the Food and Agriculture Organisation / WHO in monitoring food export and import. During an emergency, FEHD, AFCD and WSD will publish and update the relevant surveillance results and information on their websites as well as the DBCP's dedicated website.

14. As a matter of fact, even though the Mainland is our most important source of food supply, only a very small proportion of food is imported from the Daya Bay area. After reviewing the supply situations, details are tabulated as follows -

Type of fresh food and live food animals	Produced locally	Imported from the Mainland (from an area within 50 km from the nuclear power stations at Daya Bay)	Imported from the Mainland (other areas)	Imported from overseas	
Vegetables (tonnes)	2.5%	18.9% 10	$71.6\%^{10}$	7%	
Live pigs (heads)	5.2%	4.3%	90.5%	0%	
Live cattle (heads)	0%	0%	100%	0%	
Live goats (heads)	0%	0%	100%	0%	
Live chicken (heads)	61.4%	5.3%	33.3%	0%	
Live freshwater fish (tonnes)	3.8%	$0\%^{10}$	$89.8\%^{10}$	6.4%	
Live marine fish (tonnes)	23.4%	11.5%		65.1%	
Milk, milk products and frozen confections (tonnes)	27%	12.5%		60.5%	

Sources of supply of fresh food and live food animals $(2010)^9$:

15. The proportion of live and fresh food imported from places within 50km remains small. In the unlikely event of a nuclear incident, there will still be sufficient and stable supply of live and fresh food to Hong Kong, and its impact on the overall food supply to Hong Kong will be minimal.

Boundary Control Measures

16. In the light of the lessons learned in the Fukushima incident 11 ,

⁹ The percentage of the local production and overseas imports of some food items has been adjusted in accordance with the latest statistics kept by AFCD and the latest available trade statistics for the year of 2010 released by the Census and Statistics Department respectively.

¹⁰ Estimation based on the distribution of sources as indicated in the accompanying documents of food consignments inspected at import level by the Centre for Food Safety.

¹¹ For the overall situation of the lessons learned from the Fukushima incident, please refer to paragraphs 10 to 18 of the paper at Annex 1. In particular, the Fukushima nuclear incident also demonstrates that in such a serious nuclear accident with a top rating of level 7 on the International Nuclear and Radiological Event Scale, the radiological risk posed by travellers and goods originating from Japan is minimal: (a) WHO advised that travellers returning from Japan who have come from the 20 km evacuation zone surrounding the Fukushima Daiichi Nuclear Power Plant and who have undergone proper screening and decontamination procedures, and travellers from all other areas, do not pose a radioactive health risk to others and do not require screening. There is also no need to screen goods coming from Japan. In addition, the International Civil Aviation Organization has advised that there is no health reason that would require checks of passengers emanating from Japan; (b) in response to worries of some local travellers who had been to the northeastern part of Japan, the Auxiliary Medical Service set up a Health Desk in Hong Kong's airport to provide service to those who volunteered themselves for radiation monitoring. No contamination case was found; and (c) Customs and Excise Department, in consultation with the Department of Health, selected cargoes imported from Japan for inspection, including pharmaceutical products, cosmetics and personal hygiene products, more for public assurance purposes. No contamination was found.

Department of Health (DH) has reviewed the public health risk arising from radiological contamination. According to professional advice of the international health authorities, unlike pathogens of infectious diseases, radiological contamination is usually not readily transferable. It will not multiply over time. On the contrary, it will reduce significantly over time and distance owing to radioactive decay and basic personal hygiene measures. It is very unlikely for persons and goods, even if they are directly contaminated at locations outside the nuclear stations, to "contaminate" or cause harm to others. Therefore, in general, a radiological contamination of a person is more of an individual health risk, rather than a public health risk affecting the general population.

17. Moreover, we reckon that the activation and proper implementation of the on-site and off-site contingency plans required of the nuclear plant operators and Mainland authorities will have prevented and mitigated to a large extent such radiological contamination, if any, through local evacuation, sheltering, decontamination, etc.

18. In sum, the public health risk due to inbound persons and goods should be minimal in general. This notwithstanding, we will institute comprehensive monitoring of air, marine water, drinking water, food and live food animals and conduct screening in the territory and at the points of entry, with details set out in Chapters 4 and 9 of the DBCP.

Assistance to Contaminated Persons

19. Although the above has explained that radiological contamination does not normally present public health risk per se, individuals may get worried that they might be contaminated by radioactive fallout. To address public anxiety and to avoid overloading public hospital facilities by all suspected cases, we have revised the provisions in the DBCP on the establishment of Monitoring Centres to provide quick radiation scanning and simple decontamination service. For example, in the unlikely event that evacuation at Ping Chau were carried out, Auxiliary Medical Service would set up a Monitoring Centre at the discharge point to provide screening service to the evacuees as well as decontamination and counseling services as necessary. If required, the Emergency Radiation Treatment Centres will operate in designated public hospitals to provide necessary treatment to persons referred by the Monitoring Centres.

Exercise Preparation

20. We are preparing for the inter-departmental exercise based on the revised DBCP. The ensuing paragraphs outline the preliminary arrangement.

Objectives and Scope

- 21. The objectives of the exercise are to -
 - test the response capability of B&D involved in the event of a serious off-site accident at the nuclear power stations at Daya Bay;
 - practise the command, control, planning, deployment and support organisations which would function during various stages when the DBCP is activated; and
 - test and practise the above in response to other emergencies or natural disasters that might possibly happen incidental to the off-site accident, based on the complementary support of the Emergency Response System.
- 22. The scope of the Exercise will cover the following areas in the DBCP -
 - notification and alerting procedures;
 - activation of the DBCP;
 - decision making and communication among B&D involved under the emergency response structure;
 - radiation monitoring and assessment;
 - countermeasures on plume exposure;
 - countermeasures on ingestion pathway exposure;
 - boundary control measures;
 - assistance to contaminated persons;
 - communication with the public and handling of panic; and
 - handling of media and public enquiries.

Exercise Nature

23. The exercise is primarily a command post exercise involving B&D which implement the DBCP when activated, allowing them to act and interact in response to a simulated accident and focusing on their coordination and cooperation. Appropriate parts of the exercise will involve field operations in a restricted environment focusing on the tasks and coordination of resources on the ground.

Exercise Scenario and Data

24. A hypothetical accident scenario will be developed containing all the events that will drive the exercise to achieve its objectives. In its nature, the scenario will need to test the judgment, knowledge and training of B&D involved in an off-site emergency that the DBCP prepares for.

25. Therefore, the scenario must be "serious" enough, and does not necessarily reflect the likelihood of the happening of such a simulated emergency. There will also be appropriate artificialities and assumptions to enable the scenario to run its course within the exercise constraints.

26. On the other hand, every effort will be made to achieve a high degree of realism and reasonableness to the extent possible. We will develop the exercise data in consultation with technical experts in relevant fields and professional staff in related departments. These may include plant condition data, on-site/off-site radiological data, meteorological data and any other societal and conventional input that would help to provide an off-site context and a realistic response environment (e.g. media enquiries, public reactions, public pressure, etc).

27. Naturally, the exercise scenario and details will need to be kept confidential in order to test the players to the full, but reasonable indications of the scope will be given for B&D to make necessary preparations.

Players

28. We estimate that over 30 B&D directly involved in implementing the DBCP will send officers to participate in the exercise, typically those who will -

- make decisions in implementing the DBCP (and those in support);
- man the various coordination and control centres;
- attend the various emergency committees;
- answer press and public enquiries; and
- take part in the field operations.

29. Although the exercise is intended to test out the Government's response capability, we also plan to invite relevant local resident bodies and volunteers to play an appropriate part, to enhance the realism and to test out certain procedures and arrangements. We also plan to invite the Hong Kong Nuclear Investment Company to take part in the exercise.

Simulation

30. There will be both planned and improvised simulations in the exercise to drive the events for playing out the exercise scenario. Simulators will be an integral part of the exercise control who will send and receive messages, keep the exercise on track and react realistically to responses from the players.

Evaluation

31. Umpires will be deployed to players' offices, emergency centres or field operation grounds to observe players' actions, give advice and evaluate the

actions taken. They are normally senior officers of the participating B&D, who are conversant with the formulation and review of the DBCP, experienced in past exercises, or play a leadership and/or expert role in the organisation.

32. We will invite observers from the Mainland and overseas to evaluate the performance of the players in the exercise and make recommendations for improvements. We will also invite local experts to participate as observers, for example those experts who have assisted in our review of the DBCP.

Timetable

33. The planning and organisation of the exercise are in full swing, including consultation with participating organisations and resident bodies. We hope to conduct the full-scale exercise in the next quarter.

Way Forward

34. We will assess the outcome of the exercise, identify lessons learned and make refinements to the revised DBCP as necessary. We will also set out the direction for carrying out future exercises on a regular basis.

35. Meanwhile, the IAEA and major countries that use nuclear energy have been taking proactive actions to enhance nuclear safety and emergency preparedness¹². We will closely monitor any new standard that may be promulgated by the IAEA, Mainland authorities and other advanced countries following their nuclear safety inspections and reviews, and update and strengthen different aspects of the DBCP to meet the latest national or international safety levels.

Security Bureau March 2012

¹² Relevant developments include: (a) The IAEA met in September 2011 and adopted an Action Plan on Nuclear Safety which includes a requirement to review and strengthen the IAEA Standards. Further meetings will be held in 2012 to review progress and sum up the experience of the Fukushima incident, including a Ministerial Conference to be held in December 2012 that would be co-hosted by Japan and the IAEA; (b) In Japan, the Investigation Committee on the Fukushima nuclear accident has issued an interim report which will be followed by a final report in summer 2012. A review of nuclear emergency planning by the nuclear regulatory authorities is underway; (c) Major nuclear energy user countries like the United States, Canada, the United Kingdom and France are all undertaking reviews of their respective emergency planning and nuclear plant regulations with results pending. They all agreed that it was necessary to ensure nuclear safety in the course of developing nuclear energy, and have taken proactive actions to strengthen measures on nuclear safety and emergency preparedness; and (d) the State Council has launched comprehensive safety inspections of all nuclear power stations on the Mainland. The inspections are expected to complete in 2012. All nuclear power plant operators are obliged to implement additional safety measures in full compliance with the new requirements resulting from the inspections.

Legislative Council Panel on Security Review Proposals of the Daya Bay Contingency Plan

Background

With the objective of mitigating the adverse effect of ionizing radiation and protecting people and the environment, contingency planning for nuclear emergencies has been well developed in the international community, as enshrined in the standards set by the International Atomic Energy Agency (IAEA) and other international organizations. Going from strength to strength, such standards are widely practised by countries in emergency preparedness and response. These international standards and practices, especially the precious experience gained by the local and international communities in responding to the Fukushima accident earlier this year, are the cornerstones for reviewing our contingency planning, subject to necessary adaptation for application in local circumstances.

2. This paper reports the main findings of the comprehensive review of the Daya Bay Contingency Plan (DBCP) and sets out a proposed framework for enhancement.

Review Findings

International Standards and Practices

3. Our examination of the international standards and practices (see *LC Paper No.* CB(2)2435/10-11(01) of July 2011 and *LC Paper No.* CB(2)224/11-12(01) of November 2011 for reference) has distilled a number of basic principles for nuclear contingency planning as generally accepted by the international community (see *Annex A*). The key is that nuclear emergency planning is to cover a range of reasonably foreseeable (including remote but conceivable) scenarios for prioritising deployment of defined resources and the planning details should be proportional to the degree of the risks assessed. Detailed preplanning 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.

4. Central to emergency preparedness is the concept of Emergency Planning Zones (EPZs) as defined areas around a nuclear facility for which detailed planning and preparations are made in advance to ensure that appropriate protective actions can be applied in a timely and predetermined manner to protect the general public in the event of a nuclear accident. The establishment of EPZs should follow international standards and practices, subject to a comprehensive risk assessment of the nuclear facility in question.

EPZs of Hong Kong

5. The DBCP was prepared following a consultancy study undertaken by the United Kingdom Atomic Energy Authority (UKAEA) on risk assessment and contingency planning with reference to international standards and practices. Based on the consultancy findings (summary at *Annex B*), the DBCP provides for the maximum range of 20 km from the nuclear power stations in Daya Bay as "Plume Exposure Pathway EPZ1" (Ping Chau as the only landmass in Hong Kong within this zone) with possible evacuation, sheltering or the use of stable iodine¹ as a precautionary measure, and also 85 km as "Ingestion Pathway EPZ2" (covering the whole territory of Hong Kong) with controls over food, livestock, and water imported from areas close to the nuclear facilities or locally produced or available.

6. We have critically reviewed the methodologies, assumptions, parameters, etc in the original consultancy assessment (the observations are set out in *Annex C*). There are no material or significant changes that would fundamentally affect the consultancy conclusion or the EPZ arrangements. One important prerequisite to note is that the State Council has launched comprehensive safety inspections² of all nuclear power stations on the Mainland. All nuclear power plant operators are obliged to implement additional safety measures in full compliance with the new requirements resulting from the inspections. The inspections are expected to complete in 2012 and we will closely follow up the implementation arrangement with the Daya Bay nuclear power plant operators.

7. In addition, we have made use of an Accident Consequence Assessment System (ACAS) (paragraphs 26 and 27 below) to simulate the consequences of possible serious accidents at nuclear power stations in Daya Bay, using two nominal source terms (i.e. the nature and amount of radioactive substances released in a nuclear incident) which would typically represent severe accidents involving a core meltdown followed by containment failure qualifying at ratings of Level 5 and Level 7 of the International Nuclear and Radiological

¹ Taking an appropriate amount of stable iodine tablets (a non-radioactive isotope of iodine) can saturate the iodine levels in the thyroid gland and reduce its uptake of radioactive iodine. To achieve the best results, stable iodine must be taken before or shortly after the inhalation of the radioactive iodine.

² The inspections are to identify any new risks perceived from lessons learned from the Fukushima and cover robustness of assessment of external events in site selection, assessment of plans and abilities for flood and seismic protection, effectiveness of quality assurance system, inspection of fire protection systems, prevention of incidents caused by multiple extreme natural events and remedial measures, assessment of complete loss of power including emergency power and contingency plans and availability for further stand-by power supply, preventive and remedial measures of severe accidents and appraisal of their robustness, and effectiveness of the emergency response system.

Event Scale (more details of the source terms, simulation parameters and results are provided at Annex D). The EPZ arrangements of the present DBCP are found appropriate.

8. We have also considered the prevailing international standards and practices of advanced countries³. The IAEA has maintained its recommendation for an Urgent Protective Zone (UPZ) within a range from 5 to 30 km to plan for evacuation, sheltering and distribution of stable iodine. The determination of the exact size is subject to site specific analysis of the risk and practical circumstances. Twelve countries⁴ we surveyed have adopted a UPZ ranging from 7 to 20 km⁵. Hong Kong's EPZ1 up to 20 km is in line with the most stringent requirements of most of the countries, and our EPZ2 up to 85km covers the whole of Hong Kong.

9. Given the above, we consider it appropriate to maintain the present EPZ arrangements in the DBCP. At the same time, we will closely monitor any new standard that may be promulgated by the IAEA, State Council and other advanced countries following their nuclear safety inspections and reviews (paragraph 6 above and paragraph 18 below), and update and strengthen different aspects of the DBCP to meet the national or international safety levels.

Lessons from Fukushima on Emergency Preparedness

10. The serious nuclear accident at the Fukushima Daiichi Nuclear Power Station in March 2011 has triggered immediate response actions of relevant international organizations such as the IAEA and the World Health Organization (WHO) in accordance with their respective mandates and responsibilities and a joint plan^{6} . Governments worldwide also implemented different measures. Hong Kong is no exception.

11. During the Fukushima accident, all relevant bureaux and departments monitored the developments, assessed possible impacts and implemented necessary response measures continuously in accordance with their respective mandates and responsibilities, with appropriate reference to different parts of the DBCP as applicable. This demonstrated a robust government response to achieve the fundamental objective of the DBCP, which is to protect

³ LC Paper No. CB(2) 224/11-12 (01) in Annex C.

⁴ Appendix to Annex C mentioned in footnote 3.

⁵ Hungary is an exception which adopts 30 km.

⁶ Joint Radiation Emergency Management Plan of the International Organizations, sponsored by European Commission, European Police Office, Food and Agriculture Organization of the United Nations, International Atomic Energy Agency, International Criminal Police Organization, International Maritime Organization, Nuclear Energy Agency of the Organisation for Economic Co-operation and Development, Pan American Health Organization, United Nations Environment Programme, United Nations Office for the Co-ordination of Humanitarian Affairs, United Nations Office for Outer Space Affairs, World Health Organization and World Meteorological Organization in co-operation with the International Civil Aviation Organization and United Nations Scientific Committee on the Effects of Atomic Radiation.

the health and safety of Hong Kong people. The overall effectiveness of the basic arrangements and response measures of the DBCP is confirmed. Nevertheless, we may pursue enhancements in various areas for better preparedness. Some pointers are suggested below.

12. As shown in the Fukushima accident, effective coordination within Government has proved essential during an emergency. Since Fukushima is far away from Hong Kong, the direct impact of the nuclear accident on Hong Kong was minimal. Despite this, enhanced radiation monitoring and full transparency of the monitoring results have proved essential to reassure the public of our emergency preparedness, the more so if any nuclear emergency occurs in future closer to home even if the impact might be minimal or small.

13. The accident saw diverse reactions of the community, with occasional circulation of unfounded rumours. There might be a general lack of understanding of radiation safety among some members of the public. Provision of timely, accurate and appropriate information and advice to the public during an emergency and enhancement of the general public education on nuclear safety protection issues in normal times are essential.

14. International organizations such as the IAEA and the WHO, given their respective mandates and responsibilities, monitored the accident development and provided information and advice. In addition to Japan, a few advanced countries also gave their advice and observations on the accident. Practical experiences demonstrate that during a nuclear incident, we need to pay close attention to the information and advice of the international community when considering necessary response arrangements in local practical circumstances. For example, whether or not it is necessary to enhance radiation monitoring, whether or not it is necessary to monitor food produced in the vicinity of the accident site to ensure food safety, and whether or not it is necessary to monitor incoming travellers or imported goods following any guidelines of the WHO and other international organizations.

15. The Fukushima accident demonstrates that a nuclear accident which occurred at a place outside Daya Bay might possibly affect Hong Kong to different extents, depending on the geographical location of the incident, the severity, and the association with Hong Kong in terms of supply of food and water, trade in goods, travel of persons, etc. We can enhance our contingency planning and suitably apply the DBCP to nuclear incidents outside Daya Bay. We will dedicate additional coverage to address this in revising the DBCP.

16. In overall terms, relevant bureaux and frontline departments have been reviewing all aspects relating to their roles and responsibilities in the DBCP and taking into account the experience gained from the Fukushima accident as well as the new developments and arrangements of the international community. 17. Although the Fukushima accident has yet to be fully settled, the IAEA and some countries using nuclear energy have been taking proactive actions to enhance nuclear safety and emergency preparedness. In May 2011, the IAEA issued a General Safety Guide on the dose criteria for protective actions in the event of a nuclear emergency⁷. The Department of Health is carefully considering its application in Hong Kong (see paragraph 33 below).

18. As mentioned in the information paper submitted to the Legislative Council in November 2011⁸, the IAEA Action Plan on Nuclear Safety adopted in September 2011 includes a requirement to review and strengthen the IAEA Standards⁹. IAEA has set up a Nuclear Safety Action Team to follow up on implementation of the Action Plan. The four countries using nuclear energy that we have visited, including the United States, Canada, the United Kingdom and France, are launching reviews of their emergency planning with results pending. While such actions should take time to run their respective courses and the outcomes will go beyond our review timeframe, we are committed to following through the developments and will examine whether we should take reference of such developments when further enhancing the DBCP at the next stage.

Framework Proposals to Enhance the DBCP

19. In the light of the above findings, we would like to propose a framework to enhance the DBCP to better prepare Hong Kong in the event of any nuclear emergency affecting us.

Emergency Response Structure

20. According to the existing DBCP, in a major nuclear accident, the Chief Executive's Working Group (CEWG) will be convened to give overall direction to the Government's response. In a lesser emergency, the Secretary for Security (S for S), advised by a Technical Working Group (TWG), is responsible for implementation of the DBCP.

21. The existing system (schematic structure at Annex E) is to facilitate

⁷ Criteria for Use in Preparedness and Response for a Nuclear or Radiological Emergency (GSG-2) is the most upto-date set of international reference that takes account of the experience gained from past nuclear emergencies. Published in 2011, it is jointly sponsored by the Food and Agriculture Organization of the United Nations ("FAO"), the IAEA, the International Labour Office, the Pan American Health Organization and the World Health Organization.

⁸ LC Paper No. CB(2)224/11-12(01).

⁹ The original text is "The Commission on Safety Standards and the IAEA Secretariat to review, and revise as necessary using the existing process in a more efficient manner, the relevant IAEA Safety Standards in a prioritised sequence." and "This review could include, inter alia, regulatory structure, emergency preparedness and response, nuclear safety and engineering (site selection and evaluation, assessment of extreme natural hazards including their combined effects, management of severe accidents, station blackout, loss of heat sink, accumulation of explosive gases, nuclear fuel behaviour and ways to ensure the safety of spent fuel storage)."

proper coordination of government efforts at all levels, drawing on expertise and support from all relevant professional and frontline departments. To ensure that each of the units implementing the DBCP will play out its proper role, we propose the following enhancements –

- Secretary for Food and Health, as the principal official responsible for the food safety and public health portfolios, should join the CEWG which will be renamed as the Steering Group (new membership at *Annex F*).
- The TWG should be responsible for implementing the DBCP and revamped into an Implementation Task Force (ITF) to support S for S in following up and implementing the directions of the Steering Group. The composition of the ITF should be expanded to cover all major professional departments and frontline operational departments (new membership at *Annex G*).

Radiation Monitoring

22. Hong Kong Observatory (HKO) operates an environmental radiation monitoring programme to monitor the ambient environmental radiation level in Hong Kong, by analyzing different samples collected all over Hong Kong and operating 10 real-time atmospheric monitoring stations (locations at Annex H). The Water Supplies Department (WSD) runs two identical on-line water contamination monitoring system to monitor real-time raw water imported from Guangdong Province and checks water samples collected from different sources, including local reservoirs, water treatment works and consumer taps. The Food and Environmental Hygiene Department (FEHD) samples food, livestock and poultry coming from the Mainland for radiation checking. All such efforts will be enhanced in the event of a nuclear emergency. For example, HKO may activate special radiation monitoring arrangements at 13 fire stations to take readings of ambient gamma dose-rate, collect air particulates and radioiodine samples and deploy an Aerial Radiation Monitoring System on board a helicopter and a mobile radiation survey team to two designated routes on the ground.

23. To enhance the above measures –

- HKO is working to establish two new radiation monitoring stations at Chek Lap Kok in the west and Cape D'Aguilar in the south for comprehensive coverage of the territory.
- HKO plans to discuss with the Macao Meteorological and Geophysical Bureau for mutual exchange of radiation monitoring data, in addition to the exchange arrangements already in place with the Mainland.
- HKO plans to recruit more suitable fire stations over the western part of the territory for radiation monitoring all over Hong Kong during emergencies.

- HKO may, to better complement the aerial radiological survey, implement a more flexible scheme to assign additional land radiation survey routes for ground contamination monitoring during emergencies, which will help identify any hotspot in the territory.
- Environmental Protection Department (EPD) and HKO may enhance the radiation monitoring of marine water as necessary in case of nuclear emergencies, including at public beaches and Fish Culture Zones.

Notification Arrangements

24. Apart from picking up radiation data from our own efforts in monitoring air, drinking water, food and different samples collected from the environment, we may be alerted to a possible nuclear incident affecting Hong Kong and provided with accident information through the following direct means –

- Notification by Guangdong (GD) authorities in accordance with the cooperation arrangements in an off-site emergency as mutually agreed by both sides. For Site Emergency and Off-site Emergency¹⁰ situations, GD authorities must notify Hong Kong as soon as possible, in any case within two hours from a report by the plant operator to the GD authorities. For Emergency Standby and Plant Emergency situations, GD authorities should issue a notification to Hong Kong in parallel with a notification to the IAEA.
- Notification by the IAEA. China is a signatory to the United Nations Convention on Early Notification of a Nuclear Accident and is obliged to notify the IAEA of any accident with possible offsite consequences.
- Notification by CLP Power Hong Kong Limited (CLP). According to the Electricity Ordinance, CLP is obliged to notify EMSD of a loss or impending loss of electricity supply from a power source outside Hong Kong, which may or may not be related to a nuclear accident.
- 25. To enhance the notification arrangements
 - We have been discussing with the GD authorities that even if an incident is minor in nature under the Emergency Standby and Plant Emergency situations, they should issue an early notification to Hong Kong within a specific timeframe.
 - We will keep in view the development on the IAEA front to benefit from any improvements in notification in due course. Under the IAEA Action Plan on Nuclear Safety endorsed in September 2011, the IAEA is set to provide Member States, international organizations and the

¹⁰ Higher two of the four categories for classifying nuclear plant emergencies. The other two categories are Emergency Standby and Plant Emergency, with impacts confined to within a nuclear power plant.

general public with timely, clear, factually correct, objective and easily understandable information during a nuclear emergency on its potential consequences, including analysis of available information and prognosis of possible scenarios based on evidence, scientific knowledge and the capabilities of Member States.

Accident Consequence Assessment

26. HKO will be the mainstay of Government in assessing accident consequences with support from DH and EMSD. HKO has put in place the ACAS to simulate and assess the radiological consequences of a release. This computer-based system can ingest latest meteorological information as well as information on the magnitude of the radiological release to model the transport and dispersion of the released radioactive materials and predicts the radiation dose to the public in various parts of the territory. The assessment, which could be available within hours, will serve as a useful basis for forward planning and pre-arrangement of appropriate protective actions when the accident is still in the early stage and evolving, and the actual off-site release might not yet have happened.

27. To enhance its capabilities, HKO has acquired an up-to-date sophisticated ACAS software adopting latest technology and algorithm for use in a nuclear accident at Daya Bay as well as in the vicinity of Hong Kong.

Public Information

28. According to the current DBCP, in case of a nuclear emergency at Daya Bay, the Director of Information Services will convene the Information Policy Committee to advise the CEWG (suggested to be renamed as the Steering Group) on the media strategy. As always, it is essential to provide timely, accurate information to the public in a bid to stem panic which might be caused by a radiological release (or even rumours of such), to advise members of the public what to do and what not to do, and to reassure the public and overseas communities. Apart from the traditional means of press releases and the mass media (TV and radio broadcast), we may make use of more channels to get our messages across to all sectors of the public.

29. We propose enhancements along the following lines –

 As illustrated in the Fukushima accident, daily press conferences with coordinated attendance of officials of responsible departments and outside experts (to provide technical support) have proved to be a most effective way to update members of the public (and overseas communities) of the latest situation of an evolving emergency with public concern.

- A dedicated website of the DBCP, to be developed and used for public education in normal times, will provide one-stop up-to-date information to the public during emergencies. It will also be a portal to other websites providing essential information, such as radiation monitoring data hosted by HKO (including measurement results of air samples and the hourly-updated ambient gamma radiation dose rates), food and water surveillance results hosted by FEHD and WSD, health information hosted by DH, emergency information hosted by GD and other Mainland authorities, and information hosted by international organisations such as the IAEA and the WHO.
- In urgent and truly justified situations, emergency information may be sent out in the form of an SMS message to some 14 million mobile phone accounts in Hong Kong with support from telecom operators.

Public Education

30. To enhance public education, we propose to produce television and radio Announcements in Public Interests, pamphlets, booklets and posters as well as to launch a thematic website, with a view to promoting knowledge on radiation safety and enhancing public awareness in protective measures to be taken in case of nuclear incidents.

31. In the meantime, Government also encourages the operators to outreach to the public and to enhance their operational transparency -

- CLP plans to set up a Nuclear Resources Centre at Kowloon Bay in 2012 to provide the public with educational materials on nuclear energy and nuclear safety. The Centre will also feature Government's emergency preparedness and response in the unlikely event of a nuclear incident at Daya Bay.
- As reported at the special meeting held on 17 January¹¹ 2011, the Daya Bay Nuclear Power Operations and Management Co. Ltd. would notify the public through its website within two working days of any non-emergency events (i.e. those classified at Level 0 and Level 1 as well as events at Level 2 or above but not involving emergency response) at Guangdong Daya Bay Nuclear Power Station once it is confirmed. The information to be disclosed would include a brief description of the event, the initial classification of the event and the initial assessment on the impact of the event on environment and public safety. With the further agreement of the China Guangdong Nuclear Power Holding Co. Ltd, the arrangement is also applicable to the Lingao Nuclear Power Station.

¹¹ LC Paper No. CB(2)767/10-11(01)

Intervention Levels

32. An important concept in emergency preparedness and response is Intervention Levels. When the radiation dose of the public is expected to reach the Intervention Levels, protective actions should be taken to avert it to protect public health and safety.

33. The Radiological Protection Advisory Group $(\text{RPAG})^{12}$ appointed by DH, at its recent meeting in late October, has reviewed the application of the latest safety guidelines promulgated by the IAEA in this regard (para.17 above) and made recommendations to the Director of Health (see *Annex I*). The Director of Health is considering the RPAG's recommendation and will give professional advice as soon as possible to enhance the DBCP. The generic criteria, based on the framework put up by the IAEA in its latest safety guidelines, are generally consistent with the earlier recommendations of the RPAG, but are more concise in terms of the dose levels for the purpose of implementation of protective actions and are more updated in terms of radiological protection principles.

Plume Exposure Pathway Countermeasures

34. The CEWG (or the Steering Group as renamed in future) may decide on the implementation of principal countermeasures against plume exposure which may include evacuation of the affected people, sheltering and taking stable iodine. Such measures are applicable within the 20-km EPZ1 from the nuclear power stations.

35. We propose the following enhancements –

• The CE's Steering Group, after taking into consideration DH's advice on the intervention levels and health impacts and HKO's assessment on the radiation dose, should as appropriate advise the general public to stay indoors where possible during the passage of a plume across the

¹² The term of reference of Radiological Protection Advisory Group (RPAG) are listed as follows:-

RPAG is required to advise the Director of Health on health matters relating to the radiological consequences that might eventuate from radioactive releases from nuclear facilities. In particular the Group is required to advise on:-(a) the development and subsequent review of 'Dose Models' designed for use in assessing the consequences

⁽a) the development and subsequent review of Dose Models designed for use in assessing the consequences for the public of any accidental radiation release to the environment;

⁽b) the dose limits that should apply to the Hong Kong population and in particular to individuals in certain critical groups;

⁽c) the criteria that should be used to interpret emergency environmental monitoring data;

and, without prejudice to any decision that may be taken by the Director of Health, during the intermediate and recovery phases, of any nuclear accident situation affecting Hong Kong to advise on:-

⁽a) the interpretation of environmental radiation monitoring data and their impact on the public;

⁽b) the countermeasures that should be adopted having regard to the widely applied principle that the risks should be reduced to a level which is as reasonably practicable.

territory, even if the projected dose is below the criteria for evacuation/sheltering. Generally speaking, the passage of a plume may last for a few hours or longer, depending on the meteorological conditions and the duration of the radiological release.

- DH should arrange for the strategic stockpiling, storage and management of a sufficient amount of stable iodine in the territory for use as thyroid blocking agents. The distribution and use of stable iodine are subject to the advice of the Director of Health at the time based on scientific evidence in practical circumstances.
- DH may draw up guidelines on the use of stable iodine in suitable circumstances and dosages, taking reference from the WHO's advice.

Monitoring of Persons within Hong Kong

36. If evacuated members of the public and incoming local travelers and visitors were contaminated, they might need to be subject to monitoring and decontamination. Where necessary, they should further receive medical treatment. In such cases, the current DBCP provides for -

- the setting up of Monitoring Centres (MCs) by Auxiliary Medical Services (AMS) at nine designated public swimming pools as necessary to carry out monitoring and decontamination (by showering) for persons in need.
- the setting up of MCs by Fire Services Department (FSD) at 10 designated fire stations for emergency responders, and
- the activation of two Decontamination Centres by the Hospital Authority at two public hospitals to provide treatment to people who are injured and contaminated and who are internally contaminated or radiologically injured.

37. We propose the following enhancements –

The removal of the outer clothing and use of damp cloth / adhesive tapes on skin may be able to remove some 90% of contamination¹³. This decontamination procedure will be performed in-situ (e.g. at boundary control points) for persons in need. Only those still found to be contaminated after the procedure may need to be sent to showering or treatment.

¹³ For details, please see "Guidelines for Mass Casualty Decontamination During a HAZMAT/Weapon of Mass Destruction Incident", US Army Chemical, Biological, Radiological and Nuclear School and U.S. Army Edgewood Chemical **Biological** Centre, December 2008 (http://hps.org/hsc/documents/MassCasualtyDeconGuideUpdateVol2.pdf) and "Procedures for Medical Emergencies Involving Radiation". Health Physics Society, August 2006 (https://hps.org/hsc/documents/HPS President Elect Poster.pdf).

- FSD has acquired mobile decontamination units with showering facilities and will deploy them to priority locations (discharge points for evacuees) to meet the need of both evacuated members of the public and emergency responders. This would reduce the need to transfer contaminated persons to swimming pools and fire stations, and mitigate other risks in this relation.
- With LCSD's support, Tung Chung Swimming Pool in Lantau will be additionally designated as one of the MCs to cover the airport at Chek Lap Kok.
- The treatment facilities at the two public hospitals will be renamed as "Emergency Radiation Treatment Centres" to better reflect their functions and to avoid confusion to the public.

Boundary Control Measures on Inbound Travelers and Goods

38. The current DBCP provides for detection and decontamination of radiologically contaminated persons, luggage, cargo and lorries showing up at land boundary control points with the Mainland. This is to provide appropriate treatment of persons in need, prevent entry of sources of contamination and reassure the public.

39. We propose the following enhancements –

- In considering the need for undertaking boundary control measures, the CE's Steering Group should prudently examine any guidance and recommendation given by relevant international bodies, the advice of bureaux and professional departments and the actual situation at the time.
- The detection and decontamination procedures may be implemented according to needs at respective land, air and sea boundary control points, as well as at points where goods (and mail) enter Hong Kong (e.g. Kwai Tsing Container Terminals), and may also apply as appropriate to conveyances entering Hong Kong.
- Relevant departments may make use of the latest technology and equipment to minimize intrusion to travelers, optimize manpower deployment and increase throughput. For example, in addition to handheld scanners, installation of new automated screening equipment like walk-through radiation monitoring portals at where traveler traffic is high may be considered. The feasibility of building radiation monitoring facilities may be considered as part of the customs infrastructure to be erected or upgraded in future.
- AMS may also join the monitoring and scanning duties.

Ingestion Pathway Countermeasures for Food and Water

40. The Mainland is our important food source, especially for fresh produce. A certain proportion of these Mainland imports may come from the Daya Bay area.

41. Under the current DBCP, cooperation arrangements have been made for the Mainland authorities to monitor food grown or produced within 50 km of the nuclear power stations at Daya Bay to stop the export of contaminated food to Hong Kong. FEHD will conduct contamination checks for imported foodstuffs, livestock and poultry at points of entry, slaughterhouses, wholesale markets and retailers. AFCD will monitor primary produce including fish, vegetables, livestock and poultry at farm and wholesale market levels. Indeed, the whole territory of Hong Kong falls within the ingestion pathway EPZ2 up to 85 km from the nuclear power stations at Daya Bay providing for such ingestion countermeasures.

42. As regards water supply, WSD monitors incoming raw water through an automated system and samples water from different sources, including impounding reservoirs, water treatment works and consumer taps for checking. In case of an emergency and detection of a contamination, WSD will implement necessary countermeasures including rejection of contaminated inflow, preferential water draw-off from non-contaminated or least contaminated sources, adjustment of treatment processes etc to reduce the radiation level in water, temporary suspension of raw water imported from Guangdong Province, water rationing, etc.

43. Over the Fukushima accident, FEHD detected certain contaminated food samples and implemented the corresponding banning of certain food items from Japan. This experience confirms the effectiveness of our monitoring system. We should distil good practices for reflection in the DBCP.

44. We anticipate certain enhancements as follows –

- FEHD has agreed with the Mainland authorities that both sides will use the most updated guideline level of the Codex Alimentarius Commission (CAC) under FAO/WHO in monitoring food export and import, instead of an old version quoted in the DBCP.
- During an emergency, FEHD, AFCD and WSD may publish and update the relevant surveillance information on their websites as well as the DBCP's.

Disposal of Radiologically Contaminated Waste

45. The current DBCP provides for procedures for disposing radiologically

contaminated waste from various possible sources including foodstuff and sludge at Water Treatment Works in accordance with the Waste Disposal Action Plan drawn up by EPD.

46. To enhance the arrangements, the procedures may extend to contaminated livestock as well as contaminated sludge at Sewage Treatment Works which are not currently covered.

Training and Protective Gear

47. Under the DBCP, HKO arranges specialist courses for Departmental Radiological Protection Officers (DRPO) and, as necessary, specialist courses on radiation monitoring and radiological protection for staff involved in the operation of the DBCP. Trained DRPOs will assist in drawing up the departmental contingency plan and advise departments on the application of the radiological protection principles and implementation of appropriate protective measures. The DBCP also provides for the carrying out of drills and exercises by bureaux and departments individually and collectively.

48. The protective gear and equipment used in the DBCP in different tiers have been reviewed and confirmed to be adequate for the purposes of various duties of operational staff in implementing the DBCP. Nevertheless, relevant departments will continue to pay attention to the latest technology and development of new equipment and acquire the most advanced equipment to enhance the detection and monitoring capabilities for radiologically contaminated persons, luggage, cargo and conveyances. For example, walk-through radiation monitoring portals may be used at boundary control points and more hand-held scanners may be acquired. FSD has also planned to acquire more mobile decontamination units with showering facilities.

49. We propose the following enhancements –

- HKO, with support from SB, DH, EMSD and others, may seek continuous improvements in the contents of the DRPO and specialist courses to tie in with the revised DBCP, follow the latest international standards and practices and take into account new developments in future.
- A major interdepartmental exercise focusing on the revised DBCP, with participation of members of public in relevant parts, is being planned for early next year. It should provide insights for enriching the training regime and setting out directions for future drills and exercises. At present stage, we recommend that major exercises as such should remain to be held on a triennial basis.
- We would explore the feasibility of holding a joint exercise with the nuclear plant operators towards the end of 2012, in order to follow up

with the results of the comprehensive safety inspections of all nuclear power stations on the Mainland as mandated by the State Council.

Application of the DBCP outside Daya Bay

50. Distance is the best radiation protection. The nearest nuclear power station in the Mainland beyond Daya Bay is over 130 km away¹⁴. The general assessment following international standards is that all these nuclear power stations outside Daya Bay carry a much smaller threat and the risk to Hong Kong is very low. Plume exposure is unlikely a concern, while we should be more guarded against possible sources of contamination brought by arrival of food, cargo and travelers.

51. Under such circumstances, responsible bureaux and departments will monitor the situation, assess the possible impacts and implement necessary measures according to their respective roles and authorities. The concerted efforts could be formally established on a firm footing in the contingency plan to ensure adequate protection of Hong Kong in case of another emergency affecting Hong Kong in the future.

52. We propose the following enhancements -

- While the DBCP will retain a primary focus on nuclear accidents at Daya Bay, it may be improved to also apply to other nuclear accidents if happened.
- We will dedicate additional coverage to address this in revising the DBCP.

Way Forward

53. Following the above framework proposals and in the light of views received, we plan to revise the DBCP by end 2011, and, on this basis, carry out a large-scale inter-departmental exercise early next year to test the preparedness and response capability of various departments.

54. We will assess the outcome of the exercise, refine the DBCP as necessary and set out the direction for carrying out future updates and exercises.

Security Bureau November 2011

¹⁴ An indicative map showing the locations of the nuclear power stations in East Asia is at **Annex J**.

Basic Principles of Nuclear Contingency Planning

- Contingency planning should accommodate all accidents that are reasonably foreseeable and be capable of being applied in case of less likely but potentially very severe accidents that are credible.
- Contingency planning should provide for all practical measures to mitigate any consequences for human life and health and the environment (keeping radiation exposure as low as reasonably achievable). Such countermeasures should be justified (doing more good than harm) and optimized (maximizing the net benefit), and ensure that no individual bears an unacceptable risk of harm.
- Contingency planning is meant to provide a basis and necessary details for prompt emergency response in the early and intermediate phases of an accident when time is of essence. In the nature of the recovery phase, time will be available to think through the appropriate measures with necessary consultations.
- Criteria are to be set in advance for use in determining when to take different countermeasures. The "Intervention Levels" should be determined by appropriate authorities on advice of experts and in a manner in good agreement with international standards and practices.
- Contingency planning should allow room for decision makers to take into account the actual situation and various local, social, economic, environmental, demographic, psychological and other factors for making a judgment in the implementation of countermeasures. A balance has to be struck between attributes relating to radiation protection based on necessity, and the public perception of the problem and what could be done to protect public health and safety as a matter of prudence.
- Members of the public must be kept fully posted of the development of an accident and government response in a transparent manner and be given accurate, appropriate and timely information. This is of paramount importance to ensure public assurance and maintain public confidence in the responsible authorities.

Annex B

Summary of the Consultancy Study Report by the United Kingdom Atomic Energy Authority

In late 1980s, the United Kingdom Atomic Energy Authority (UKAEA) was commissioned to undertake a consultancy study on the environmental aspects of the building of Guangdong Nuclear Power Station (GNPS) at Daya Bay, which produced two reports, one on risk assessment and the other on contingency planning.

2. The report on risk assessment followed a Probabilistic Safety Assessment methodology¹, adopting a conservative or so called pessimistic approach (e.g. no countermeasures taken in accidents) that would lead to a deliberate over-estimation of the risks of major releases from the plant².

3. Factored into the assessment was the defence-in-depth concept applied in the design and operation of GNPS to ensure a multi-tier nuclear safety system, with different levels of protection including multiple reactor protection systems, engineered safety features, emergency operating procedures, barriers to prevent release of radioactive materials, on-site and off-site emergency plans, etc. One important aspect is the redundant safety features of the pressurized water reactors (PWRs) of GNPS based on the French 900 MWe design. The 0.9 metre thick reinforced concrete containment building, together with the release filtration capability, is one of the most important barriers in keeping the radiological materials away from the public. The probability of a major off-site nuclear accident as a result of simultaneous occurrence of a severe reactor core meltdown (say, due to long duration of loss of reactor core coolant) and containment failure (say, due to an extensive rupture of the reactor pressure vessel and the concrete containment building) is assessed to be extremely remote³.

¹ Referencing NUREG 1150, a document of the United States Nuclear Commission entitled "Severe Accident Risks: An Assessment for Five U.S. Nuclear Power Plants".

 $^{^2}$ In this study, as is shown in the analysis of the consequences and risks of severe accidents, the pessimistic analysis did still lead to a demonstration that the risks to people in Hong Kong from severe accidents at the Guangdong plants were negligible in comparison with the normal risks of everyday life. Thus the more extensive best estimate studies were not necessary, although they could have been performed.

³ Other areas that the UKAEA risk assessment had looked into include reactor core meltdown together with other containment condition scenarios such as deliberate venting through filter to protect the containment and by-passing of the containment to the surroundings (say due to component failure). External hazards including various natural events like earthquakes, flooding and typhoons and man-made events like aircraft crash have also been examined.

4. The main conclusion was that the risks of early death and fatal cancer associated with nuclear accidents in Daya Bay were very small, indeed much lower than analogous risks encountered by Hong Kong people in everyday life, by an enormous margin (65,000 and 20,000 times respectively). See the table below:

Comparison of everyday risk	s of death	with those	arising f	from the l	Daya
Bay nuclear power station					

	Average individ	lual risk of death per annum	Approximately factor by		
Hazard	Everyday	Nuclear (Pessimistically assessed)	which the everyday risk exceeds the nuclear risk		
Accidental Death	$\frac{1.3}{10,000}$	<u>2.0</u> 1,000,000,000	65,000		
Fatal Cancer	$\frac{1.5}{1,000}$	<u>8.4</u> 100,000,000	20,000		

5. The other consultancy report focused on contingency planning for Hong Kong in the unlikely event of an off-site nuclear emergency. Its main result was that any design-basis accident at Daya Bay would not require plume countermeasures such as sheltering or evacuation. In the highly unlikely event of a beyond design basis accident, plume countermeasures might be desirable, particularly sheltering, in the northeastern sector of Hong Kong closer to the Daya Bay site. A reasonable consensus of international opinion about the size of the plume emergency planning zone (EPZ) typically up to 5km - 20km was noted.

New developments which might affect the level of risk assessments of nuclear power plants

Lingao Nuclear Power Station

Since the Daya Bay Contingency Plan (DBCP) was put in place, the Lingao Nuclear Power Station (LNPS) has come into operation in two phases in 2002/03 and 2010/11 respectively. Added to the original two Pressurized Water Reactors (PWRs) in the Guangdong Nuclear Power Station (GNPS) are four PWRs of similar but enhanced design in the LNPS, all originating from the same French model. The safety features of the later reactors are better than the original two¹. The assessment by the professional departments is that such an addition of four similar reactors to the original two (i.e. increase by a factor of two) should not have material significance to the original risk assessment as the margin of risk arising from the nuclear power plant operation was lower than the normal everyday risk in the order of tens of thousands of times.

Performance of the GNPS/LNPS

2. Unlike the GNPS which is a Mainland-Hong Kong joint venture with part of the output supplying Hong Kong, the LNPS is solely a Mainland investment and its output does not supply Hong Kong. Nevertheless, the operation of both the GNPS and the LNPS is vested under one roof in a joint venture management company owned by Hong Kong and the Mainland. The arrangement enables consistency in the operation of the two nuclear power stations and the sharing of best practice and precious experiences² in operation.

3. Over the years, the operational performance of the GNPS and LNPS is steady with robust safety records. Based on nine performance indicators in generation capacity, safety and reliability, radiation protection and industrial safety, operation of the two nuclear power stations compares very well to similar nuclear plants worldwide³ with good performance, with regular

¹ The LNPS Phase 1 (two reactors) adopts the same design as the GNPS, but with a number of design improvements and modifications, largely in the reliability of safety and conventional systems based on the operating experience of the GNPS. The LNPS Phase 2 (two reactors) is an improvement based on the LNPS Phase 1 (mainly in equipment fabrication and the reliability of safety and conventional systems based on the operating experience and design improvements at the GNPS and the LNPS Phase 1). The UKAEA report on risk assessment conservatively put the safety level of the GNPS, expressed through "Core melt frequency", at 4.5×10^{-5} per reactor year. With the continuous improvement modifications taken at the GNPS over the years, and the design improvements taken at the LNPS, a more representative value of "Core melt frequency" for the GNPS/LNPS is closer to 1.5×10^{-5} per reactor year.

² When the LNPS Phase 2 began full commercial operation in 2011, the GNPS and the LNPS Phase 1 have been operating respectively for about 17 and 9 years.

³ The comparison is made with reference to performance indices promulgated by the World Association of

top rankings. The proven track records are in line with the basis of the original UKAEA risk assessment.

Demography

4. Given the fact that the mortality statistics used by the UKAEA study was based on the data available in the early 1980s, the Department of Health has conducted a review using the mortality statistics of 2002–2009. The average individual risk of death per annum due to accidents including transport accidents, falls, accidental drowning and submersion, exposure to smoke, fire and flames and accidental poisoning by and exposure to noxious substances was 8.5 in 100 000. The average individual risk of death per annum due to cancer was 2 in 1 000. With these updated data, the approximate factors by which the everyday risks exceed the nuclear risk in the UKAEA assessment have become 42 500 and 24 000 for accidental death and fatal cancer respectively, compared to 65 000 and 20 000 in the original assessment remains.

Lessons learnt from Fukushima accident

5. While the serious accident occurred at the Fukushima Daiichi Nuclear Power Station has yet to be fully settled, the IAEA and countries across the globe using nuclear energy have been taking proactive actions to enhance nuclear safety and emergency preparedness.

6. In China, as mandated by the State Council, the National Nuclear Safety Administration and the National Energy Administration launched in April comprehensive safety inspections of all nuclear power stations on the Mainland. The general approach is to identify any new risks perceived from lessons learned from the Fukushima accident to date, to check against the safety provisions under the prevailing requirements and to put in place necessary new measures to prevent or mitigate such risks identified. Specific issues that the inspections seek to address include –

- robustness of assessment of external events in site selection
- assessment of plans and abilities for flood protection
- assessment of plans and abilities for seismic protection
- effectiveness of quality assurance system
- inspection of fire protection systems
- prevention of incidents caused by multiple extreme natural events and remedial measures

Nuclear Operators, with membership covering all nuclear operators in the world.

- assessment of complete loss of power including emergency power and contingency plans and availability for further standby power supply
- preventive and remedial measures of severe accidents and appraisal of their robustness
- effectiveness of the emergency response system

The comprehensive inspections, in our view, would ensure a safety level of the GNPS (and the LNPS) at least on a par with that accounted for in the original UKAEA risk assessment. We understand that the inspections are underway and the results will be released in due course⁴.

7. Meanwhile, the operator of the GNPS and LNPS is already planning to explore and pursue a host of proposals for additional safety measures, taking into account the safety inspection process so far and the latest review findings of the IAEA, World Association of Nuclear Operators, European Union and many other national and international bodies as well as a number of major nuclear operators in the light of the Fukushima lessons. The operator is committed to meeting all new safety requirements to be imposed as a result of the safety inspections.

8. As far as possible within the DBCP review timetable, our risk assessment is taking into account such efforts of the operator, results of the safety inspection and follow-up and all other relevant information available to date. As an illustration, we would like to address some pertinent issues as follows.

9. <u>Earthquake</u>. The choice of the present Daya Bay site for hosting the nuclear power stations is subject to strict adherence to international practices and approval by the National Nuclear Safety Administration. The earth crust around the site is safe and stable, and the chance of having a massive earthquake is very low. The buildings, structures, systems and facilities of the GNPS and the LNPS are specially designed to withstand an earthquake impact at the Modified Mercalli Scale (MMS) Level VIII relative to historical records indicating a maximum earthquake intensity at Level VI. The reactors will stop operation promptly and safely if the earthquake intensity has reached a preset level. Since the UKAEA risk assessment, the seismic activities over the Guangdong Province have not shown any significant changes from the past.⁵

⁴ The initiative is in line with a recommendation in the IAEA Action Plan on Nuclear Safety for Member States to promptly undertake a national assessment of the design of nuclear power plants against site specific extreme natural hazards and to implement the necessary corrective actions in a timely manner.

⁵ The assessment made by the Geotechnical Engineering Office (GEO) in Report No. 65 of the GEO of HKSARG in 1998, and GEO's Information Note 09/2010 concluded that the seismicity of Hong Kong is "medium to low".

10. <u>Tsunami.</u> The Daya Bay site is located in a cove within a bay on the northern shore of the South China Sea. The water depth in the vicinity is 20m to 30m, which is adverse to the formation or propagation of tsunami. Furthermore, the offshore islands provide a natural barrier to tsunami arriving from the open sea. In South China Sea, the principal threat comes from the Manila Trench which saw the strongest recorded earthquake at magnitude 7.6 (Richter scale) in 1934 and generated a tsunami that was observed in the Philippines but not in Hong Kong. In case a magnitude 9 earthquake were to occur at the Manila Trench, the tsunami heights at some places in Hong Kong might exceed 5m based on the tsunami model operated by HKO.⁶ The situation at Daya Bay is considered similar to Hong Kong.

11. <u>Storm Surge</u>. The risk of flooding at Daya Bay is more associated with tropical cyclones rather than tsunami. Since the publication of the UKAEA report on risk assessment, there has not been any significant increase in the height of storm surges recorded in Hong Kong. For comparison purposes, the highest storm surge in Hong Kong is 6.25m, recorded in 1937, while the height of all the storm surges recorded during the past two decades are below 2m. The situation at Daya Bay can be considered on the same basis.

12. <u>Extreme Rainfall and Climate Change</u>. Climate change might eventually lead to rising sea levels⁷, increase in rainfall intensity and more extreme storms in the 21st Century⁸. A forthcoming IAEA Safety Guide on Meteorological and Hydrological Hazards in Site Evaluation for Nuclear Installations will be published to provide guidance on the possible effects of climate change in designing, siting and operating nuclear power plants.

13. <u>Flooding Prevention</u>. A breakwater of about 17 metres above sea level is constructed off Daya Bay and the plants (including standby facilities) are also situated on the land at an elevation of at least 6.5 metres above sea level, which should be adequate to guard against the rise in water level discussed in paragraph 10 or 11. The Daya Bay site has also provided for an adequate drainage system for stormwater envisaged.

14. <u>Reactor Type.</u> The Japanese Fukushima nuclear power plant adopts a boiling water reactor design, while the GNPS and the LNPS adopts a

⁶ After the publication of the UKAEA report, there has not been any significant tsunami wave reaching the South China coast. In Hong Kong, the highest tsunami wave during the past two decades is 0.2 meters, recorded in March 2011. This is lower than the historical high of 0.3 meters recorded in Hong Kong in 1960 and 1988.

⁷ It is expected that the mean sea level rise in the South China Sea, including Hong Kong waters, would increase to tally with the global average in the late 21st century (i.e. expected to range between 0.18 and 0.59 m, relative to the average from 1980 to 1999).

⁸ A review conducted by the Guangdong Meteorological Bureau suggested that, over the past 50 years, there is an increasing trend in the average rainfall intensity and the frequency of occurrence of intense rainfall event in Guangdong. A recent study also indicated that the frequency of occurrence of intense heavy rain with hourly rainfall of 100 mm or more nearly doubled in the past 100 years in Hong Kong. The highest hourly rainfall recorded at the Hong Kong Observatory is 145.5 mm, taken in 2008.

PWR design. The reactor cooling water of the GNPS/LNPS is separated into two independent circuits, namely the primary and secondary circuits. The primary circuit with radioactive contents is kept inside a strong containment with filtration capacity, while the secondary circuit outside the containment has no direct contact with the nuclear fuel and is generally non-radioactive. For the Fukushima nuclear power plant, cooling water is not separated into two independent circuits with no comparable partition to keep the radioactivity within. The GNPS and LNPS fare better in such protection.

15. <u>Loss of cooling.</u> At the GNPS and LNPS, this problem is mitigated by the automatic insertion of control-rods into the reactor, to stop the nuclear chain reaction and most of the heat that would be produced. Also, residual heat at the reactor can be taken away by a multiple arrangement of safety systems which operate on electricity.

16. <u>External power supply</u>. At the GNPS and LNPS, there are multiple main connections to the external electricity transmission network, as well as separate, auxiliary external electrical transmission lines. Each nuclear generating unit is provided with two diesel generators to supply essential safety equipment. In addition, a separate diesel generator is provided as a common emergency facility available to back up the nuclear generating units at the Daya Bay site.

17. <u>Prolonged station black out.</u> The present design of the GNPS and LNPS has provided for the use of steam-driven pumps as the source of power to inject cooling water into the steam generators to maintain reactor cooling. During a total loss of electrical power to drive electrical equipment for reactor cooling water flow, reactor cooling is maintained by the discharge of steam raised in the steam generators to the environment. A portion of this steam can be diverted to power a steam-driven pump to inject a continuous stream of water into the steam generators for reactor cooling. The process can be maintained as long as steam is produced.

18. <u>Hydrogen explosion</u>. The risk of hydrogen explosion at the GNPS and LNPS is mitigated by the use of hydrogen recombiners inside the containment building. They enable a controlled chemical reaction of any hydrogen present inside the containment building with oxygen in the air without an explosion.

19. <u>Breach of containment.</u> The use of safety cooling systems will suppress temperature and pressure in the reactor as well as inside the containment building. An internal water spraying system will wash out some of the radioactivity in the space inside into an internal sump. In case of a breach, radioactive releases will be implemented under control by passing the discharge through filters. All such safety features will delay as well as reduce radiological releases into the environment.

Consequence Assessment Simulation Study

We have carried out a simulation study using the Accident Consequence Assessment System (ACAS) of the Hong Kong Observatory based on the nominal source term proposed in the UKAEA consultancy report¹ for consideration of taking protective actions during an emergency, and the nominal source term used in France as a technical basis for emergency planning². The nominal source term used in the UKAEA consultancy study represents a very large release towards the upper end of the range of possible source terms in the event of a serious accident at the nuclear power station at Daya Bay. Such a severe scenario is typically a core melt followed by basemat failure, which may qualify up to Level 5 of the International Nuclear and Radiological Event Scale (INES). The French source term represents a reasonable envelope of the releases of various scenarios, and has been adopted as the maximum conceivable release. This much larger source term assumes the occurrence of very severe accidents of the French designed nuclear reactors as used in the nuclear power stations at Daya Bay with core meltdown and breach of containment at the same time, which may be classified at Level 7 of the INES rating. Using this source term as a technical basis, emergency plans in France are designed to cope, as far as possible, with the consequences of such a release.

2. The French source term is in general two to three orders of magnitude (i.e. 10^2 to 10^3 times) more conservative (pessimistic) than the UKAEA source term. Such an extremely large French source term can be considered as covering the upper end of the worst foreseeable scenarios for nuclear plants at Daya Bay.

3. An assessment is made to evaluate whether the following latest IAEA generic criteria³ as recommended by the Radiological Protection Advisory Group (RPAG) will be reached in Hong Kong for protective actions to be taken –

¹ Neal, A.P., M.C. Davies, 1987: "Contingency Planning - Consultancy on the Environmental Aspects of the Daya Bay Nuclear Power Station for the Government of Hong Kong", Government Printer, Hong Kong, 1987.

² Charpin, F., E. Raimond and B. Chaumont, 2008: Technical Basis for Off-site Emergency Planning in France, Int. J. of Risk Assessment and Management, Vol. 8, Nos. 1/2, 2008.

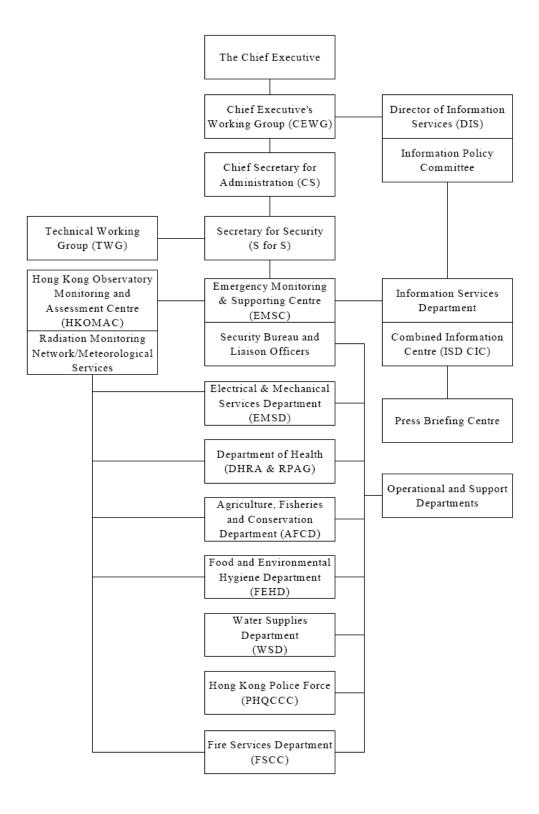
³ IAEA, 2011: IAEA Safety Standards Series No. GSG-2, Criteria for Use in Preparedness and Response for a Nuclear or Radiological Emergency, General Safety Guide. RPAG recommendations can be found in paragraph 33 of the paper.

sheltering/evacuation:	100 mSv (effective dose) in the first 7 days; and
iodine thyroid blocking:	50 mSv (equivalent dose in thyroid) in the first 7 days.

4. In the assessment, the ACAS simulation is based on climatological conditions in terms of wind direction and speed over a 30-year period of 1981 – 2010. Other assumptions are neutral atmospheric stability (i.e. class D), even distribution of radioactive releases over 48 hours in the absence of rain, and normal living conditions (80% indoor and 20% outdoor).

5. In the case of the UKAEA source term, the projected doses within Hong Kong are all below the IAEA reference criteria for both sheltering/evacuation and iodine thyroid blocking. Even in the case of the French source term, similar results follow, only that a few remote areas in north-east Hong Kong up to about 30 km from Daya Bay (mostly sea areas) might meet the IAEA dose criteria for thyroid blocking.

Government Emergency Response Structure



Annex F

Proposed Composition of the Steering Group

Chief Executive (Chairman) Chief Secretary for Administration Secretary for Security Secretary for the Environment Secretary for Food and Health Secretary for Home Affairs Commissioner of Police Director of the Hong Kong Observatory Director of Health Director of Electrical & Mechanical Services Director of Information Services Assistant Secretary, Security Bureau (Secretary)

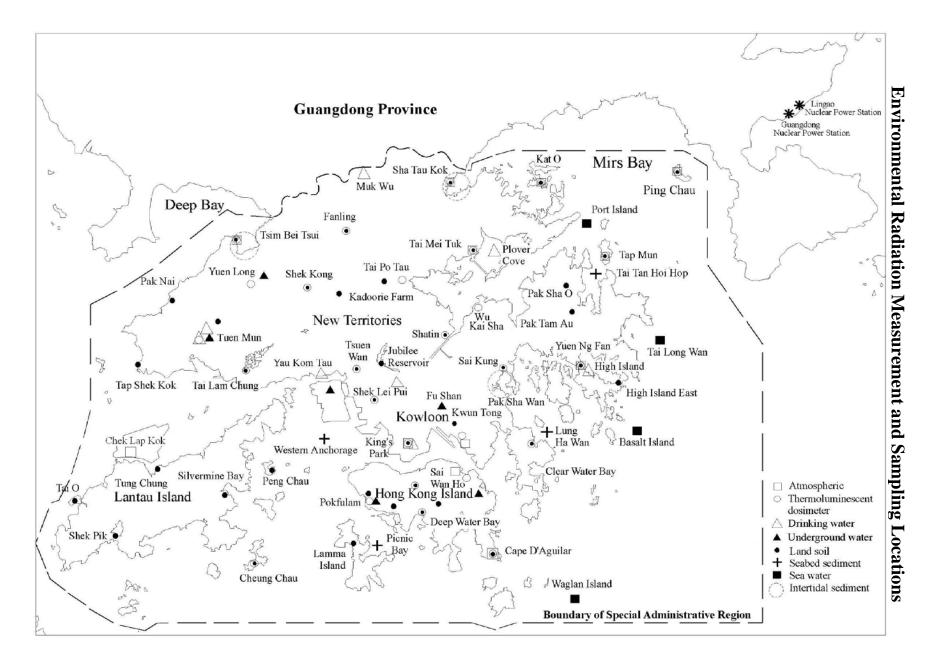
N.B.

Note: Other Heads of Bureau or Department, including Director of Home Affairs, Director of Fire Services, Director of Immigration, Commissioner of Customs and Excise, Director of Food and Environmental Hygiene, Director of Water Supplies, Director of Agriculture, Fisheries and Conservation, and the Chief Executive of the Hospital Authority may be invited to attend as and when necessary.

Proposed Composition of the Implementation Task Force

Secretary for Security or his representative (Chairman) Director of Agriculture, Fisheries and Conservation or his representative Commissioner for Customs and Excise or his representative Director of Health or his representative Director of Electrical and Mechanical Services or his representative Director of Environmental Protection or his representation Director of Fire Services or his representative Director of Food and Environmental Hygiene or his representative Director of Home Affairs or his representative Director of the Hong Kong Observatory or his representative Commissioner of Police or his representative Chief Executive, Hospital Authority or his representative Director of Immigration or his representative Director of Information Services or his representative Commissioner for Transport or his representative Director of Water Supplies or his representative Assistant Secretary, Security Bureau (Secretary)

Note: Other Heads of Bureau or Department or his representatives may be invited to attend as and when necessary.



Annex I

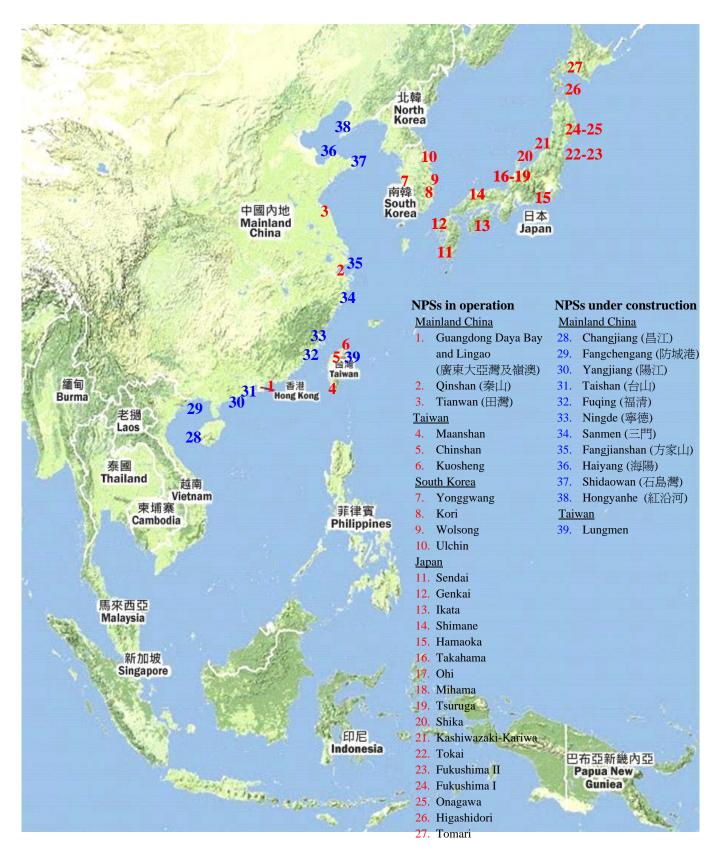
Recommendations by Radiological Protection Advisory Group (RPAG)

RPAG has come up with the following recommendations for consideration by the Director of Health for the purposes of the DBCP review -

- (1) The set of **Intervention Levels** ("ILs") recommended earlier by RPAG in the Report No. 1 of RPAG (1990) should be updated with the set of generic criteria ("GC") based on the framework put up by the International Atomic Energy Agency ("IAEA") in its General Safety Guide No. GSG-2, Criteria for Use in Preparedness and Response for a Nuclear or Radiological Emergency ("GSG-2").
- (2) The set of **Derived Intervention Levels** ("DILs"), which is referenced to the lower ILs recommended earlier by RPAG in the Report No. 1 of RPAG (1990) should be updated with the set of **Operational Intervention Levels** ("OILs") as detailed in GSG-2.
- (3) The Codex Guideline Levels most up-to-date for Food following Radionuclides in Accidental Nuclear Contamination for Use in International Trade be given precedence in the control of all food items (including milk, milk products and bottled water) that are locally produced or imported into Hong Kong.
- (4) The bilateral standards for the control of radioactivity in drinking water following a nuclear emergency in Guangdong be given precedence in the control of all sources of drinking water, of Dongjiang or local origins.
- (5) In the event of shortage of certain food items (including milk, milk products and bottled water) or water as a result of the application of the more stringent standards, and such shortages cannot be reduced or averted by practicable means, the OILs as applicable to the particular radionuclide of concern in the affected food item or water be adopted instead.

- (6) In the event of an emergency situation, for which thyroid blocking should be implemented at the generic criterion of 50 mSv projected dose to the thyroid in 7 days for all ages, appropriate prudent factors and considerations should be taken in the dose projection and priority should be given to the early administration of iodine blocking to infants, adolescents and pregnant or lactating women. Consideration should be given to the stockpiling of thyroid blocking agents at strategic locations to facilitate effective distribution when such protective action is necessary.
- The DIL for decontamination of skin and inanimate objects (7)advised by RPAG in Report No. 3 of RPAG entitled Intervention Level and Derived Intervention Levels for Decontamination for Members of the Public (1993) be updated with the applicable OIL. Instruments for checking radiological contamination on skin and other surfaces should be appropriately chosen and calibrated to meet the requirements for the measurement at levels corresponding to the OIL. In the event adequate instruments and operating procedures are not available for the implementation of RPAG Recommendations, allowance should be given to applying the DILs where appropriate according to the scaling principle provided in Report No. 1 of RPAG (1990) so that emergency operations can be expeditiously carried out for the benefit of public safety.
- (8) As indiscriminate self-initiated protective actions may do more harm than good, suitable proactive actions should be taken to better inform the public of the Government's preparedness for the unlikely event of a radiological/nuclear emergency, and how they could better react in response to the advice given by the Government at the time of an emergency.

Nuclear Power Station in East Asia



The Government of the Hong Kong Special Administrative Region

DAYA BAY CONTINGENCY PLAN

Emergency Support Unit Security Bureau March 2012

THE GOVERNMENT OF THE HONG KONG SPECIAL ADMINISTRATIVE REGION

DAYA BAY CONTINGENCY PLAN

Table of Contents

Abbreviations and Notes

CHAPTER 1 INTRODUCTION

Guangdong Daya Bay Nuclear Power Station /Lingao Nuclear Power Station

Contingency planning

- (a) Planning basis
- (b) Contingency plans for incidents or accidents at the GNPS/LNPS Possible consequences to Hong Kong of an accident at the GNPS/LNPS
 - (a) Electricity supply
 - (b) Exposure to radioactive plume
 - (c) Ingestion of contaminated food and drinking water

Consequences of radiological exposure

Public information

Countermeasures

- (a) Plume Exposure Pathway Countermeasures
- (b) Ingestion Pathway Countermeasures
- (c) Countermeasures in the Mainland

Criteria for Intervention

Application of the DBCP outside Daya Bay

- Annex 1.1 Location Map of Daya Bay Nuclear Power Stations
- Annex 1.2 Information on the Nuclear Power Stations at Daya Bay
- Annex 1.3 The International Nuclear and Radiological Event Scale
- Annex 1.4 Radiation in Daily Life
- Annex 1.5 Generic Criteria for Protective Actions and Other Response Actions in Emergency Exposure Situations to Reduce the Risk of Stochastic Effects

CHAPTER 2 GOVERNMENT EMERGENCY RESPONSE STRUCTURE

Role of the Chief Executive's Steering Group Role of the Implementation Task Force Role of the Information Policy Committee Role of Secretary for Security

- Annex 2.1 DBCP Government Emergency Response Structure
- Annex 2.2 DBCP Chief Executive's Steering Group (CESG)
- Annex 2.3 Provision of Liaison Officers to EMSC
- Annex 2.4 DBCP Implementation Task Force (ITF)

CHAPTER 3 NOTIFICATION AND ASSESSMENT OF INFORMATION CONCERNING A NUCLEAR INCIDENT OR ACCIDENT AT THE GNPS/LNPS

Notification of a Nuclear Incident

- (a) Notification by Guangdong
- (b) Notification by IAEA
- (c) Other sources of information concerning a possible nuclear incident at the GNPS/LNPS
- (d) Notification by CLP Power Hong Kong Limited (CLP) and the Hong Kong Nuclear Investment Company (HKNIC) concerning a possible nuclear incident at the GNPS

Assessment of notification of a nuclear incident or of information indicating the possibility of a nuclear incident

Activation levels of the Daya Bay Contingency Plan

- (a) Observation
- (b) Ready
- (c) Partial activation
- (d) Full activation

The stepping down or ceasing operation of DBCP

- Annex 3.1 Information to be exchanged during an off-site emergency at the GNPS/LNPS
- Annex 3.2 Information to be exchanged in respect of non off-site emergency at the GNPS/LNPS
- Annex 3.3 DBCP Alerting Chart No.1 Notification for assessment of activation level in response to an indication of a possible incident at the GNPS/LNPS.
- Annex 3.4 Figure 1 Actions to be taken on receipt of an emergency message from PEACO
 - Figure 2 Actions to be taken on receipt of a notification message from CLP or HKNIC in connection with faults at GNPS
 - Figure 3 Actions to be taken on receipt of an emergency message from IAEA
 - Figure 4 Actions to be taken when the alarm of the Radiation Monitoring Network is triggered
 - Figure 5 Actions to be taken when the alarm of the On-line Water Contamination Monitoring Systems (OWCMS) at Muk Wu Pumping Stations is triggered
 - Figure 6 Actions to be taken when radiation-contaminated food or live food animals is detected during routine monitoring at Man Kam To & Lok Ma Chau Control Points and Sheung Shui Slaughterhouse
 - Figure 7 Actions to be taken in response to miscellaneous reports of problems at the GNPS/LNPS from other sources (including rumours)
- Annex 3.5(a) DBCP Alerting Chart No. 2 Notification for Observation Level
 - (b) DBCP Alerting Chart No. 3 Notification for Ready Level
 - (c) DBCP Alerting Chart No. 4 Notification for Partial and Full Activation Level

CHAPTER 4 RADIATION MONITORING AND ASSESSMENT

Radiation monitoring in normal times

Monitoring of radioactivity in the air and on the ground Monitoring of drinking water, underground water and marine water Monitoring of land soil and sediments Monitoring of food

Enhanced monitoring during a nuclear emergency

Accident consequences assessment

Advice on countermeasures

- Annex 4.1 Environmental radiation measurement and sampling locations
- Annex 4.2 Locations for real-time measurement of ambient radiation
- Annex 4.3 Locations of designated fire stations conducting radiation monitoring
- Annex 4.4 Radiation Monitoring Data to be sent from Guangdong during an off-site emergency at the GNPS/LNPS

Annex 4.5 Grid reference map

CHAPTER 5 PUBLIC INFORMATION

Emergency preparedness

Emergency response Introduction The initial press release Media strategy Handling of media/public enquiries by CLP/HKNIC Communication channels Overseas information

- Annex 5.1 Suggested DBCP Sample Press Release
- Annex 5.2 Scenario (1) Rumour Situation/Abnormal Radiation Level in HK
- Annex 5.3 Scenario (2) Incidents Other than Site and Off-Site Emergency

Annex 5.4 Scenario (3) – Site and Off-site Emergency

CHAPTER 6 PLUME COUNTERMEASURES: EVACUATION, SHELTERING AND THYROID BLOCKING

Introduction 20 km emergency planning zone 1(EPZ1) Objective Alerting system Public Information Assessment of countermeasures Preparations for countermeasures on Ping Chau Evacuation of Ping Chau Sheltering on Ping Chau Evacuation of Mirs Bay Plume Countermeasures elsewhere in Hong Kong

- Annex 6.1 General Guidelines on Sheltering in a Nuclear Emergency
- Annex 6.2 Administration of Thyroid Blocking Agent
- Annex 6.3 Generic Criteria for Protective Actions and Other Response Actions in Emergency Exposure Situations to Reduce the Risk of Stochastic Effects
- Annex 6.4 Location Map of Ping Chau
- Annex 6.5 EPZ1 (Ping Chau Island and Mirs Bay) Alerting System Chart
- Annex 6.6 Ping Chau Time Frame for Evacuation by Sea Using HKPF and C&ED Fleet Resources

CHAPTER 7 BOUNDARY CONTROL MEASURES: PERSONS AND GOODS

Introduction

Boundary control measures Public Information

- Annex 7.1 Possible arrangements for mandatory control measures
- Annex 7.2 Operational Intervention Level 4 (OIL4)

Annex 7.3 Boundary Control Measures: Alerting Chart

CHAPTER 8 ASSISTANCE TO CONTAMINATED PERSONS: MONITORING CENTRES AND EMERGENCY RADIATION TREATMENT CENTRES

Introduction Strategy Opening of MCs Closure of MCs ERTCs Public Information

- Annex 8.1 Resource Factors for Opening Monitoring Centres
- Annex 8.2 Monitoring Centres Alerting Chart
- Annex 8.3 Procedures for Dry Decontamination
- Annex 8.4 Operation Guidelines of MCs
- Annex 8.5 Sample of Sitrep for MCs
- Annex 8.6 FSD/AMS HQ Sitrep Sample
- Annex 8.7 Monitoring centre flow chart

CHAPTER 9 INGESTION COUNTERMEASURES: FOOD, LIVE FOOD ANIMALS AND WATER

Introduction

Control of food

- (a) Imported food from Mainland
- (b) Locally produced food
- (c) Imported food from places outside the ingestion EPZ of the Mainland
- (d) Exports of food

Live food animals

- (a) Imported live food animals
- (b) Local live food animals

Food Control Committee

Response plan to address food shortages

Water

Public information

- Annex 9.1 Ingestion countermeasures: Alerting chart
- Annex 9.2 Sources of supply of fresh food and live food animals (2010)
- Annex 9.3 Control value for water
- Annex 9.4 Default Screening Operational Intervention Levels (OILs)

for Food, Milk and Water Concentrations from Laboratory Analysis

CHAPTER 10 DISPOSAL OF RADIOLOGICALLY CONTAMINATED WASTE

Introduction

Disposal of contaminated waste (except sludge from water treatment works and sewage treatment works)

Disposal of contaminated sludge from water treatment works

Disposal of contaminated wastes from sewage treatment works and sewage pumping stations

CHAPTER 11 ELECTRICITY GENERATION AT THE GUANGDONG AND LINGAO NUCLEAR POWER STATIONS

Introduction

Brief description of the reactors at the GNPS/LNPS Safety systems of the reactors Regulation by Mainland authorities Electricity generation at the GNPS/LNPS Electricity supply to Hong Kong

Annex 11 Schematic drawing of one unit of the GNPS

CHAPTER 12 LEGAL POWERS AND COMPENSATION

Legal powers Compensation

Annex 12 Emergency (Radiological Contamination) Regulation

CHAPTER 13 STAFFING AND RESOURCES

General protective guidelines for operational staff

(a) Introduction
 (b) General protective guideline
 Training of staff
 Exercises to test the DBCP
 Resources

Annex 13 List of protective equipment

CHAPTER 14 CROSS-BOUNDARY AND EXTERNAL LIAISON AND ASSISTANCE

Cross-boundary liaison Cross-boundary assistance Assistance given to Guangdong in Hong Kong

- (a) Radiation monitoring
- (b) Medical treatment

Assistance from external organizations

CHAPTER 15 RESPONSE TO A NUCLEAR EMERGENCY OUTSIDE DAYA BAY

Introduction

Objective and application Emergency response structure Notification of a nuclear incident Activation levels of contingency plan Radiation monitoring and assessment Response measures

- (a) Plume countermeasures
- (b) Ingestion countermeasures
- (c) Boundary control measures

Public information

External liaison and assistance

Annex 15 Nuclear Power Stations in East Asia

CHAPTER 16 RESPONSIBILITIES OF DEPARTMENTS AND BUREAUX

Overall command and co-ordination Security Bureau (Emergency Monitoring & Support Centre) Key Bureaux and Departments Agriculture, Fisheries and Conservation Department Department of Health **Environment Bureau Electrical and Mechanical Services Department** Food and Environmental Hygiene Department Food and Health Bureau Home Affairs Bureau Hong Kong Observatory Hong Kong Police Force Information Services Department Water Supplies Department **Operational Departments** Auxiliary Medical Service **Civil Aid Service Civil Aviation Department Civil Service Bureau** Customs and Excise Department Department of Justice **Drainage Services Department Education Bureau Environmental Protection Department** Fire Services Department **Government Flying Service** Government Laboratory Government Logistics Department Home Affairs Department Hospital Authority **Immigration Department** Leisure and Cultural Services Department Marine Department Post Office Social Welfare Department Telecommunications Authority, Office of the **Transport Department**

Abbreviations and Notes

<u>Abbreviatio</u>	<u>Full</u>		
<u>n</u>			
A&E	Accident and Emergency		
ACAS	Accident Consequence Assessment System		
AFCD	Agriculture, Fisheries and Conservation Department		
AGSS	Automatic Gamma Spectrometry System		
AMS	Auxiliary Medical Service		
ARMS	Aerial Radiation Monitoring System		
Bq	Becquerel		
CÊ	Chief Executive		
CS	Chief Secretary for Administration		
CAC	Codex Alimentarius Commission		
CAEA	China Atomic Energy Authority		
CAS	Civil Aid Service		
C&ED	Customs and Excise Department		
CEDB	Commerce and Economic Development Bureau		
CACCS3	The 3 rd Generation Computer Assisted Command and		
	Control System		
CEDD	Civil Engineering and Development Department		
CESG	Chief Executive's Steering Group		
CFS	Centre for Food Safety		
CGNPC	China Guangdong Nuclear Power Holding Company,		
	Limited		
CIC	Combined Information Centre		
CLP	CLP Power Hong Kong Limited		
CLPH	CLP Holdings Limited		
CLP-SCCT	CLP – System Control Centre at Tai Po		
CPS	Counts per second		
DBCP	Daya Bay Contingency Plan		
DH	Department of Health		
D of Health	Director of Health		
DIS	Director of Information Services		
DILs	Derived Intervention Levels		
DNMC	Daya Bay Nuclear Power Operations and Management		
	Co Ltd.		
DoJ	Department of Justice		
DRPOs	Departmental Radiological Protection Officers		
DWDO-EPD	Departmental Waste Disposal Officer of the Environment		
	Protection Department		
EDB	Education Bureau		
EMSC	Emergency Monitoring and Support Centre		
EMSD	Electrical & Mechanical Services Department		
ENB	Environment Bureau		
EPD	Environmental Protection Department		
EPZ1	Emergency Planning Zone 1 (within 20 km of		

<u>Abbreviatio</u>	<u>Full</u>		
<u>n</u>			
	GNPS/LNPS)		
EPZ2	Emergency Planning Zone 2 (within 85 km of GNPS/LNPS)		
ERMP	Environmental Radiation Monitoring Programme		
ERTCs	Emergency Radiation Treatment Centres		
ESU	Emergency Support Unit		
FCC	Food Control Committee		
FEHD	Food and Environmental Hygiene Department		
FHB	Food and Health Bureau		
FSCC	Fire Services Communications Centre		
FSD	Fire Services Department		
GDCIQ	Guangdong Entry-Exit Inspection and Quarantine Bureau		
GFS	Government Flying Service		
GL	Government Laboratory		
GLD	Government Logistics Department		
GDEMO	Guangdong Emergency Management Office		
GDEPB	Guangdong Environment Protection Bureau		
GDCIQ	Guangdong Entry-Exit Inspection and Quarantine Bureau		
GNIC	Guangdong Nuclear Investment Company		
GNPJVC	Guangdong Nuclear Power Joint Venture Company		
	Limited		
GNPS	Guangdong Daya Bay Nuclear Power Station		
HA	Hospital Authority		
HAD	Home Affairs Department		
HD	Housing Department		
НКМАО	Hong Kong and Macao Affairs Office of the State Council		
HKNIC	Hong Kong Nuclear Investment Company Limited		
НКО	Hong Kong Observatory		
НКОМАС	Hong Kong Observatory Monitoring and Assessment Centre		
HKPF	Hong Kong Police Force		
НКРО	Hong Kong Post Office		
HKSARG	Government of the Hong Kong Special Administrative Region		
IAEA	International Atomic Energy Agency		
ICRP	International Commission on Radiological Protection		
ImmD	Immigration Department		
IHR	International Health Regulations		
INES	International Nuclear and Radiological Event Scale		
IPC	Information Policy Committee		
ISD	Information Services Department		
ITF	Implementation Task Force		
KIO ₃	Potassium Iodate		
KI	Potassium Iodide		

<u>Abbreviatio</u> n	<u>Full</u>	
km	kilometers	
LANPC	Ling Ao Nuclear Power Company Limited	
LCSD	Leisure and Cultural Services Department	
LDNPS	Ling Dong Nuclear Power Company, Limited	
LNPS	Lingao Nuclear Power Station	
LOs	Liaison Officers	
MD	Marine Department	
MAR RCCC	Marine Regional Command & Control Centre	
MWe	Megawatt electrical	
μSv	Microsievert	
mSv	Millisievert	
MCs	Monitoring Centres	
MEP	Ministry of Environmental Protection of the People's	
	Republic of China	
NEA	National Energy Administration	
NNSA	National Nuclear Security Administration	
OCMFA	Office of the Commissioner of the Ministry of Foreign	
	Affairs in Hong Kong	
OILs	Operational Intervention Levels	
PWR	Pressurised Water Reactor	
PEACO	Prevention and Emergency Administrative Commission	
	Office of Guangdong Province for Nuclear Accident of	
DUO	Civil Nuclear Facility	
PHQ	Police Headquarters	
PHQCCC	Police Headquarters Command & Control Centre	
PTU	Police Tactical Unit	
RMN	Radiation Monitoring Network	
RPAG	Radiological Protection Advisory Group	
SB SBDO	Security Bureau	
SBDO	Security Bureau Duty Officer Secretary for Justice	
S for S	Secretary for Security	
SWD	Social Welfare Department	
TD	Transport Department	
TID	Trade and Industry Department	
TLD	Thermoluminescent Dosimeter	
UKAEA	The United Kingdom Atomic Energy Authority	
UPZ	Urgent Protective Zone	
WDAP	Waste Disposal Action Plan	
WHO	World Health Organization	
WSD	Water Supplies Department	

Notes: Unless the context otherwise requires, the word 'department' also carries the meaning of "bureau".

CHAPTER I

INTRODUCTION

1.1 The Daya Bay Contingency Plan (DBCP) deals with the emergency measures to be taken in Hong Kong in the event of an accident at the Guangdong Daya Bay Nuclear Power Station (GNPS) / Lingao Nuclear Power Station (LNPS) which results, or may result, in the release of radioactive material off-site with a view to protecting the health and safety of the Hong Kong people. Although the chances of such an event are very remote, it is prudent to be prepared and have ready plans which are designed to provide a flexible response to any incident which could affect the safety of the GNPS/LNPS and hence possibly impact on Hong Kong.

1.2 The DBCP was prepared following a consultancy study undertaken by the United Kingdom Atomic Energy Authority (UKAEA) on risk assessment and contingency planning with reference to international standards and practices. As part of the Government's ongoing efforts in reviewing Hong Kong's nuclear emergency preparedness to ensure that it progresses with time and to take into account the latest international development¹, the Government conducted a comprehensive review on the DBCP in 2011. The present plan reflects the outcome of the review having regard to the latest situation of the nuclear power stations at Daya Bay, as well as the prevailing international standards and practices.

GNPS/LNPS

1.3 The GNPS is located on the coast of Guangdong Province, northeast of Hong Kong at Da Peng, Daya Bay whereas the LNPS Phase 1 is about 1 kilometre east of GNPS, and LNPS Phase 2 is immediately further to the east. The two power stations are about 12 km from Ping Chau in Mirs Bay - the only Hong Kong land within 20 km of the site, 33 km from Sha Tau Kok, 40 km from Tai Po, and 50 km from Tsim Sha Tsui. They are also 45 km from the city centre of Shenzhen. A map showing the location is at *Annex 1.1*.

1.4 The GNPS is a joint venture between Hong Kong and Mainland enterprises, with 70% of its annual electricity output supplying to Hong Kong². The LNPS is wholly owned by Mainland interests and all its electricity output is supplied to the Guangdong Province. The operation of both the GNPS and the LNPS is vested under one roof in a joint venture management company between Hong Kong and the Mainland, the Daya Bay Nuclear Power Operations and Management Company Limited (DNMC). The unified operation enables consistency in the operation of the

¹ A severe nuclear accident happened at the Fukushima Daiichi nuclear power plant in Japan in March 2011 following a disastrous earthquake and tsunami. While the accident is yet to be fully settled and the consequence is still being studied in Japan and by international organisations, this plan has taken into account the lessons learnt as far as possible.

² Purchased for CLP Power Hong Kong Limited which meet about 30% of the electricity demand from CLP's customers in Kowloon and the New Territories.

two nuclear power stations, the sharing of the same best practice in operation mode and experiences and cost effective utilization of the relevant resources.

1.5 The two stations operate a total of six Pressurised Water Reactors (PWR) originating from a French design. The GNPS comprises two 984 MWe PWRs. The design is a proven one with an excellent safety record world-wide. The design philosophy is one of defence-in-depth: there are three barriers to prevent the escape of radioactive material from the core; there is duplication or even triplication of mechanisms required to maintain safety; and there are several methods to achieve each safety objective in the event of failure of one system. Phase 1 of the LNPS comprises two 990 MWe PWRs with enhanced design features based on the operating experience of the GNPS. Phase 2 of the LNPS evolves from the same design as the GNPS but comprises two 1,080 MWe PWRs with further improvements. Detailed information on the ownership, operation and electricity output of the nuclear power stations at Daya Bay can be found at *Annex 1.2*.

1.6 The siting, design, construction and operation of the GNPS/LNPS are subject to the stringent oversight of the Mainland authorities following national laws and regulations on a par with international standards. They have maintained very good track records in performance and safety to date. More information about the GNPS/LNPS can be found in Chapter 11.

Contingency Planning

1.7 The design and operational safety features of the GNPS/LNPS combine to make the risk of an accident with off-site radiological consequences very small. UKAEA has assessed the risk to the health of the people of Hong Kong of such an accident as being very small - lower by a large margin than the analogous risks encountered by Hong Kong people in everyday life. The comprehensive review conducted by the Government in 2011 confirmed the validity of the risk assessment³. However, it is sensible and prudent to have a contingency plan to deal with accidents should they occur.

(a) <u>Planning basis</u>

1.8 In line with international nuclear safety standards set by the International Atomic Energy Agency (IAEA) and relevant international organisations as well as the best practices of major advanced countries, the following are a few basic principles which underline the planning basis of the DBCP –

(i) Contingency planning should accommodate all accidents that are reasonably foreseeable and be capable of being applied in case of less likely but potentially very severe accidents that are credible for prioritising deployment of defined resources and the planning details

³ One important prerequisite to note is that the State Council launched a comprehensive safety inspection of all nuclear power stations on the Mainland in March 2011. All nuclear power plant operators are committed and obliged to implement additional safety measures in full compliance with the new requirements. The inspection programme is expected to be completed in 2012.

should be proportional to the degree of the risks assessed.

- (ii) 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.
- (iii) Contingency planning should provide for all practical measures to mitigate significant consequences for human health and safety and the environment (keeping radiation exposure as low as reasonably achievable). Such countermeasures should be justified (doing more good than harm) and optimized (maximizing the net benefit), and ensure that no individual bears an unacceptable risk of harm.
- (iv) Contingency planning is meant to provide a basis and necessary details for prompt emergency response in the early and intermediate phases of an accident when time is of essence. In the nature of the recovery phase, time will be available to think through the appropriate measures with necessary consultations.
- (v) Criteria are to be set in advance for use in determining when to take different countermeasures. The criteria for intervention should be determined by appropriate authorities on advice of experts and in a manner in good agreement with international standards and practices.
- (vi) Contingency planning should allow room for decision makers to take into account the actual situation and various local, social, economic, environmental, demographic, psychological and other factors for making a judgment in the implementation of countermeasures. A balance has to be struck between attributes relating to radiation protection based on necessity, and the public perception of the problem and what could be done to protect public health and safety as a matter of prudence.
- (vii) Members of the public must be kept fully posted of the development of an accident and government response in a transparent manner and be given accurate, appropriate and timely information. This is of paramount importance to ensure public assurance and maintain public confidence in the responsible authorities.

(b) <u>Contingency plans for incidents or accidents at the GNPS/LNPS</u>

1.9 The contingency plans for incidents or accidents at the GNPS/LNPS include –

- (i) On-Site plans designed to deal with any emergency situation at the power station. These have been developed by, and are the responsibility of, the plant operator; and
- (ii) Off-Site plans designed to ensure that appropriate response actions are taken promptly to protect the population living in close vicinity of the

plant. In Guangdong, the development of such a plan is the responsibility of the Guangdong authorities; in Hong Kong, it is the responsibility of the Government of the Hong Kong Special Administrative Region.

1.10 The DBCP is the Off-Site plan adopted in Hong Kong, and is one of the specific contingency plans drawn up for particular incidents as part of the Emergency Response System of the Government⁴. As circumstances may warrant, other parts of the Emergency Response System may also be adopted to support implementation of the DBCP in dealing with a nuclear emergency.

1.11 The management of the GNPS/LNPS has adopted IAEA's four-category system for classifying nuclear and radiological emergencies. The category of the emergency is an important determinant of the state of the activation of the DBCP in Hong Kong. A description of the four categories and their relationship to the activation levels of the DBCP is given below –

Category⁵

Purpose and Action Required

Emergency Standby

Events are in process or have occurred which indicate a potential degradation of the level of the safety of the plant. No release of radioactivity is expected beyond authorised limits and there is no threat to irradiated fuel. To provide early and prompt notification of minor events which could, if not properly rectified, lead to more serious consequences. Appropriate plant personnel are placed on standby. The appropriate off-site emergency response organisation in Guangdong will be notified by the plant. Upon notification to Hong Kong, the DBCP would be activated at the OBSERVATION level.

Plant Emergency

(The consequences of the emergency situation are confined to a section of the plant.) The purpose is the same as for the 'Emergency Standby' described above, but the category reflects a more serious situation, requiring a fuller response preparation. On-

 ⁴ Please refer to Security Bureau's website at <u>www.sb.gov.hk</u>.
 ⁵ IAEA has undated the terminology in the classification of r

IAEA has updated the terminology in the classification of nuclear and radiological events as relevant to a nuclear power plant as follows –

AlertAn uncertain or significant decrease in the level of protection for the public
or people on the siteFacility emergencyA major decrease in the level of protection for people on the site; cannot
give rise to an off-site hazardSite area emergencyA major decrease in the level of protection for those on the site and near the
facility but not sufficient to meet criteria for 'general emergency'General emergencyAn actual or substantial risk of a release or radiation exposure warranting
taking urgent protective actions off the site

Events are in process or have occurred which involve an actual or a potential for substantial degradation of the level of safety of the plant. Any release is expected to be very small.

Site Emergency

(The consequences of the emergency situation are confined to the site.)

Events are in process or have occurred which involve actual or likely major failure of plant functions needed for protection of public. Any release of radioactivity beyond the site boundary is not expected to exceed the defined criteria for intervention which trigger countermeasures in Hong Kong.

Off-Site Emergency

(The consequences of the emergency situation extends beyond the site boundary.)

Events are in process or have occurred which involve imminent substantial core degradation or melting with potential for loss of containment integrity. Areas beyond the site likely to be affected. site personnel are activated and appropriate off-site emergency response organisations notified and placed on standby. Upon notification to Hong Kong, the DBCP would be escalated to the READY level.

Reflects conditions where some significant releases are likely or are occurring but where a core melt situation is not indicated based on the information available. On-site personnel are activated and some off-site emergency response organisations may be activated. In Hong Kong the DBCP would be escalated to the PARTIAL ACTIVATION level as a precautionary measure. This would include activating Emergency Monitoring and Support Centre (EMSC), alerting all departments, considering the evacuation of Ping Chau and Mirs Bay, and informing the public of the situation.

Reflects conditions where major releases are occurring with possible widespread health and environmental effects. All on-site and off-site emergency plans including Hong Kong's DBCP would be at the FULL ACTIVATION level in order to mitigate any adverse effects and to implement effective countermeasures. All those involved will be alerted and mobilised.

Evacuation of, and/or sheltering on the island of Ping Chau and clearance of the Mirs Bay area within 20 km of the GNPS/LNPS will normally be executed. The monitoring of food and water, consideration of appropriate boundary measures, and dissemination of information and advice to the public would be necessary.

1.12 In case of a nuclear emergency at the GNPS/LNPS, based on observation on the prevailing plant condition, the plant operator will at real time

declare the appropriate emergency category according to the above four-category classification system and the DBCP will be activated at the appropriate level accordingly (i.e. from OBSERVATION, READY, to PARTIAL ACTIVATION or FULL ACTIVATION). Details are at Chapter 3.

1.13 Furthermore, within 24 hours from the occurrence of a nuclear incident, the safety significance of the reported event will also be classified by the plant operator according to the International Nuclear and Radiological Event Scale (INES), which is outlined in *Annex 1.3*. This ranges from Level 0 to Level 7 in an ascending order of safety significance. Such classification does not have direct bearing on the activation of the DBCP but is more for the information of the nuclear community or the public generally.

Possible Consequences to Hong Kong of an Accident at the GNPS/LNPS

(a) <u>Electricity supply</u>

1.14 When dealing with an incident at the GNPS/LNPS, the management there will be concerned to minimise risks. In many such incidents, even those which pose little or no radiological hazard to Hong Kong, the problem reactor will be taken out of service until the matter is rectified. Supply from the GNPS to Hong Kong may also cease for entirely non-nuclear reasons. In case the electricity supply from the GNPS is at stake, the DNMC as the nuclear plant operator will inform the CLP System Control Centre at Tai Po (CLP-SCCT) of the reduction in electricity supply and CLP-SCCT can also immediately observe the reduction from its monitoring system. In most cases, electricity supply in Hong Kong will not be affected as our power companies will immediately utilize the spinning reserve available to ensure the electricity supply. Only under extreme circumstances may there be a need to shed non-essential load over certain areas in the power supply system with a view to maintaining the system stability and electricity supply to essential services. Even in such cases, the system will stabilize very soon and electricity supply to the affected areas will be restored within 30 minutes. For further details, see Chapter 11.

(b) **Exposure to radioactive plume**

1.15 In the unlikely event of a release of radioactive fission products into the atmosphere, some of the gaseous and volatile radioactive isotopes could be transported by wind from the GNPS/LNPS. The invisible radioactive material would behave in a way similar to a plume or cloud of smoke dispersing into the atmosphere and depositing some of its contents on the ground. The concentration of radioactive materials in the plume will decrease rapidly with distance from the site.

1.16 Through the **Plume Exposure Pathway**, an individual could be exposed to radiation –

(i) directly from the plume, called cloud shine;

- (ii) directly from radioactive material deposited on the ground, called ground shine, or deposited on skin, clothing and other objects; or
- (iii) by inhalation of airborne radioactive material.

1.17 The plume pathway may also cause contamination on goods and conveyances in close proximity of the accident site. We may be affected by contaminated products imported into Hong Kong. However, unlike infectious agents, the risk of transferring the radioactive substances from contaminated persons or objects to other persons is much smaller and diminishes rather than increases over time. Hence, the public health risk posed by these contaminated persons and objects, if they travel to Hong Kong, is minimal in most cases. (see Chapter 7)

(c) <u>Ingestion of contaminated food and drinking water</u>

1.18 When radioactive substances in the plume are deposited in the environment, such as on plants, soil or water, they may enter the food chain. People may, through the consumption of contaminated fruits and vegetables and drinking of contaminated water, take in the radioactive substances directly, or indirectly through consuming the milk, meat and meat products of animals (including fish) which have themselves eaten contaminated items. This **Ingestion Pathway** is the means by which even people living in areas not directly affected by the plume may continue to be exposed to radioactivity arising from the accident for a prolonged period of time after the accident.

Consequences of Radiological Exposure

1.19 There is a threshold of exposure to radiation below which there will be Because of the distance of Hong Kong from the no immediate health effects. GNPS/LNPS, this threshold of a few hundred millisievert (mSv) is most unlikely to be exceeded anywhere in Hong Kong. In the long-term, exposure to low levels of radiation might result in an increased lifetime risk of developing a fatal cancer (the normal incidence rate of cancer is 1 in 5; for every additional mSv of radiation exposure, the incidence rate would increase by approximately 1 in 20,000). This effect however has not been demonstrated, nor disproved, in exposure to lower levels of radiation of the order of tens of mSv. Nevertheless, it is prudent to minimise exposure to radiation, especially internal exposure. To keep these numerical values in context, human beings are subject to natural exposures of radiation (global average of 2.4 mSv per year) as well as artificial exposures of medical radiation like X-ray and CT scan. The dose limit for people working in the nuclear industry is 50 mSv in any one year, subject to 20 mSv per year averaged over five years. An illustrative diagram is at Annex 1.4.

Public Information

1.20 Panic is a likely reaction to the fear of the unknown caused by the news of an accident, however small, at the GNPS/LNPS. The exact manifestation of the panic cannot be predicted but experience from past incidents would indicate that flight away from the source of the problem, a run for salt believed to contain iodine and going to excessive lengths to avoid consumption of potentially contaminated food are likely consequences.

1.21 In the event of an incident or accident at the GNPS/LNPS, it is essential to minimise panic by giving timely, accurate and appropriate information about the event combined with credible assurances and advice about what an individual should do and should not do. An ongoing programme of public education on radiation safety and the DBCP would be an important part of our nuclear emergency preparedness and assist in reducing possible panic during a real emergency (Chapter 5).

Countermeasures

1.22 Against the remote possibility of a nuclear accident at the GNPS/LNPS with an off-site radiological release, countermeasures can be instituted to guard against exposure through the plume exposure pathway or the ingestion pathway. The closer to the reactor, the greater are the potential effects of the release and the more countermeasures are required.

1.23 The purpose of this plan is to enable appropriate countermeasures to be instituted quickly and efficiently in the event of an off-site radiological release from the GNPS/LNPS. These countermeasures, when taken together, will reduce the residual radiation doses to the exposed individuals and the collective radiological dose to the population.

(a) <u>Plume exposure pathway countermeasures</u>

1.24 The radiological effects of the plume decline rapidly with distance from the source. The UKAEA report concluded that countermeasures against the plume exposure pathway need only be considered up to 10 km to 16 km (10 miles) from the nuclear power station. In Hong Kong, an even more cautious approach has been taken and plume exposure countermeasures will be taken, as far as Hong Kong is concerned, within 20 km of the GNPS/LNPS. The area subject to these countermeasures is called the **Emergency Planning Zone l** (EPZI).

1.25 As part of the 2011 review, we have critically reviewed the UKAEA's risk assessment and found no material or significant changes that justifies a fundamental change of the original conclusion or the present EPZ arrangements in the DBCP (paragraph 1.7 above refers). In addition, we have made use of an Accident Consequence Assessment System to simulate the consequences of possible serious accident at the nuclear power stations in Daya Bay, and considered the prevailing

international standards⁶ and practices of advanced countries⁷. The review confirmed that it is scientifically justified and appropriate to maintain a 20 km radius for EPZ1 (paragraph 1.24) which is in line with the prevailing IAEA standards and the most stringent requirements of most countries. The Administration will closely monitor any new standard announced by IAEA, the relevant authorities in the Mainland and advanced countries in due course to update and strengthen different aspects of the DBCP so that it will go in line with the latest national and international safety standards.

1.26 Once the plume has passed, the countermeasures normally can be lifted except in areas very close to the power stations where there might be longer-term radiological hazard from deposited plume material. The countermeasures could be in place for longer there.

1.27 Countermeasures considered in this plan against the plume exposure pathway are -

(i) Evacuation or sheltering (Chapter 6)

In Hong Kong, this may apply to Ping Chau and the waters of Mirs Bay within 20 km of the GNPS/LNPS (EPZ1), possibly as a precautionary measure. Elsewhere in the territory where the projected dose is below the criterion accepted for evacuation/sheltering, appropriate advice may be given to the general public to stay indoors where possible during the passage of a plume.

(ii) Thyroid blocking (Chapter 6)

Radioactive iodine is among the most common fission products released in a nuclear accident. People in close vicinity to the accident site and emergency responders may be exposed to significant levels of radioactive iodine. Infants and young children are the more susceptible groups. Thyroid blocking agent, taken before the arrival of the plume or within a few hours of the arrival of the plume, can effectively block the thyroid gland's uptake of radioactive iodine and so reduce the risk of thyroid cancer.

The Government has stockpiled thyroid blocking agent for emergency use. If needed, the Government will give announcements, distribute the thyroid blocking agent for use by specific groups of the public and provide usage instructions.

⁶ The IAEA has maintained its recommendation for an Urgent Protective Zone (UPZ), the radius of which may fall within a range from 5 to 30 km, to plan for evacuation, sheltering and distribution of stable iodine. The determination of the exact size is subject to site specific analysis of the risk and practical circumstances.

⁷ 12 countries we surveyed have adopted a UPZ ranging from 7 to 20 km (Hungary is an exception which adopts 30 km). Hong Kong's EPZ1 up to 20 km is in line with the most stringent requirements of most of the countries, and our EPZ2 up to 85km covers the whole of Hong Kong (see paragraph 1.28).

 (iii) Monitoring and assisting persons who have been within the 20 km EPZl (including persons arriving in Hong Kong from areas of Guangdong within 20km of the GNPS/LNPS) (Chapters 7 and 8)

Monitoring is the process of checking radiological contamination levels and removing external contamination. Where necessary, Monitoring Centres (MCs) may be set up in-situ or at designated swimming pools for evacuees from Ping Chau and Mirs Bay and incoming persons at the boundary. In the very rare case of any persons who cannot be completely decontaminated at the MCs, they will be sent to the Emergency Radiation Treatment Centres in designated public hospitals.

(iv) Monitoring incoming goods (except food and live food animals) (Chapter 7)

Where necessary, special boundary control measures may be considered to detect any contamination in goods being imported into Hong Kong.

(b) <u>Ingestion pathway countermeasures</u>

1.28 In Hong Kong, ingestion pathway countermeasures will be taken throughout Hong Kong (i.e. within 85 km of the GNPS/LNPS). The area subject to these countermeasures is known as the **Emergency Planning Zone 2** (EPZ2).

1.29 Even after the plume has passed, ingestion pathway countermeasures may still be required. An extensive programme of monitoring food and water supplies will continue. When results show a decline in radiological activity, the programme can then be reduced in size. It could be expected to operate from a few weeks to several years.

1.30 Countermeasures considered in this plan against the ingestion pathway are –

(i) Control of food (Chapter 9)

Imported food from the Mainland will be monitored at the boundary and other entry points for contamination, especially those from within 50 km of the GNPS/LNPS. Food exceeding the standard for cross-boundary trade with reference to the prevailing standard laid down by the Codex Alimentarius Commission (CAC) (see Chapter 9 for details) will be returned to Guangdong. The same standard will be used for the control of food produced in Hong Kong. But if this would give rise to a threat of food shortage, the food control may be made with reference to the IAEA recommended Operational Intervention Levels (OILs) for the food commodity in question which are based on radiological protection considerations. OILs have been recommended by the Radiological Protection Advisory Group (RPAG)⁸ in accordance with updated international scientific evidence, such that persons consuming food contaminated to that level over one year would not experience short-term health effects and the risk of potential long-term health effects would be insignificant (paragraphs 1.32-1.33 below).

(ii) Control of live food animals (Chapter 9)

Control of live food animals, whether imported or locally reared, will be exercised at both import level and after slaughter; the same standards as for other food will be used.

(iii) Control of water (Chapter 9)

It is most unlikely that the control standard for water (*Annex 9.3*) would be approached let alone exceeded in a radiological emergency at the GNPS/LNPS. If it were, then the raw water supply from Guangdong Province would be suspended until the radioactivity fell below the control standard, when it would be resumed. Water Supplies Department (WSD) would take steps to ensure that non-contaminated or least contaminated sources would be used preferentially.

(c) <u>Countermeasures in the Mainland</u>

1.31 In Guangdong, a 10 km plume exposure EPZ has been adopted - an inner zone of 5 km in which evacuation and relocation (if necessary) would be planned for and an outer zone from 5 to 10 km in which sheltering would be applied. The EPZ for adopting ingestion pathway countermeasures is the area within 50 km of the GNPS/LNPS. Special measures will be taken there by the Guangdong authorities to prevent the export to Hong Kong of food exceeding the prevailing standards in the CAC Guideline Levels. Food will be screened at the boundary. The Guangdong authorities will issue a certificate for qualified food originating within the EPZ certifying that the food is below the Control Standard. Food importers can apply for certificates of origin for food from areas outside the 50km area.

Criteria for Intervention

1.32 An important concept in emergency preparedness and response is criteria for intervention, which basically are doses due to radiation at which countermeasures should be taken to mitigate the potential adverse impact to public health and safety.

1.33 For this purpose, RPAG has recommended, and the Director of Health has accepted, the general adoption of a set of Generic Criteria (*Annex 1.5*), based on

⁸ The Radiological Protection Advisory Group is appointed by the Director of Health to advise on health matters relating to the radiological consequences that might eventuate from radioactive releases from nuclear facilities.

the framework promulgated by IAEA in its *General Safety Guide No. GSG-29*. Their application subject to domestic considerations is included in Chapters 6 to 9.

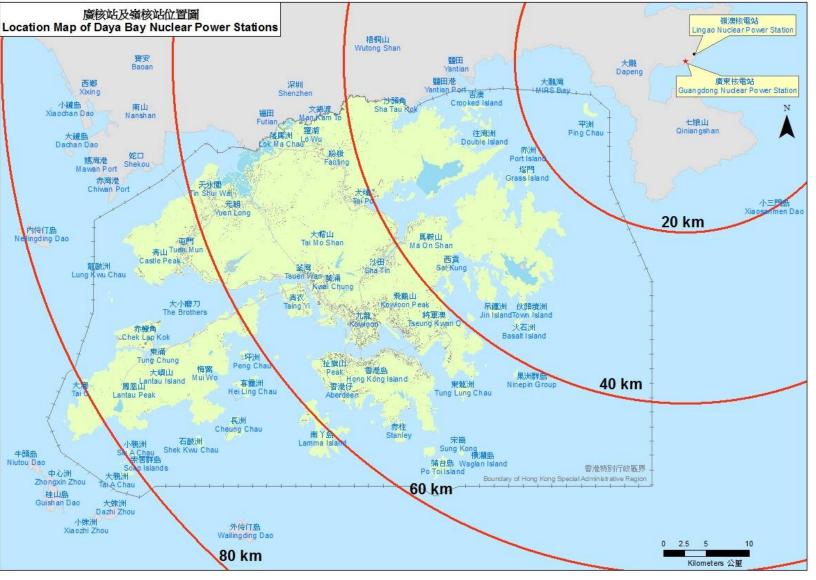
Application of the DBCP outside Daya Bay

1.34 Distance is the best protection for radiation. The nearest nuclear power station on the Mainland beyond Daya Bay is about 130 km away. The general assessment following international standards is that all these nuclear power stations outside Daya Bay carry a much smaller threat and the risk to Hong Kong is very low. Plume exposure is unlikely a concern, while we should be more alert to any contaminated food, goods and travellers coming to Hong Kong.

1.35 Under such circumstances, responsible bureaux and departments will monitor the situation, assess the possible impacts and implement necessary measures according to their respective roles and authorities. While the DBCP will retain a primary focus on nuclear accidents at Daya Bay, supplementary provisions have been included in Chapter 15 to apply to other nuclear accidents if happened. This would establish the concerted efforts of the Government on a firm footing in contingency planning to ensure adequate protection of Hong Kong even though the risk is minimal.

⁹ Criteria for Use in Preparedness and Response for a Nuclear or Radiological Emergency (GSG-2), IAEA 2011. GSG-2, published in May 2011 soon after the Fukushima NPP accident, is the most up-to-date set of international reference that takes account of the experience gained from past nuclear emergencies. It is jointly sponsored by the Food and Agriculture Organization of the United Nations ("FAO"), the IAEA, the International Labour Office, the Pan American Health Organization and the World Health Organization ("WHO"), and hence a suitable basis for harmonization between nations.





Annex 1.2

	Guangdong Daya Bay Nuclear Power Station	Lingao Nuclear Power Station (LNPS)		
	(GNPS)	Phase 1	Phase 2	
Owner	Guangdong Nuclear Power	Ling Ao Nuclear	Ling Dong Nuclear	
	Joint Venture Company,	Power Company,	Power Company,	
	Limited (GNPJVC) ¹	Limited (LANPC) ²	Limited (LDNPC) ³	
Operation, Maintenance & Technical Support	Daya Bay Nuclear Power Operations and Management Company, Limited (DNMC) ⁴			
Year of Commercial Operation	1994	2002/2003	2010/2011	
Reactors	Two Pressurised	Two Pressurised	Two Pressurised	
	Water Reactors ⁵	Water Reactors ⁶	Water Reactors ⁷	
	(2 x 984 MWe)	(2 x 990 MWe)	(2 x 1080 MWe)	
Typical annual	14 billion kilowatt-hours	14 billion kWh per	Annual record pending	
output	(kWh) per year	year		
Supply of electricity	70% output to Hong Kong,	100% output to	100% output to	
	30% to Guangdong	Guangdong	Guangdong	

- 1 A 75:25 joint venture between Guangdong Nuclear Investment Company Limited (GNIC) and the Hong Kong Nuclear Investment Company Limited (HKNIC). GNIC is a wholly owned subsidiary of the China Guangdong Nuclear Power Holding Company Limited (CGNPC) which is a state-owned corporation with nuclear power as its core business. HKNIC is a wholly owned subsidiary of CLP Holdings Limited.
- 2 LANPC is a subsidiary of CGNPC (70%) and GNIC (30%).
- 3 LDNPC is also a subsidiary of CGNPC (70%) and GNIC (30%).
- 4 DNMC is a 12.5:87.5 joint venture between CLP Nuclear Power Operations & Management (China) Limited and GNIC.
- 5 French Pressurised Water Reactor (PWR) technology.
- 6 A modified French PWR technology.
- 7 Chinese PWR based on French PWR technology.

Annex 1.3

The International Nuclear and Radiological Event Scale

1.3.1 Nuclear events are classified on the International Nuclear and Radiological Event Scale (INES) at seven levels as shown at Table 1 below. The lower levels (1 - 3) are termed INCIDENTS, and the upper levels (4 - 7) ACCIDENTS. The scale is designed so that the severity of an event is about ten times greater for each increase in level on the scale. Events which have no safety significance are classified as level 0 / below scale and are termed DEVIATIONS.

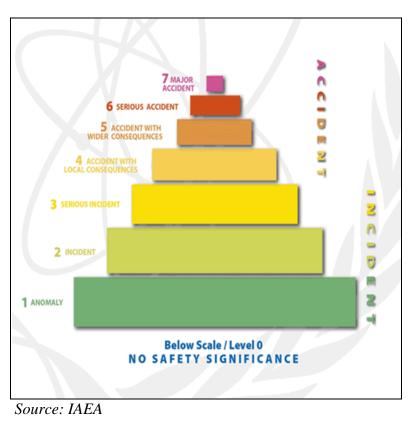


Table 1 - INES

1.3.2 INES was designed by an international group of experts convened jointly by IAEA and the Nuclear Energy Agency of the Organisation for Economic Co-operation and Development. The underlying logic of the Scale involves taking into account three areas of impact: people and the environment (off-site), radiological barriers and control (on-site) and defence-in-depth. General description of the Scale is shown in Table 2. Selected examples of historic events rated using the Scale is shown in Table 3.

GENERAL DESCRIPTION OF INES LEVELS			
INES Level	People and Environment	Radiological Barriers and Control	Defence-in-Depth
Major Accident Level 7	 Major release of radioactive material with widespread health and environmental effects requiring implementation of planned and extended countermeasures. 		
Serious Accident Level 6	Significant release of radioactive material likely to require implementation of planned countermeasures.		
Accident with Wider Consequences Level 5	 Limited release of radioactive material likely to require implementation of some planned countermeasures. Several deaths from radiation. 	 Severe damage to reactor core. Release of large quantities of radioactive material within an installation with a high probability of significant public exposure. This could arise from a major criticality accident or fire. 	
Accident with Local Consequences Level 4	 Minor release of radioactive material unlikely to result in implementation of planned countermeasures other than local food controls. At least one death from radiation. 	 Fuel melt or damage to fuel resulting in more than 0.1% release of core inventory. Release of significant quantities of radioactive material within an installation with a high probability of significant public exposure. 	
Serious Incident Level 3	 Exposure in excess of ten times the statutory annual limit for workers. Non-lethal deterministic health effect (e.g., burns) from radiation. 	 Exposure rates of more than 1 Sv/h in an operating area. Severe contamination in an area not expected by design, with a low probability of significant public exposure. 	 Near accident at a nuclear power plant with no safety provisions remaining. Lost or stolen highly radioactive sealed source. Misdelivered highly radioactive sealed source without adequate procedures in place to handle it.
Incident Level 2	 Exposure of a member of the public in excess of 10 mSv. Exposure of a worker in excess of the statutory annual limits. 	 Radiation levels in an operating area of more than 50 mSv/h. Significant contamination within the facility into an area not expected by design. 	 Significant failures in safety provisions but with no actual consequences. Found highly radioactive sealed orphan source, device or transport package with safety provisions intact. Inadequate packaging of a highly radioactive sealed source.
Anomaly Level 1			 Overexposure of a member of the public in excess of statutory annual limits. Minor problems with safety components with significant defence-in-depth remaining. Low activity lost or stolen radioactive source, device or transport package.
NO SAFETY SIGNIFICANCE (Below Scale/Level 0) Source: IAEA			

Table 2 - General Description of INES

Table 3 - Examples of Events at Nuclear Facilities Rated Using INES

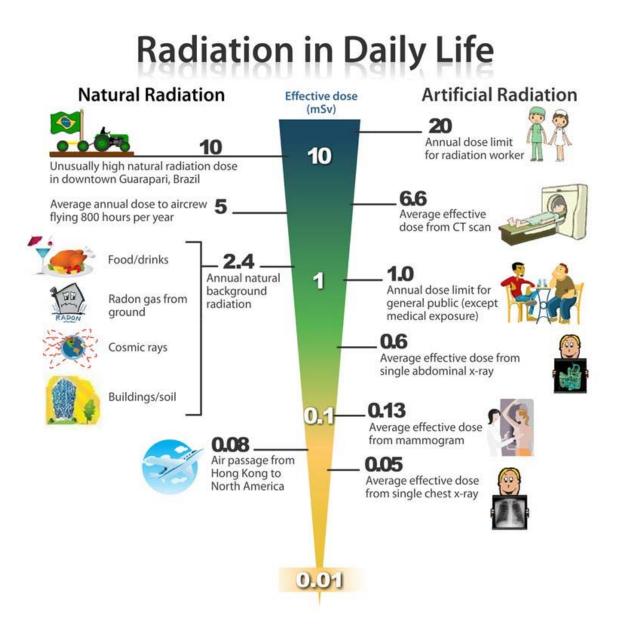
EXAMPLES OF EVENTS AT NUCLEAR FACILITIES			
	People and Environment	Radiological Barriers and Control	Defence-in-Depth
7	Chernobyl, 1986 — Widespread health and environmental effects. External release of a significant fraction of reactor core inventory.		
6	Kyshtym, Russia, 1957 — Significant release of radioactive material to the environment from explosion of a high activity waste tank.		
5	Windscale Pile, UK, 1957 — Release of radioactive material to the environment following a fire in a reactor core.	Three Mile Island, USA, 1979 — Severe damage to the reactor core.	
4	Tokaimura, Japan, 1999 — Fatal overexposures of workers following a criticality event at a nuclear facility.	Saint Laurent des Eaux, France, 1980 — Melting of one channel of fuel in the reactor with no release outside the site.	
3	No example available	Sellafield, UK, 2005 — Release of large quantity of radioactive material, contained within the installation.	Vandellos, Spain, 1989 — Near accident caused by fire resulting in loss of safety systems at the nuclear power station.
2	Atucha, Argentina, 2005 — Overexposure of a worker at a power reactor exceeding the annual limit.	Cadarache, France, 1993 — Spread of contamination to an area not expected by design.	Forsmark, Sweden, 2006 — Degraded safety functions for common cause failure in the emergency power supply system at nuclear power plant.
1			Breach of operating limits at a nuclear facility.

EXAMPLES OF EVENTS AT NUCLEAR FACILITIES

Source: IAEA

Note: The Fukushima Nuclear Accident that occurred in Japan in March 2011 was also classified as Level 7 Accident under INES with external release of a significant fraction of reactor core inventory (preliminary estimated to be about one tenth of that of the Chernobyl accident); widespread environmental effect; health effect under monitoring.

Annex 1.4



Annex 1.5

Generic Criteria for Protective Actions and Other Response Actions in Emergency Exposure Situations to Reduce the Risk of Stochastic Effects

A. Generic criteria of projected dose for urgent protective actions and other response actions

Generic criteria		Examples of protective actions and other response actions
H _{Thyroid}	50 mSv in the first 7 days	Iodine thyroid blocking
$E \\ H_{Fetus}$	100 mSv in the first 7 days 100 mSv in the first 7 days	Sheltering; evacuation; decontamination; restriction of consumption of food, milk and water; contamination control; public reassurance

B. Generic criteria of projected dose for protective actions and other early response actions

Generic criteria		Examples of protective actions and other response actions
E H_{Fetus}	100 mSv per annum 100 mSv for the full period of in utero development	<i>Temporary relocation; decontamination; replacement of food, milk and water; public reassurance</i>

C. Generic criteria of dose received for longer term medical actions to detect and to effectively treat radiation induced health effects

Generic criteria		Examples of protective actions and other response actions
E	100 mSv in a month	Screening based on equivalent doses to specific radiosensitive organs (as a basis for medical follow-up); counseling
H _{Fetus}	100 mSv for the full period of in utero development	Counselling to allow informed decisions to be made in individual circumstances

 H_T - Equivalent dose in an organ or tissue T

E - Effective dose

Reference: International Atomic Energy Agency 2001 Report - "Criteria for Use in Preparedness and Response for a Nuclear or Radiological Emergency, General Safety Guide No. GSG-2"

CHAPTER 2

GOVERNMENT EMERGENCY RESPONSE STRUCTURE

2.1 The Government emergency response structure to handle the consequences to Hong Kong of a nuclear incident or accident at the GNPS/LNPS at Daya Bay is set out at *Annex 2.1*. The key is to facilitate proper coordination of government efforts at all levels, drawing on expertise from all relevant professional and frontline departments. This structure provides for comprehensive coverage of relevant bureaux and departments for each to play out its role and exercise authority in a concerted manner to support implementation of the DBCP. Notably, there will be rapid mobilisation of technical groups to assess the situation, to give advice to decision-makers based on that assessment and to recommend appropriate countermeasures.

Role of the Chief Executive's Steering Group

2.2 In major incidents such as an off-site emergency at the GNPS/LNPS, the Chief Executive (CE) would direct Hong Kong's response. He would be advised by a steering group comprising the Heads of bureaux and departments most involved. The composition and terms of reference of the CE's Steering Group (CESG) are set out at *Annex 2.2*. The Chief Secretary for Administration (CS) may, where necessary, deputise CE in convening CESG, and also play a coordinating role among bureaux and departments in resolving issues with wider implications.

2.3 Some decisions may need to be made before CESG can convene. In those circumstances, the Secretary for Security (S for S) will be responsible for the initial implementation of the DBCP, having already received advice from key departments (i.e. Hong Kong Observatory (HKO), Electrical and Mechanical Services Department (EMSD), Department of Health (DH), Agriculture, Fisheries and Conservation Department (AFCD), WSD and Food and Environmental Hygiene Department (FEHD)) on the activation level of the plan (see Chapter 3). He would obtain further advice and support from the relevant technical and operational departments (see paragraph 2.5 below). He would ensure that CE and CS are consulted and that CESG is convened as soon as possible. Thereafter, he will continue to coordinate the Government's response, acting under the guidance of CESG and following up its instructions.

2.4 In lesser emergencies, CESG may not need to be convened. Members of CESG will be kept informed of the overall situation by S for S, and their departments will inform them of matters within their own responsibilities.

Role of the Implementation Task Force

2.5 When CESG is not convened, the overall responsibility for the implementation of the DBCP will rest with S for S. He may convene an Implementation Task Force (ITF) with a composition covering all relevant technical and operational departments. ITF will support S for S on all aspects relating to the implementation of the DBCP covering not only technical, expert matters, but also operational and service issues. The composition and terms of reference of ITF are at *Annex 2.4*.

Role of the Information Policy Committee

2.6 In any emergency at the GNPS/LNPS, it is vital for the public to be kept fully in the picture, so that any panic caused by exaggerated fears and rumours can be avoided or mitigated. The Information Policy Committee (IPC) to be convened by the Director of Information Services will provide advice to CESG and S for S on public announcements concerning the most significant events (see Chapter 5).

Role of Secretary for Security

2.7 S for S occupies a key role in the activation and implementation of the DBCP. It is his responsibility to activate the DBCP at the appropriate level (see Chapter 3), and to direct and coordinate the Government's response to the nuclear incident, either directly or under the guidance of CESG.

2.8 S for S will discharge his responsibilities with the support of ITF, and will be underpinned by Emergency Monitoring and Support Centre (EMSC). EMSC is the Government's civil emergency monitoring and support organisation and can be activated, according to established procedures, once any emergency has been declared. When activated under the DBCP, the EMSC procedures will remain the same as for other emergencies, but its manning will be enhanced by the provision of Liaison Officers sent by departments with key roles to play in the DBCP, as set out in this plan or as requested by EMSC. The role of Liaison Officers is set out at *Annex 2.3*. The Government Security Officer and his staff in Emergency Support Unit will provide guidance and support to the operation of EMSC.

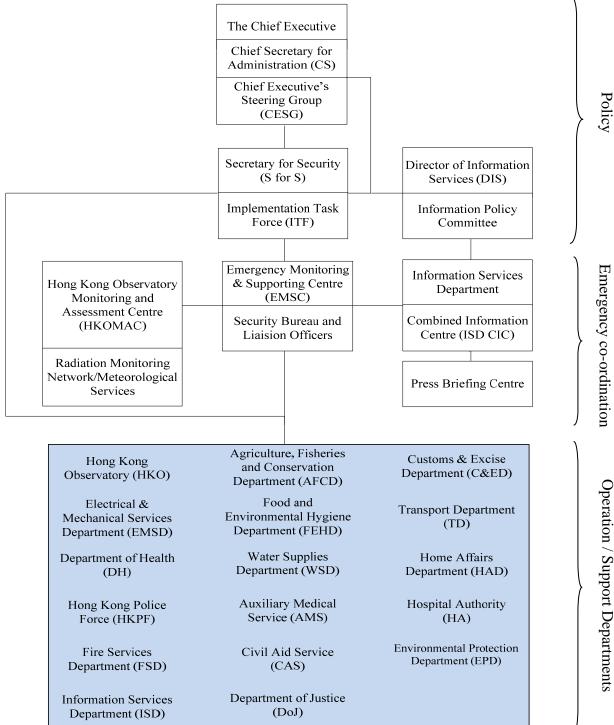
2.9 It is essential that departmental representatives acting as members of ITF or as Liaison Officers in EMSC are continuously informed by their headquarters about incoming data and assessments of the situation; raw data should be limited to that specifically requested. Only in this way can appropriate advice be given to S for S.

2.10 The specific responsibilities of S for S, with ITF's support, are –

- (a) to determine, with advice from HKO, EMSD, DH, AFCD, WSD and FEHD on the appropriate activation level of the DBCP (Chapter 3);
- (b) to activate EMSC and to maintain continuous communication with HKO, EMSD and DH so that immediate reports can be obtained on
 - (i) the situation at the GNPS/LNPS;
 - (ii) the observations and advice of the international community, including IAEA, World Health Organization (WHO) and other relevant international and national organisations or authorities;
 - (iii) the actual and predicted radiological situation in Hong Kong; and
 - (iv) the recommended countermeasures to protect the people of Hong Kong from danger from both the plume and the ingestion pathways;
- (c) to ensure that CE, CS and other members of CESG (*Annex 2.2*) are notified of the situation and, when necessary, to convene an urgent meeting;
- (d) to coordinate liaison with the Mainland authorities/organisations (including the Guangdong Nuclear Power Joint Venture Company Limited (GNPJVC), DNMC, Prevention and Emergency Administrative Commission Office of Guangdong Province for Nuclear Accident of Civil Nuclear Facility (PEACO), Hong Kong and Macao Affairs Office of the State Council (HKMAO), China Atomic Energy Authority (CAEA) and National Nuclear Safety Agency) in order to obtain the fullest possible information and, where practicable, to enable coordinated and mutually supportive action to be taken with Guangdong to deal with the situation (Chapters 3 & 14);
- (e) in the event of the most serious situations, to take immediate decisions in consultation with ITF (taking into consideration the reports at (b)) concerning
 - (i) implementation of evacuation or sheltering on Ping Chau and within the 20 km EPZl in Mirs Bay and any other countermeasures as necessary (e.g. use of thyroid blocking agent) (Chapter 6);
 - (ii) implementation of boundary control measures (Chapter 7);

- (iii) provision of appropriate assistance to contaminated persons through the setting up of Monitoring Centres and Emergency Radiation Treatment Centres (Chapter 8);
- (iv) implementation of countermeasures against the ingestion pathway (Chapter 9); and
- (v) implementation of measures to protect government emergency workers (Chapters 8 and 13);
- (f) to advise CESG, once established, on the countermeasures taken or countermeasures to be taken (as in (e) above) and to ensure the implementation of CESG's decisions;
- (g) to prepare, through EMSC, regular reports on the situation for CESG;
- (h) to advise CESG on the practical necessity for making emergency legislation to cope with the emergency and to follow up the decision (Chapter 12);
- to assess and advise CESG on whether external assistance should be sought from IAEA or other parties to enhance Hong Kong's emergency response arrangements; to be the authority for liaison with IAEA through CAEA; to assess and to advise CESG whether to accede to the requests for assistance from PEACO, if any (Chapter 14);
- (j) to authorise the initial press release on the incident and to ensure that relevant advice and information is promulgated to the public and the media by the Combined Information Centre (CIC) of the Information Services Department (ISD); to ensure that other government departments are aware of the overall situation concerning the incident and Hong Kong's response to it (Chapter 5);
- (k) to maintain the DBCP website (through EMSC with the support of Information Technology Management Unit of the Security Bureau (SB)) for coordination and dissemination of up-to-date information during a nuclear emergency; and
- (1) to ensure that the DBCP is kept updated and to remind bureaux/departments to keep their departmental contingency plans up-to-date (the responsibility for which rests with the head of the bureau/department concerned).

Annex 2.1



DBCP Government Emergency Response Structure



Operation and Support Departments serving in EMSC (Annex 2.3) and/or ITF (Annex 2.4)

Annex 2.2

Daya Bay Contingency Plan

Chief Executive's Steering Group (CESG)

Composition

Chief Executive (Chairman) Chief Secretary for Administration Secretary for Security Secretary for the Environment Secretary for Food and Health Secretary for Home Affairs Commissioner of Police Director of the Hong Kong Observatory Director of Health Director of Electrical & Mechanical Services Director of Information Services Assistant Secretary (Security), Security Bureau (Secretary)

N.B.

Other Heads of Bureaux or Departments, including the Secretary for Justice, Director of Home Affairs, Director of Fire Services, Commissioner of Customs and Excise, Director of Food and Environmental Hygiene, Director of Water Supplies, Director of Agriculture, Fisheries and Conservation, Director of Immigration and the Chief Executive of the Hospital Authority may be asked to attend as and when necessary.

Terms of Reference

To oversee, co-ordinate and direct the implementation of the Government's response in the event of an incident at the GNPS/LNPS requiring the activation of the DBCP.

Annex 2.3

Provision of Liaison Officers to EMSC

2.3.1 Liaison Officers (LOs) will be provided to EMSC according to the level of activation of the DBCP and the requests of EMSC Controller.

Level of Activation of DBCP (see Chapter 3)	Departments to provide Liaison Officers
OBSERVATION	None.
READY	None. However, it is possible that some LOs required at the PARTIAL ACTIVATION level may be required to attend at the request of EMSC.
PARTIAL ACTIVATION	HKO, EMSD, DH, ISD and Police*.
FULL ACTIVATION	HKO, EMSD, DH, ISD, FSD and Police*.AFCD, AMS, CAS, DoJ, EPD, FEHD and WSD may be required to send an LO at the request of EMSC.CAS may also be requested by EMSC to provide dispatch riders as necessary and available.

* Police will send a senior police officer plus an experienced CACCS3^(note) terminal operator.

(Note): CACCS3 denotes the 3rd Generation Computer Assisted Command and Control System.

Duties and Responsibilities of Liaison Officers

2.3.2 LOs form the link between their departments and EMSC and vice versa. The LO from each department should –

- (a) maintain frequent and regular contact with his department to watch out for anything which should be brought to the attention of EMSC;
- (b) keep abreast of developments in EMSC and watch out for anything which should be brought to the attention of his department;

- (c) explain to EMSC the significance of any information sent by his department; and
- (d) advise EMSC on any matters requiring actions to be taken by his department under the DBCP.

2.3.3 Departments required to provide LOs should ensure they are provided 24 hours a day until EMSC advises the requirement has ceased. LOs should be familiar with the responsibilities of their departments in the contingency plan. They should be senior enough to convey authoritatively their departments' analysis and assessment of the situation and also, where necessary, to query such with their departments. They should possess good judgement and have the ability to prepare clear practical advice based on a technical analysis of the situation.

Annex 2.4

Daya Bay Contingency Plan

Implementation Task Force (ITF)

Composition

Secretary for Security or his representative (Chairman) Director of Agriculture, Fisheries and Conservation or his representative Chief Staff Officer, Auxiliary Medical Service or his representative Commissioner of Customs and Excise or his representative Chief Staff Officer, Civil Aid Service or his representative Director of Health or his representative Director of Electrical and Mechanical Services or his representative Director of Environmental Protection or his representative Director of Fire Services or his representative Director of Food and Environmental Hygiene or his representative Director of Home Affairs or his representative Director of the Hong Kong Observatory or his representative Commissioner of Police or his representative Chief Executive, Hospital Authority or his representative Director of Information Services or his representative Commissioner for Transport or his representative Director of Water Supplies or his representative Assistant Secretary, Security Bureau (Secretary)

Terms of Reference

To support the Secretary for Security in coordinating the implementation of the DBCP, by providing authoritative advice as and when required, facilitating sound decision making and disseminating information and instructions within the Government and to the public.

N.B.

- 1. Other Heads of bureaux or departments or their representatives may be co-opted into ITF at the discretion of S for S.
- 2. All representatives should be at sufficiently senior levels with delegation to speak authoritatively on behalf of their bureaux/departments and provide professional advice competently at ITF.

- 3. Bureaux/departments concerned must provide such representatives 24 hours a day during any emergency for duty in EMSC if required.
- 4. The representative of each department at the press conference convened by EMSC or ITF should preferably be at directorate level. In the event ITF and press conference are to be attended by different officers of the same department, issues discussed at ITF should be brought to the attention of the attending officer prior to the press conference.

CHAPTER 3

NOTIFICATION AND ASSESSMENT OF INFORMATION CONCERNING A NUCLEAR INCIDENT OR ACCIDENT AT THE GNPS/LNPS

Notification of a Nuclear Incident

3.1 The management of the GNPS/LNPS has adopted IAEA's fourcategory system for classifying nuclear and radiological emergencies –

Emergency Standby	Safety levels may be reduced at the plant.
Plant Emergency	Radiological consequences of the emergency are confined to a section of the plant.
Site Emergency	Radiological consequences of the emergency are confined to the site.
Off-Site Emergency	Radiological consequences of the emergency extend beyond the site boundary.

A more detailed description is at paragraph 1.11.

(a) <u>Notification by Guangdong</u>

3.2 The emergency organisation in Guangdong responsible for coordinating the Guangdong authorities' response to a nuclear emergency at the GNPS/LNPS is the Prevention and Emergency Administrative Commission Office of Guangdong Province for Nuclear Accident of Civil Nuclear Facility (PEACO). It will be informed promptly by the plant operator of all accidents at the GNPS/LNPS, except some minor Emergency Standby situations.

3.3 On making an Off-Site Emergency declaration by the relevant Mainland Authority, PEACO will immediately inform HKO which acts as S for S' representative in this matter. The Fire Services Communication Centre (FSCC) serves as backup of HKO for this purpose. The initial information to be given is at *Annex 3.1*. Written information will be given in simplified Chinese characters and spoken information in Putonghua. The Duty Officer of HKO will acknowledge receipt and then the assessment process will begin (see paragraph 3.12).

3.4 In respect of non off-site emergencies, PEACO will also notify Hong Kong. The scope, contents and form of notifications are at *Annex 3.2*.

(b) <u>Notification by IAEA</u>

3.5 China is a signatory to IAEA's Convention on Early Notification of a Nuclear Accident. Under this Convention, China is obliged to inform IAEA of any accident at a nuclear facility from which a release of radioactive material occurs or is likely to occur that may have transboundary radiological consequences. Subsequently, HKO would receive information from IAEA source in English or simplified Chinese characters in addition to the notification by PEACO.

(c) <u>Other sources of information concerning a possible nuclear incident</u> <u>at the GNPS/LNPS</u>

(i) HKO's Radiation Monitoring Network

3.6 The Radiation Monitoring Network (RMN), consisting of twelve field stations, is operated by HKO to monitor the real-time ambient gamma radiation level. An alarm will sound at HKO's Headquarters if there is a significant increase of the ambient radiation level at any one of these stations. Such an increase can be of a meteorological origin and need not be due to an accidental release of radioactive materials from the GNPS/LNPS. Additional radiation measurements and enquiries on the status of the GNPS/LNPS may be made to ascertain the cause of the alarm. HKO will alert the SB or other relevant departments if there are indications that the alarm could be due to an accident at the GNPS/LNPS (see Chapter 4 for further details).

(ii) WSD's real-time On-line Water Contamination Monitoring Systems at Muk Wu Pumping Stations

3.7 There are two identical real-time On-line Water Contamination Monitoring Systems at Muk Wu Pumping Stations to monitor raw water imported from Guangdong Province. Alarms will sound at HKO and WSD (Sha Tin Water Treatment Works) if there is a significant increase in radiation level. HKO and WSD will investigate the cause of the alarm and arrange for detailed analysis of water samples if necessary. HKO and WSD will alert SB if the alarm is found to be genuine after confirmation analysis.

(iii) FEHD's monitoring of food and live food animals at the points of entry and Sheung Shui Slaughterhouse

3.8 FEHD monitors the radioactivity of food and live food animals imported from the Mainland at Man Kam To and Lok Ma Chau Control Points. Livestock Contamination Monitoring Systems have been installed to monitor the radioactivity of livestock at Man Kam To and Lok Ma Chau Control Points and Sheung Shui Slaughterhouse. Imported poultry are also screened by using the hand-held Poultry Contamination Monitoring Systems at the two Control Points. FEHD also monitors the radioactivity in food during their routine food surveillance. Food samples will be collected and checked. Samples with radioactivity level found exceeding the prevailing CAC Guideline Levels will be further analysed by the Government Laboratory (GL). FEHD will alert SB if the finding is confirmed after the detailed analysis (see Chapter 9 for further details).

(iv) Reports from travellers, media enquiries and other sources

3.9 All departments should be alert to receiving information about incidents at the GNPS/LNPS. They should pass such information fully and promptly, together with an assessment of its reliability, to HKO's Duty Officer and SB's Duty Officer (SBDO) (and the appropriate desk officer, if during office hours) for assessment. Possible sources of information could include reports from travellers from near the GNPS/LNPS, media enquiries about abnormal events at the GNPS/LNPS and injured workers from the GNPS/LNPS being medevaced to Hong Kong. In the latter case, the Chief Executive of the Hospital Authority (HA) and HA Head Office Duty Officer should be informed if exposure to radioactivity is suspected (such exposure does not necessarily indicate a nuclear incident).

(d) <u>Notification by CLP Power Hong Kong Limited (CLP) and the</u> <u>Hong Kong Nuclear Investment Company (HKNIC) concerning a</u> <u>possible nuclear incident at the GNPS</u>

3.10 CLP are obliged under the Electricity Ordinance to notify the Director of Electrical and Mechanical Services of a loss or impending loss of all or a portion of the electric supply from a power source outside Hong Kong. A power supply interruption from the GNPS may indicate an abnormality at the power station but is not conclusive evidence of a nuclear incident. CLP-System Control Centre at Tai Po (CLP-SCCT) will be informed by DNMC of the power interruption and can itself immediately detect the interruption in its monitoring system. EMSD and HKO will be alerted by CLP-SCCT according to an established notification system for power interruptions. CLP will send HKO and EMSD the first notice and incident report within 15 and 30 minutes respectively from the time of occurrence. FSCC serves as backup of HKO for this purpose. The information obtained can then be assessed.

3.11 The Permanent Secretary for Security and the Permanent Secretary for the Environment are both board members of HKNIC and may be in a position to obtain further clarification from HKNIC on events at the GNPS.

Assessment of Notification of a Nuclear Incident or of Information indicating the Possibility of a Nuclear Incident

3.12 The decision on the activation level of the DBCP will be made by S for S (or his designated representatives, normally Deputy Secretary for Security 2). To perform this task, he will need advice from HKO, EMSD and

DH. These people and organisations will be informed of the situation requiring assessment by the Duty Officer of HKO using the alerting chart at *Annex 3.3*.

3.13 The Director of HKO (or his designated representative Assistant Director (Radiation Monitoring and Assessment)) will determine the level of activation of the Hong Kong Observatory Monitoring and Assessment Centre (HKOMAC). HKOMAC will be the focal point for the collection, collation and analysis of data on the developing situation. It will provide a recommendation to S for S on the appropriate level of activation of the DBCP.

3.14 A procedure for determining the level of activation of the DBCP is at *Annex 3.4*. Once the decision is made, it must be communicated immediately to HKOMAC which will initiate the appropriate alerts to departments (see *Annexes 3.5 (a)-(c)*). If, within 30 minutes of receiving the first notification, S for S is not convinced that there is no nuclear incident/accident, then he should activate the DBCP at OBSERVATION level or above. If the assessment of rumours or media reports of a nuclear incident at the GNPS/LNPS indicates no such an incident, then a press release should be prepared immediately by ISD and authorised for issue by S for S (see Chapter 5 concerning the issue of press releases).

Activation Levels of the Daya Bay Contingency Plan

3.15 There are four levels of activation in the DBCP to provide an appropriate level of reassurance and protective measures to reduce the consequences of a nuclear incident or accident at the GNPS/LNPS. S for S, or his designated representative, will determine the appropriate level of activation of the DBCP following the assessment procedures described in the preceding paragraphs. These four levels are, in ascending order -

- (a) OBSERVATION
- (b) READY
- (c) PARTIAL ACTIVATION
- (d) FULL ACTIVATION

A brief description of each level and the action to be taken is given in paragraphs 3.16 to 3.19 below.

(a) <u>Observation</u>

3.16 Emergency Standby events and prolonged investigations of indications of a nuclear emergency at the GNPS/LNPS will be handled at this

level. Indications of a possible nuclear emergency include power interruptions, media information and rumours concerning the operation of the GNPS/LNPS.

- EMSC will be on stand-by and manned by the Emergency Support Unit personnel.
- HKOMAC will be activated partially or fully.
- EMSD Co-ordination Office will be manned.
- EMSC, HKO, EMSD Co-ordination Office and DH will keep a close watch on the developing situation and maintain close communication.
- ISD and the Hong Kong Police Force (HKPF) will be kept informed.
- HKO may order additional radiation monitoring; HKO monitoring teams may need to be transported by the Government Flying Service (GFS) and HKPF. (Chapter 4)
- Press release may be issued.

The alerting chart for this level is at *Annex 3.5(a)*.

(b) <u>Ready</u>

3.17 Plant Emergency events and situations where it is assessed that there is a probable incident of radiological significance but there are no indications that the release, if any, will affect Hong Kong, will be handled at this level.

- All key bureaux and departments will be notified and advised to be at a heightened state of readiness.
- EMSC will be opened at partial manning levels; certain Liaison Officers may be required to report to EMSC.
- HKOMAC will be fully activated and will continually assess the situation in conjunction with EMSD, SB (EMSC) and DH.
- EMSD Co-ordination office and DH Radiation Health Unit will be manned.
- HKOMAC may initiate additional radiation monitoring at the designated fire stations. The Government Laboratory (GL) may be involved in the sample pre-treatment, the Civil Aid Service

(CAS) in the collection and delivery of samples, and the GFS and HKPF in the transportation of mobile survey teams. (Chapter 4)

- Press releases may be issued.
- HKPF and relevant departments may make preparations for taking countermeasures on Ping Chau and in Mirs Bay.

The alerting chart for this level is at *Annex 3.5(b)*.

(c) <u>Partial Activation</u>

3.18 Site Emergency events and situations where it is assessed that there is an incident of radiological significance, but there are no indications that the release, if any, will affect Hong Kong, will be handled at this level.

- All relevant bureaux and departments will be notified and advised to prepare to mobilise quickly, if required to do so.
- EMSC will be opened at partial or full level manning. HKO, EMSD, DH, ISD and Police Liaison Officers will report there. AFCD, WSD, Environmental Protection Department (EPD), FEHD, Auxiliary Medical Service (AMS) and CAS Liaison Officers may also be required. (Chapter 2)
- HKOMAC will be fully activated and will continually assess the situation in conjunction with EMSD, SB (EMSC) and DH.
- EMSD Co-ordination office and DH Radiation Health Unit will be manned.
- ISD CIC will be activated.
- DH may alert the Radiological Protection Advisory Group (RPAG).
- HKOMAC will initiate additional radiation monitoring at the designated fire stations. GL may be involved in the sample pretreatment, CAS in the collection and delivery of samples, and GFS and HKPF in the transportation of mobile survey teams. (Chapter 4)
- WSD will initiate additional monitoring. (Chapter 9)
- AFCD, EPD, HKO and Leisure and Cultural Services Department (LCSD) will initiate additional marine water monitoring. (Chapter 4)

- FEHD will prepare to enhance monitoring of food, live food animals at points of entry, wholesale and retail outlets as appropriate. AFCD will monitor fresh food, live food animals at farms and wholesale markets. Where necessary, sample food monitoring may commence at this level. (Chapter 9)
- AMS and Customs and Excise Department (C&ED) will start preparations for monitoring incoming persons and goods at the points of entry if necessary. Government Logistics Department (GLD) will prepare for transportation requirements. (Chapter 7)
- AMS, CAS, FSD, LCSD, WSD, Drainage Services Department (DSD), HA, GLD and DH will be at an enhanced state of readiness to prepare for a progressive opening of Monitoring Centres (MCs) and Emergency Radiation Treatment Centres (ERTCs) if necessary. (Chapter 8)
- The plan for taking countermeasures on Ping Chau and in Mirs Bay may be activated. (Chapter 6)

The alerting chart for this level is at *Annex 3.5(c)*.

(d) <u>Full Activation</u>

3.19 Off-Site Emergency events and situations where it is assessed that an off-site release has occurred or is about to occur will be handled at this level.

- All relevant bureaux and departments will be notified and required to mobilise immediately as necessary.
- EMSC will be opened at full level manning. HKO, EMSD, DH, ISD, FSD and Police Liaison Officers will report there. AFCD, FEHD, WSD, EPD, Department of Justice (DoJ), AMS and CAS Liaison Officers may also be required. ITF will be convened. (Chapter 2)
- CESG is most likely to be convened.
- S for S will consider the need to activate the Emergency (Radiological Contamination) Regulation and make recommendation to CESG. (Chapter 12)
- HKOMAC will be fully activated and will continually assess the situation in conjunction with EMSD, SB (EMSC) and DH.

- DH will closely monitor the advice and temporary recommendations of the WHO, if any, for application in Hong Kong. (Chapter 7)
- EMSD Co-ordination office and DH Radiation Health Unit will be manned.
- ISD CIC will be activated and the Press Briefing Centre will be opened.
- DH will alert RPAG, and convene meetings as and when necessary.
- HKOMAC will continue the additional radiation monitoring at the designated fire stations. GL may be involved in the sample pre-treatment, CAS in the collection and delivery of samples, and GFS and HKPF in the transportation of mobile survey teams. (Chapter 4)
- AFCD, EPD, HKO and LCSD will initiate additional marine water monitoring. (Chapter 4)
- WSD will initiate additional monitoring. (Chapter 9)
- FEHD and AFCD will monitor food and live food animals at points of entry, wholesale and retail outlets and on farms as appropriate. (Chapter 9)
- AMS and C&ED will prepare to monitor incoming persons and goods at the points of entry. (Chapter 7)
- AMS, CAS, FSD, LCSD, WSD, DSD, HA, GLD and DH will prepare to open MCs and ERTCs to provide necessary assistance to the public on instructions from S for S in consultation with ITF. (Chapter 8)
- The plan for taking countermeasures on Ping Chau and in Mirs Bay may be activated. (Chapter 6)
- EPD will make preparations to implement the Waste Disposal Action Plan. (Chapter 10)

The alerting chart for this level is at *Annex 3.5(c)*.

3.20 Throughout an emergency at the GNPS/LNPS, S for S will continually assess the activation level of the DBCP. It is not necessarily that the activation levels are raised in sequence. Some may be omitted. Therefore,

HKSARGDBCP – Chapter 3

it is important at lower levels of activation to prepare for activities which might take place when the plan is at FULL ACTIVATION level. It may not be possible to estimate in advance the duration of each activation level.

The Stepping Down or Ceasing Operation of DBCP

3.21 S for S will, having regard to the prevailing situation and on the advice of ITF, order lower levels of activation of the DBCP or call-off the entire operation. All such messages will be routed through EMSC to relevant bureaux/departments.

3.22 Even if the emergency is over and the DBCP is deactivated, it might be necessary for relevant departments to continue some measures on their respective mandate for some time to deal with the aftermath or remaining consequences. For example, if the emergency has resulted in radiological releases, some substances might have got into the food chain. DH will continue to work with RPAG in seeking its advice on the intervention levels, facilitating FEHD, AFCD and WSD's consideration of the need to continue with the ingestion countermeasures as necessary. Relevant bureaux and departments should inform SB should there be any significant changes in the matter.

Annex 3.1

Information to be exchanged during an Off-Site Emergency at the GNPS/LNPS

3.1.1 (a) From Guangdong

Information will be given in simplified Chinese characters from PEACO to HKO (acting as the first point of contact or directly to EMSC after it is activated), as follows –

- (i) the time of the occurrence and the nature of the accident, and, if possible, the exact location of the accident;
- (ii) the facilities or activities involved;
- (iii) the estimated or established cause or foreseeable development of the nuclear accident which leads to a release of radioactive materials to the environment;
- (iv) the prevailing and forecast meteorological conditions (for release through water channels, hydrological conditions should also be included);
- (v) the general features of the release of radioactivity. The following information should be included, provided that it is possible in practice and appropriate –
 - the nature of the release of radioactivity,
 - the likely physical and chemical forms,
 - quantity and composition, and
 - the effective height of release;
- (vi) the results of environmental monitoring after the radioactive materials have been released;
- (vii) the off-site protective measures which have been taken or planned to be taken; and
- (viii) the predicted behaviour of the radiological release.

(b) From Hong Kong

Information will be given in simplified Chinese characters from EMSC or HKOMAC, if EMSC is not yet in full operation, to PEACO, as follows –

- (i) the prevailing and forecast meteorological conditions (within the area of Hong Kong);
- (ii) the situation and results of radiological monitoring of the environment;
- (iii) the protective measures which have been taken or planned to be taken for the Hong Kong public;
- (iv) the predicted consequences in the plume exposure pathway; and
- (v) the reaction of the Hong Kong public.

3.1.2 Information from Guangdong as in (a)(i) will be given immediately after PEACO declares an Off-Site Emergency at the GNPS/LNPS; information as in (a)(ii)-(viii) promptly as it becomes available. Updates will be given at least every six hours or immediately on detecting significant changes. More detailed information on follow-up monitoring and meteorological information to be provided, on a more frequent basis, is given in *Annex 4.4*.

3.1.3 Information given by Hong Kong to Guangdong will similarly be updated at least every six hours or immediately on detecting significant changes.

Annex 3.2

Information to be exchanged in respect of Non Off-Site Emergency at the GNPS/LNPS

Notification by both sides when the GNPS/LNPS enters a Site Emergency situation

3.2.1 Notification to the Hong Kong Side by the Guangdong Side

- 3.2.1.1 Timing and frequency of notification
 - a) First notification: to be made by PEACO as soon as possible based on the circumstances at the time and at the latest two hours after being notified by the GNPS/LNPS that it has entered a Site Emergency situation.
 - b) Follow up notification
 - i) if there is no significant change in the information to be notified under section 3.2.1.2 herein, notification will be made once every six hours.
 - ii) if there are significant changes in the information to be notified under section 3.2.1.2 herein, the information will be notified as soon as possible.
- 3.2.1.2 Contents of notification

When the GNPS/LNPS enters a Site Emergency, the following information will be provided as available at that time -

- a) the time of the occurrence and the nature of the accident, and, if appropriate, the exact location of the accident;
- b) the facilities or activities involved, including, if appropriate, the current condition of the reactor and the safety system;
- c) the estimated or established cause for or foreseeable development of the accident;

- d) the prevailing and forecast meteorological conditions;
- e) the general features of the release of radioactivity. The following information should be included provided that it is possible in practice and appropriate
 - the nature of the release of radioactivity,
 - the likely physical and chemical forms,
 - quantity and composition, and
 - the effective height of release;
- f) abnormal environmental radiation monitoring data;
- g) off-site protective measures planned to be taken; and
- h) the predicted behaviour of the radiological release.
- 3.2.1.3 Form of notification

Notification will be carried out in the same way as the Off-Site Emergency.

3.2.2 Notification to the Guangdong Side by the Hong Kong Side

- 3.2.2.1 Timing and frequency of notification
 - a) First notification
 - i) If the Hong Kong side receives information that the GNPS/LNPS has entered a Site Emergency situation before it has been notified by the Guangdong side, the Hong Kong side will notify the Guangdong side of the information obtained immediately upon receipt of the information.
 - ii) When the first notification is made by the Guangdong side to the Hong Kong side, the Hong Kong side will provide the same information as detailed in section 3.2.2.2 herein, within two hours of receipt of the first notification.
 - b) Follow up notification -

- i) If there are no significant changes in the information to be notified under paragraph 3.2.2.2 herein, follow-up notification will be made at least once every six hours.
- ii) if there are significant changes in the information to be notified under paragraph 3.2.2.2 herein, follow-up notification will be made as soon as possible.
- 3.2.2.2 Contents of notification

When the Hong Kong side has obtained information that the GNPS/LNPS has entered a Site Emergency situation, the Hong Kong side will provide the Guangdong side with -

- a) the Hong Kong side's understanding of the situation of the accident at the GNPS/LNPS;
- b) the prevailing and forecast meteorological conditions (within the area of Hong Kong);
- c) any abnormal environmental radiation data if monitoring has started;
- d) the protective measures which have been taken or are planned to be taken for the Hong Kong public; and
- e) the reactions of the Hong Kong public.
- 3.2.2.3 Form of notification

Notification will be carried out in the same way as the Off-Site Emergency.

Notification by Either Side under Other Emergency Situations (including Plant Emergency and Emergency Standby) and for Other Nuclear Incidents

3.2.3 Timing and Contents of Notification

3.2.3.1 Notification to the Hong Kong side by the Guangdong side

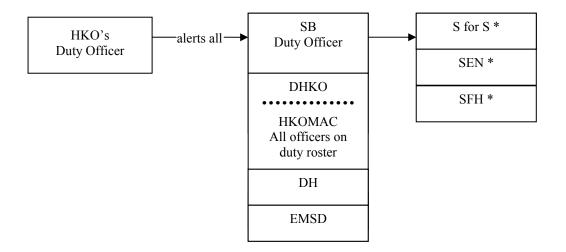
When a nuclear accident leading to a Plant Emergency or an Emergency Standby, or any other nuclear incident, occurs at the GNPS/LNPS, the Guangdong side will notify the Hong Kong side at the same time as it notifies IAEA in accordance with the INES Event Rating Form. The Hong Kong side may contact the Guangdong side through the liaison channel when it would like to further clarify the contents of the notification.

- 3.2.3.2 Notification to the Guangdong side by the Hong Kong side
 - a) If the Hong Kong side receives information that a Plant Emergency, Emergency Standby or any other nuclear incident has occurred at the GNPS/LNPS before it has been notified by the Guangdong side, the Hong Kong side will notify the Guangdong side of the information it has received.
 - b) When the Guangdong side has confirmed the situation to the Hong Kong side, the Hong Kong side will provide to the Guangdong side -
 - (i) the Hong Kong side's understanding of the situation of the accident at the GNPS/LNPS; and
 - (ii) the reactions of the Hong Kong public.
- 3.2.3.3 Form of notification

All notifications will be made in writing.

Annex 3.3

Daya Bay Contingency Plan Alerting Chart No. 1 Notification for Assessment of Activation Level in response to an Indication of a Possible Incident at the GNPS/LNPS



* For information only



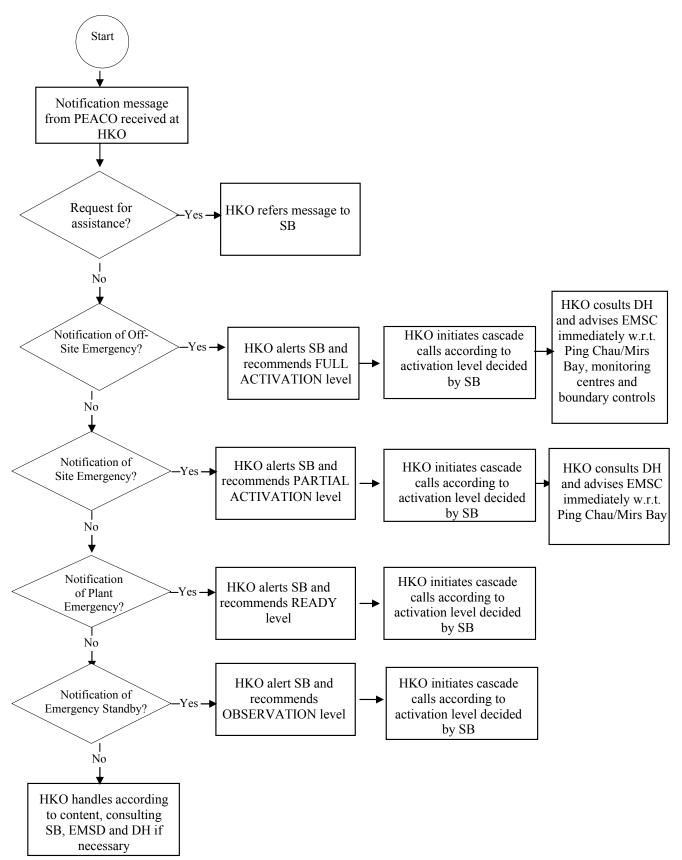
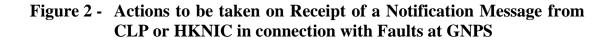
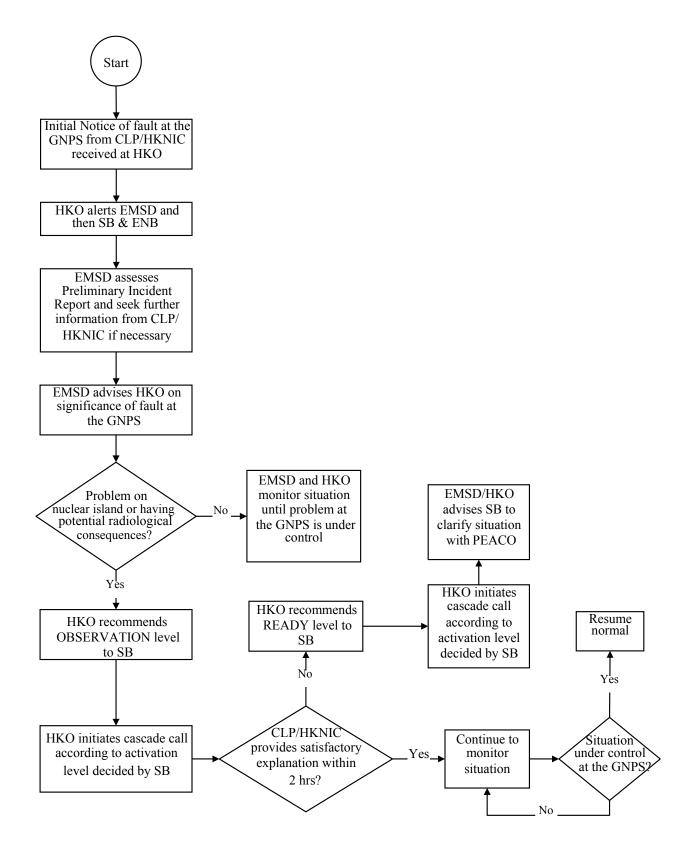


Figure 1 - Actions to be taken on Receipt of an Emergency Message from PEACO





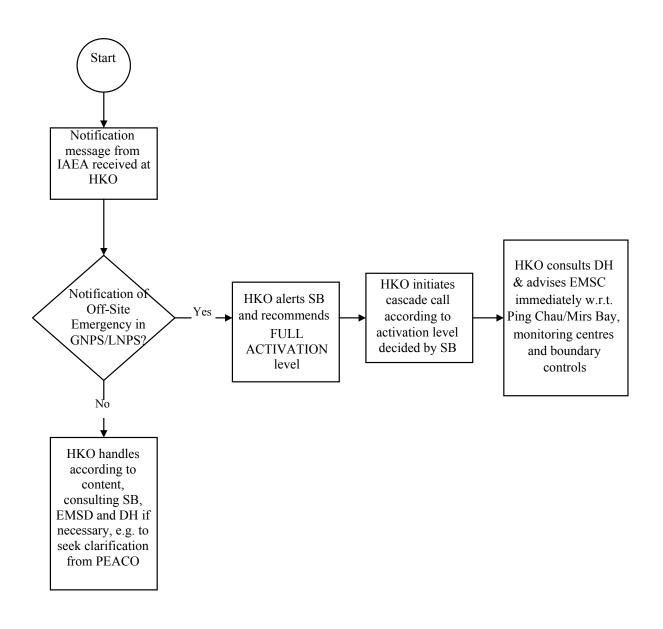


Figure 3 - Actions to be taken on Receipt of an Emergency Message from IAEA

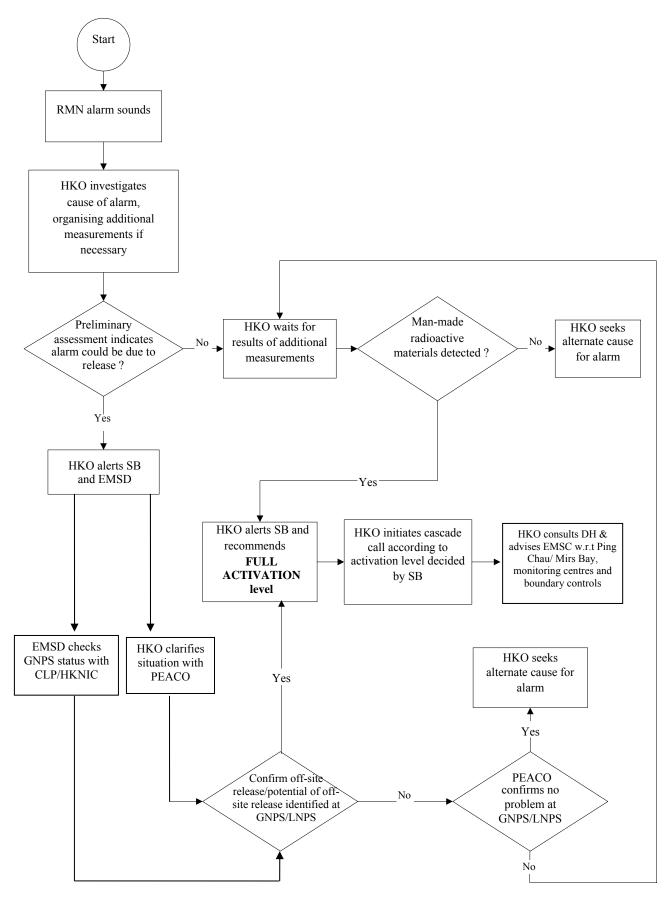


Figure 4 - Actions to be taken when the Alarm of the Radiation Monitoring Network is triggered

Figure 5 -Actions to be taken when the Alarm of the On-line Water Contamination Monitoring Systems (OWCMS) at Muk Wu Pumping Stations is triggered

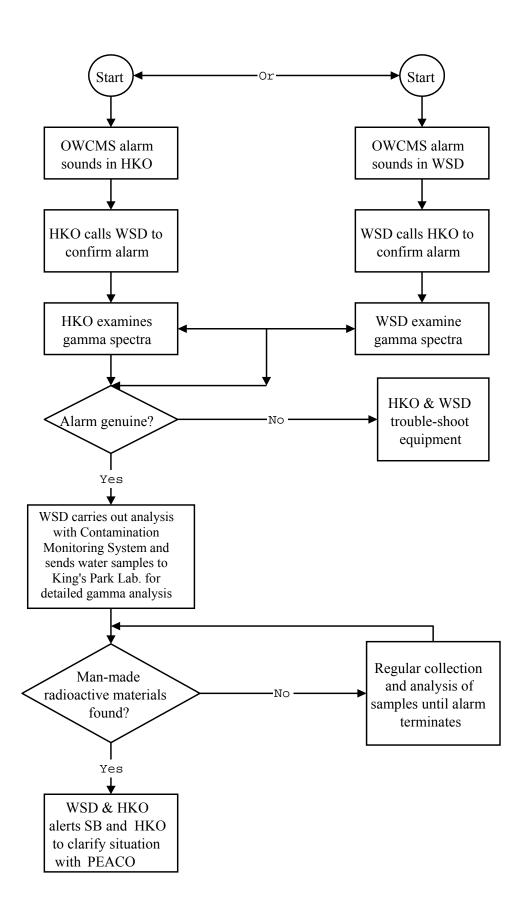


Figure 6 - Actions to be taken when Radiation-contaminated Food or Live Food Animals is detected during Routine Monitoring at Man Kam To & Lok Ma Chau Control Points and Sheung Shui Slaughterhouse

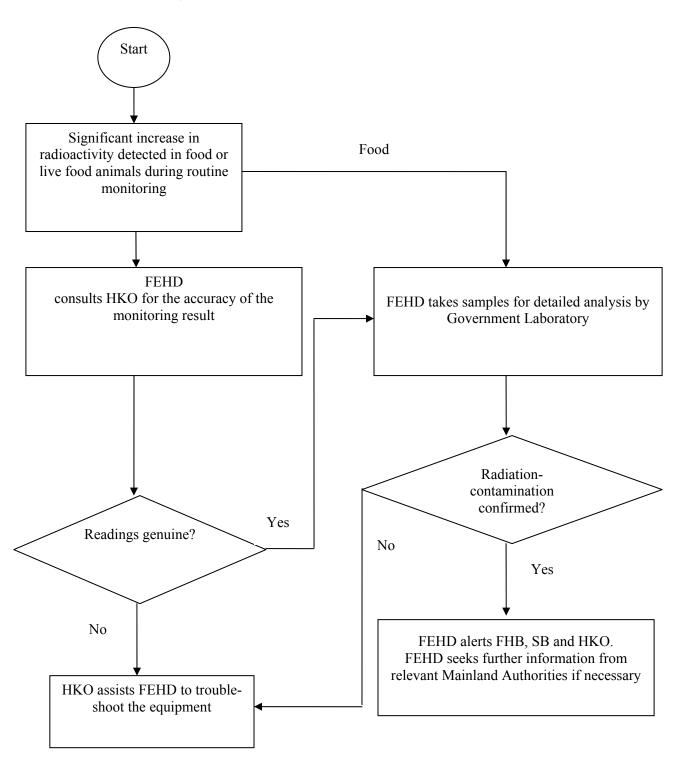
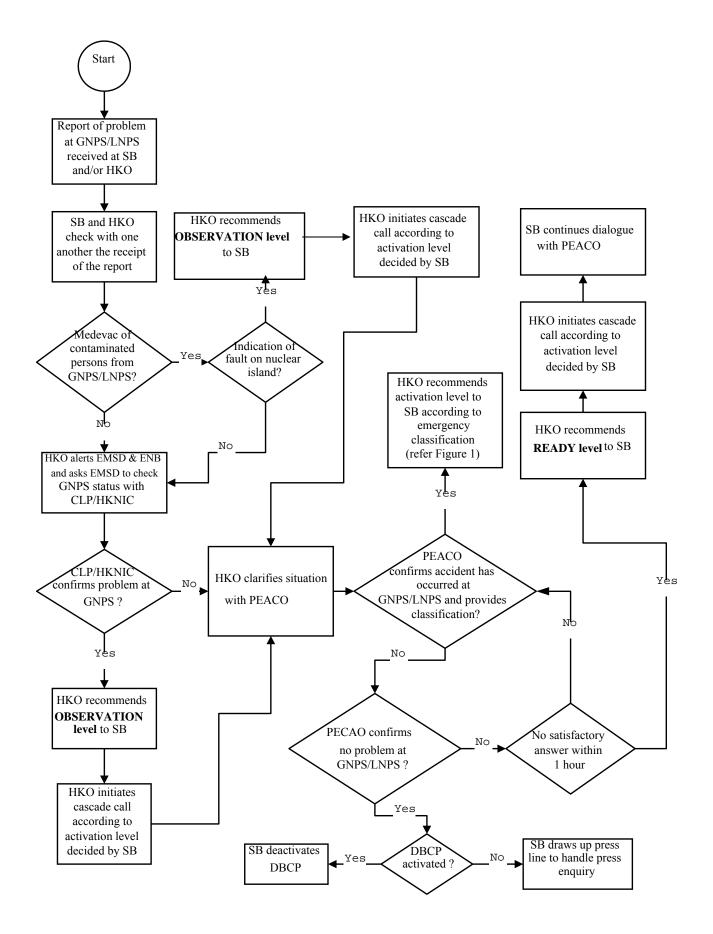
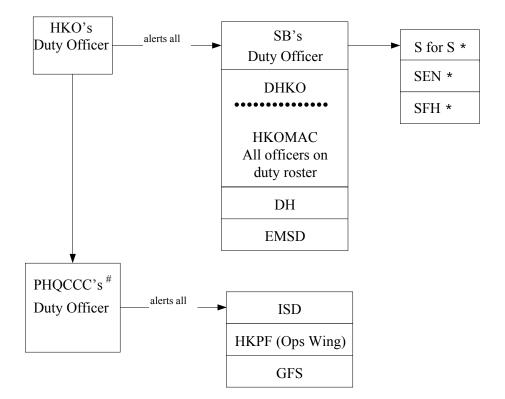


Figure 7 - Actions to be taken in response to Miscellaneous Reports of Problems at the GNPS/LNPS from Other Sources (including Rumours)



Annex 3.5(a)



Daya Bay Contingency Plan Alerting Chart No. 2 Notification for OBSERVATION Level

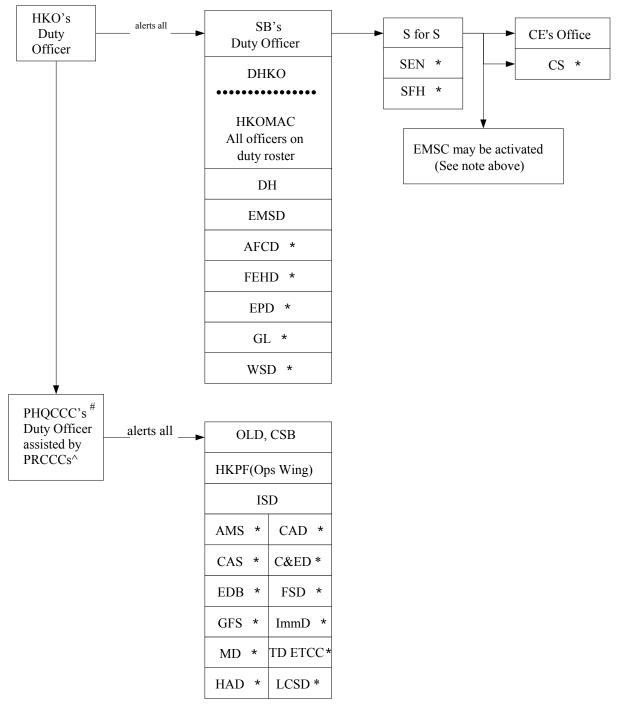
* For information only

PHQCCC denotes Police Headquarters Command and Control Centre

Annex 3.5(b)

Daya Bay Contingency Plan Alerting Chart No. 3 Notification for READY Level

Upon the decision to activate the plan at this level, the HKOMAC and ISD will be activated, EMSC may be activated at initial or partial manning level by SB depending upon circumstances. All other departments will be on standby and must be able to respond quickly should the situation deteriorate.

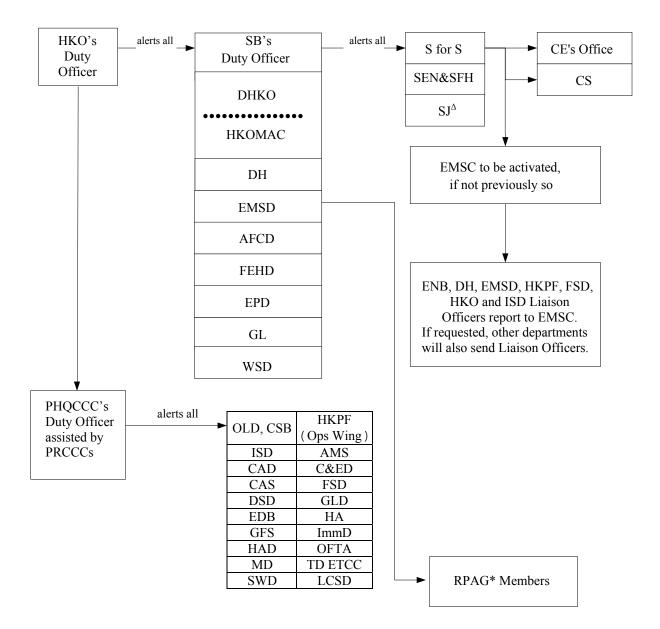


- * For information only
- # PHQCCC denotes Police Headquarters Command and Control Centre
- ^ PRCCC denotes Police Regional Command and Control Centre

Annex 3.5(c)

Daya Bay Contingency Plan Alerting Chart No. 4 Notification for PARTIAL and FULL ACTIVATION Level

Upon the decision to activate the plan at this level, the EMSC will be activated at partial or full manning level depending on the circumstances. All other departments will move to immediate standby and must respond rapidly.



 $^{\Delta}$ Secretary for Justice

- # PHQCCC denotes Police Headquarters Command and Control Centre
- ^ PRCCC denotes Police Regional Command and Control Centre
- * Radiological Protection Advisory Group

CHAPTER 4

RADIATION MONITORING AND ASSESSMENT

RADIATION MONITORING IN NORMAL TIMES

4.1 HKO has established an on-going Environmental Radiation Monitoring Programme (ERMP) to determine long-term changes in environmental radiation levels in Hong Kong, particularly those arising from the operation of the GNPS and the LNPS. The programme covers the three major exposure pathways, namely the atmospheric pathway, the terrestrial pathway and the aquatic pathway. In respect of the measurement, there are two major components including (i) direct measurement of ambient radiation levels and (ii) detection of any artificial radioactive materials, arising from the operation of the GNPS/LNPS, in the environment of Hong Kong and in the food commonly consumed by Hong Kong people. The environmental radiation measurement and sampling locations are shown in *Annex 4.1*.

4.2 HKO operates an extensive network of automatic weather stations throughout Hong Kong. Wind direction, wind speed, temperature and rainfall data are collected from these stations every minute by the central station at the HKO Headquarters. The data can be analyzed and utilized to assess the transportation, dispersion and deposition of radioactive materials which might be released from the GNPS/LNPS.

4.3 HKO also routinely obtains radiation monitoring data available from the Ministry of Environmental Protection (MEP) and the Macao Meteorological and Geophysical Bureau.

Monitoring of Radioactivity in the Air and on the Ground

4.4 An important component of ERMP is Radiation Monitoring Network (RMN) consisting of 12 radiation monitoring stations in Hong Kong (*Annex 4.2*). Each of these stations measures continuously the ambient gamma dose-rate in real time and transmits the dose-rate readings to the HKO Headquarters once every minute. When the reading exceeds a pre-set threshold, an alarm will sound at the HKO Headquarters to alert the Duty Officer of the rise in ambient radiation level. The background ambient gamma dose-rate fluctuates with the season and weather, and typically varies between 0.06 and 0.30 microsievert¹ per hour, with the high end of this range occurring during heavy rain situations. There are also air particulate samplers, radioiodine samplers and deposition collectors at each field station. In particular, air

¹ The health effect of ambient gamma radiation, usually expressed in unit of microsievert, is numerically equal to the ambient gamma dose expressed in microgray.

HKSARGDBCP – Chapter 4

particulate, deposition and radioiodine samples are collected regularly at King's Park while air particulate and deposition samples are collected regularly at Yuen Ng Fan and Sha Tau Kok for analysis at the King's Park Radiation Laboratory.

4.5 HKO operates an Automatic Gamma Spectrometry System (AGSS) at Ping Chau (*Annex 4.2*). The system continuously collects air particulate samples and gaseous iodine samples and measures continuously the activity concentrations of selected natural and artificial radionuclides in the air particulate samples. The measurement results are transmitted back to the HKO Headquarters automatically at regular intervals. Gross alpha and beta measurements on the air particulate sample, iodine concentration measurement and gamma-emitting artificial radionuclides measurement are also performed by the system, with the measurement results transmitted to the HKO Headquarters automatically. An alarm will sound at the HKO if any of the readings exceeds the pre-set threshold to alert the Duty Officer of the rise in the radiation level.

4.6 To measure accumulated ambient gamma dose over a specified period of time, HKO runs a Thermoluminescent Dosimeter (TLD) network comprising 29 monitoring points over the territory (*Annex 4.1*). A batch of five TLDs is placed at each site to ensure the statistical accuracy.

4.7 HKO also operates an Aerial Radiation Monitoring System (ARMS). During operation, the system would be mounted on board a Government Flying Service's helicopter to monitor the radiation levels on the ground surface and at various altitudes over the territory of Hong Kong. In normal situations, survey flights are scheduled at regular intervals to determine the radiation levels under different weather conditions. The radiation levels obtained in these survey flights serve as background values for assessment purposes in the case of an accidental release from the GNPS/LNPS.

4.8 In addition, a special vehicle equipped with portable and specially designed instruments is used by HKO in routine radiological surveys to measure the ambient gamma dose-rates and surface radioactivity concentration and to collect air particulate, radioiodine, soil and surface water samples at selected locations along assigned routes.

4.9 HKO measures the radioactivity in the upper atmosphere routinely by radioactivity sensors attached to balloon-borne radiosondes. Data from the radioactivity sensor is transmitted back and processed via the upper-air sounding system at the ground station.

Monitoring of Drinking Water, Underground Water and Marine Water

4.10 WSD runs two identical real time On-line Water Contamination Monitoring Systems at Muk Wu Pumping Stations to provide real-time monitoring of raw water imported from Guangdong Province and collect raw and treated water samples from different sources, including local catchment, impounding reservoirs, water treatment works and consumer taps for routine radiological analysis. WSD also collects water samples from designated points including High Island Reservoir, Plover Cove Reservoir, Muk Wu Pumping Station and the treatment works at Shatin, Tuen Mun and Yau Kom Tau for radiological analysis by the HKO under the ERMP (*Annex 4.1*).

4.11 With the assistance of the Housing Department (HD) and the respective estate management agencies, etc., HKO routinely collects underground water at six locations, namely Cheung Hong Estate (Tsing Yi), Kwan Lok San Tsuen (Yuen Long), Wan Tsui Estate (East Hong Kong Island), Wah Fu Estate (Pokfulam), Fu Shan Estate (East Kowloon) and Ching Leung Nunnery (Tuen Mun) (*Annex 4.1*) for radiological analysis.

4.12 Marine water samples are routinely collected by the EPD for HKO's analysis at four locations in the eastern part of the coastal waters of Hong Kong, namely waters off Waglan Island, Basalt Island, Tai Long Wan and Port Island (*Annex 4.1*).

Monitoring of Land Soil and Sediments

4.13 Land soil samples are collected routinely at 39 designated sites throughout the territory (*Annex 4.1*). At each site, samples are collected by HKO from two layers, the upper layer from the surface to 15 cm deep and the lower layer from 15 cm to 30 cm deep.

4.14 HKO routinely collects intertidal sediments at three locations along the coast of Hong Kong, namely Pak Sha Wan, Tsim Bei Tsui and Sha Tau Kok while samples of seabed sediments are collected with the assistance of the Civil Engineering and Development Department (CEDD) at four locations in the coastal waters of Hong Kong namely, Tai Tan Hoi, Lung Ha Wan, Picnic Bay and Western Anchorage (*Annex 4.1*).

Monitoring of Food

4.15 Under the ERMP, HKO routinely collects both terrestrial and aquatic food typical of diet of the local population from main retail points, wholesale markets and enlisted suppliers for radiation monitoring and analysis.

4.16 Livestock Contamination Monitoring Systems have been installed to monitor the radioactivity of livestock at the Man Kam To and Lok Ma Chau Control Points and Sheung Shui Slaughterhouse. Imported poultry are also screened by using the hand-held Poultry Contamination Monitoring Systems at two Control Points. FEHD also monitors the radioactivity in food during their routine food surveillance. Food samples will be collected and checked. Samples found exceeding threshold values will be further analysed by GL (Chapter 9).

ENHANCED MONITORING DURING A NUCLEAR EMERGENCY

4.17 HKOMAC will be activated as soon as the Director of the Hong Kong Observatory sees the need to do so, even before OBSERVATION level is declared by S for S. The Controller of HKOMAC will determine if and when the following enhanced radiation monitoring is required -

- (a) remotely activate samplers of air particulate and radioiodine to collect additional samples at RMN stations;
- (b) deploy mobile survey teams to measure ambient gamma doserates and surface radioactivity concentration, and to collect additional air particulate, radioiodine, soil and water samples at possible hot spots or monitoring sites (with additional survey routes as appropriate or rapid dispatches to specific areas) for analysis;
- (c) deploy ARMS on board a GFS helicopter to track the plume coverage (plume phase) or measure the extent of ground level contamination (intermediate or late phase);
- (d) monitor and analyse the emergency radiation data available from PEACO and/or other sources; and
- (e) at PARTIAL or FULL ACTIVATION level or as the need arises, HKOMAC may request Fire Services Communication Centre Commander to take readings of ambient gamma dose-rate and collect air particulate and radioiodine samples at designated fire stations (*Annex 4.3*).

CAS may be requested by the HKOMAC to help deliver samples to the King's Park Radiation Laboratory. HKPF and GFS may be requested to provide land and helicopter transport respectively to and from remote locations.

4.18 When at PARTIAL or FULL ACTIVATION level, relevant departments may also carry out relevant enhanced monitoring activities, including the following -

(a) WSD will step up radiological monitoring of raw water imported from Guangdong Province, raw and treated water in Hong Kong by taking samples from the water supply system including local catchment, impounding reservoirs, water treatment works and consumer taps for radiological analysis (Chapter 9).

- (b) EPD will increase the frequency of marine water sampling at the designated collection points for HKO's analysis as needed. Besides, the radiation monitoring of marine water will be further enhanced to include LCSD gazetted beaches and Fish Culture Zones of AFCD.
- (c) AFCD and FEHD will carry out more extensive food monitoring (Chapter 9). HKO may provide details of likely affected area and the plume coverage if any to AFCD and FEHD to facilitate the food monitoring and will update such information whenever there are major changes. Food samples will be taken and checked by AFCD and FEHD and samples exceeding threshold values will be analysed by GL (Chapter 9), with results reported to HKOMAC.

Accident Consequence Assessment

4.19 To facilitate the assessment of the radiological consequences of a release, HKOMAC operates an Accident Consequence Assessment System (ACAS). ACAS is a computer-based system which has the capability to make use of weather observations and forecast information to simulate the transport and dispersion of the released radioactive material and to predict the radiation dose to the public in various parts of the territory, based on available information provided by Guangdong on the magnitude of the radiological release. Information from Guangdong, apart from normal meteorological data, is unlikely to be made available unless and until a Site Emergency or an Off-Site Emergency has been declared by PEACO. The information which may then become available is listed in *Annex 4.4* regarding radiation and meteorological monitoring; the content of the initial notification at this level can be found in Chapter 3 *Annexes 3.1* and *3.2*.

Advice on Countermeasures

4.20 With reference to the results of emergency radiation monitoring and ACAS simulation based on available information from Guangdong, the HKOMAC will, in consultation with DH and EMSD to take into consideration available information on plant conditions, advice of relevant international organisations and other relevant factors, advise S for S through EMSC on the necessary countermeasures.

4.21 Advice on countermeasures must be coordinated with DH's liaison officer deployed to EMSC. EMSD's assessment of the state of the nuclear power stations will also need to be taken into account. Specific advice that needs to be given to EMSC includes -

- (a) the evacuation or temporary sheltering of people on Ping Chau, taking into account the actual and forecast meteorological and sea conditions there (Chapter 6);
- (b) the imposition of control measures on water, food and live food animals (Chapter 9);
- (c) the imposition of measures to monitor persons and goods (Chapter 7);
- (d) the establishment of MCs and provision of demand estimates so that sufficient centres can be opened at appropriate locations (Chapter 8);
- (e) use of thyroid blocking agent by persons engaged in radiological monitoring work, persons on Ping Chau and Mirs Bay and those emergency responders assisting in the evacuation (Chapters 6 and 13);
- (f) the appropriate protective measures for government emergency workers (Chapter 13); and
- (g) any other countermeasures, for example evacuation/sheltering, which may be considered appropriate in the circumstances.

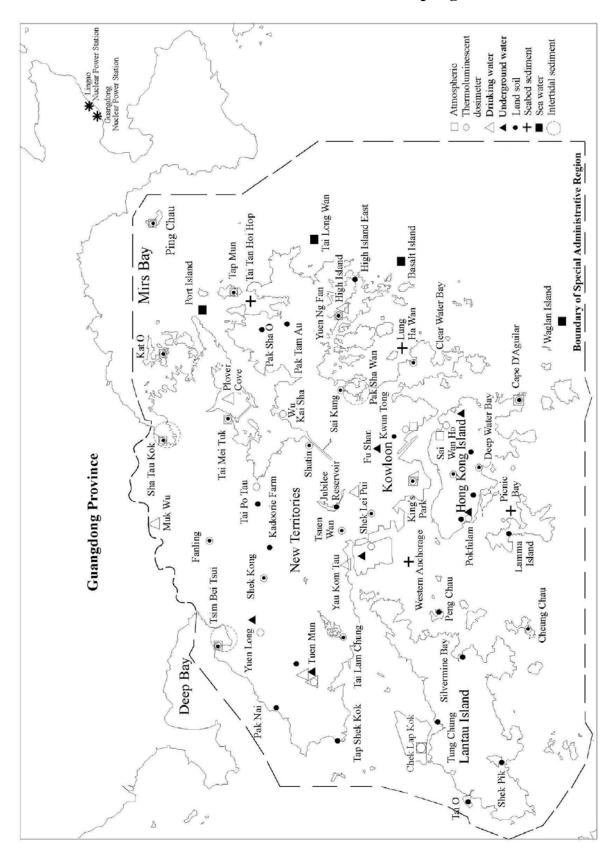
4.22 HKOMAC is required to provide the following information to EMSC, the information being updated as new information becomes available -

- (a) to confirm whether a release of radioactive materials has or has not taken place;
- (b) to produce regular predictions, even if no release of radioactive materials may have taken place, of which areas (in Hong Kong or in Guangdong) might be affected by the plume if a release were to take place;
- (c) to provide, in the event of a release, an indication of the areas in Hong Kong that are likely to be affected using grid reference map as in *Annex 4.5* and, when relevant information is available from Guangdong, to provide a similar assessment with respect to Guangdong to help to determine how best to safeguard the ingestion pathway; and
- (d) to advise on the projected dose that may be experienced along the projected path of the plume based on early assessment of the plume source term provided by PEACO.

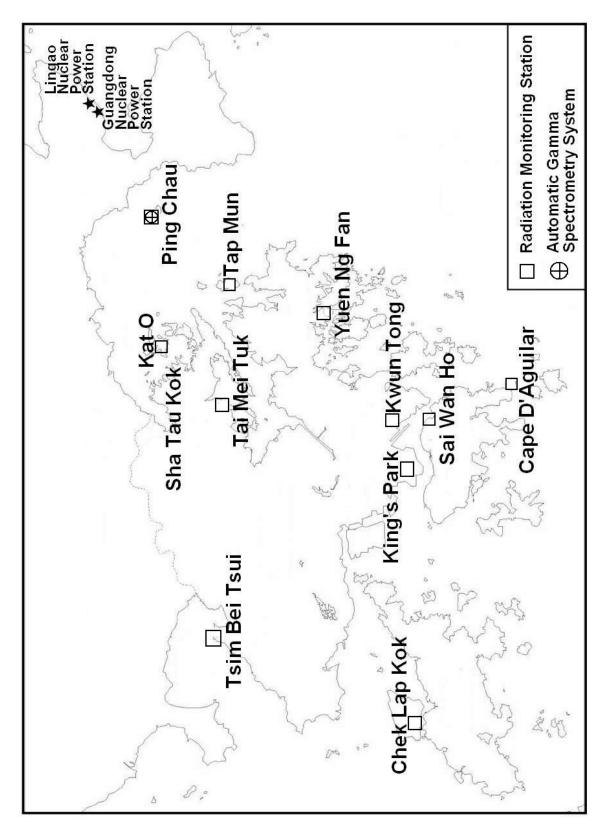
4.23 HKOMAC will also provide the information in paragraph 4.22 to the following departments for their information and necessary actions -

- (a) AFCD
- (b) DH
- (c) EMSD
- (d) FEHD
- (e) FSD
- (f) HKPF
- (g) WSD

4.24 Information in press releases will be based only on actual measurements (Chapter 5).



Environmental Radiation Measurement and Sampling Locations



Locations for Real-time Measurement of Ambient Radiation

Locations of Designated Fire Stations Conducting Radiation Monitoring



A. Radiation Monitoring Data to be sent from Guangdong during an Off-Site Emergency at the GNPS/LNPS

During the Early Phase

- 4.4.1 (i) Continuous gamma measurement results at eight monitoring points:
 - Pengcheng, Dongshan, Shuitou, Bagang, Shataujiao, Shenzhen, Beilong, Yangmeikeng;
 - to be provided every 30 minutes from PEACO through a direct computer link to HKOMAC;
 - (ii) Results of mobile monitoring of gamma radiation, alpha and beta contamination obtained along the road from Shataujiao (Shataukok) to Kuichong. (Mobile Route #3); and
 - (iii) Gaseous and liquid effluent data at the GNPS/LNPS.

During the Intermediate and Late Phase

- 4.4.2 (i) As (i), (ii) and (iii) above for the early phase;
 - (ii) Thermoluminescent Dosimeter data, monitoring data of deposition, rainwater, aerosol, animal, plant and food; and
 - (iii) raw water monitoring data from the inlet of the aqueduct and the Shenzhen Reservoir.

4.4.3 Frequency of exchange of monitoring data: continuous gamma measurement results once every 30 minutes; raw water monitoring data every 24 hours (if 50% of control value is exceeded frequency will be increased to 4 hourly); other data as soon as they are available.

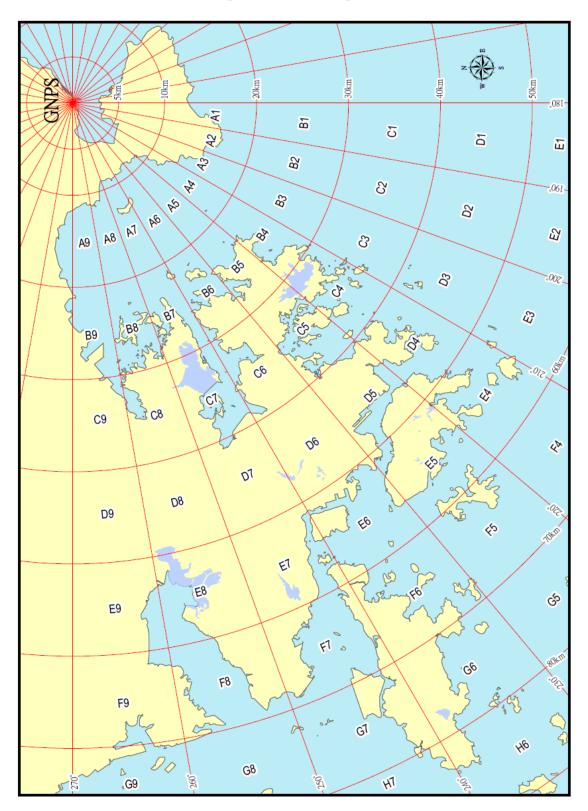
B. Meteorological Data to be sent from Guangdong during an Off-Site Emergency at the GNPS/LNPS

(i)	l0m level at the GNPS/LNPS:	wind direction, wind speed, temperature;
	80m level at the GNPS/LNPS:	wind direction, wind speed, temperature;
	Ground level at the GNPS/LNPS:	temperature and rainfall;

- (ii) wind direction, wind speed, temperature and rainfall from nine automatic weather stations; and
- (iii) other data as required by HKOMAC for accident consequence assessment data from upper air wind and manual surface stations.

Data will be disseminated by the Guangdong Emergency Meteorological Information Centre on a 30-minute frequency except data as in (i) above which will be disseminated with the emergency notification messages, probably by PEACO.

Annex 4.5



Grip Reference Map

CHAPTER 5

PUBLIC INFORMATION

EMERGENCY PREPAREDNESS

5.1 On-going public education in radiation and nuclear safety as well as protective actions to be taken during a nuclear emergency is an important part of our emergency preparedness. Some basic understanding in these areas will help prevent panic and the spread of ungrounded rumours should an accident happen. One particular focus is on the non-communicable and decaying nature of radioactive substances and the minimal public health risk of contaminated persons and goods in most cases.

5.2 SB and relevant departments including DH, HKO and EMSD have been making use of various channels and contributing contents to one another's efforts for comprehensive coverage, including webpages, television and radio Announcements in Public Interests, videos, pamphlets, booklets etc. Notably, a thematic website on the DBCP (www.dbcp.gov.hk) is in place, as a focal point and unified platform for disseminating useful information. It will also be a portal to in-depth, technical information hosted by other departments as well as entities outside Government such as nuclear plant owners and operators as well as authoritative national and international organizations. In the unlikely event of a nuclear accident at Daya Bay, this website will be used for posting important emergency response information for members of the public (paragraph 5.17 below).

5.3 Operational transparency at the GNPS/LNPS also plays an important part in educating the public. A host of information concerning the two nuclear power plants, including information relates to operational safety and performance, emergency preparedness and regulatory oversight, etc., is posted in the websites of DNMC (www.dnmc.com.cn). Relevant information on GNPS is also available at the website of HKNIC (www.hknuclear.com). In particular, within two working days of any non-emergency events at the GNPS/LNPS (i.e. events classified at Level 0 and Level 1 of the INES ratings as well as those at Level 2 or above but not involving emergency response), relevant information (i.e. brief description of the event, the initial classification of the event and the initial assessment on the impact of the event on environment and public safety) will be disclosed to the public in the above two websites as applicable.

5.4 Separately, as a private sector initiative, CLP plans to set up a Nuclear Resources Centre at Kowloon Bay in 2012 to provide the public with educational materials on nuclear energy and nuclear safety. The Centre will

HKSARGDBCP – Chapter 5

also feature Government's emergency preparedness and response in the unlikely event of a nuclear incident at Daya Bay.

EMERGENCY RESPONSE

Introduction

5.5 The provision of accurate, timely and appropriate information and advice to the public, via the media, Internet and other communication channels, is essential to stem panic which might be caused by a radiological release, or even rumours of such a release, from the GNPS/LNPS, and to advise members of the public what to do and what not to do. To prepare itself for this role, ISD must be brought into the full picture of the developing situation in the very first instance of an indication of a possible nuclear emergency, whatever the activation level of the DBCP (see Chapter 3).

5.6 In the event that the rumour is unfounded or the incident has not given rise to a radiological release - the vast majority of occasions on which this plan might be used - a prompt press release is required. The press release should be cleared with S for S before issue. This should be backed up with scientific and technical information where available, e.g. on the normal background radiation level, the maintenance of electricity supply, action taken at the GNPS/LNPS, etc. In these circumstances it will be necessary to liaise with PEACO, HKNIC and DNMC where appropriate on the release of information concerning the incident. If the incident continues, the procedure for clearing subsequent press releases is described in paragraphs 5.11-5.16.

5.7 In the event of a confirmed radiological release from the GNPS/LNPS, a prompt press release is required to provide the initial information available, reassure the public by describing the actions being taken to monitor the situation and mitigate the consequences of the radiological release, assess the overall impact, and give instructions on what the public should do. This initial press release should be cleared for issue by S for S. The procedure for clearing subsequent press releases is described in paragraphs 5.11-5.16.

The initial press release

5.8 The initial press release must be timely and accurate. It should be prepared by ISD based on information provided by HKOMAC (concerning the radiological situation and information (if any) received from PEACO), DH (concerning any human health impact) and EMSD (concerning electricity supply and reactor state). Comments on the press release should be sought from ENB if it touches on electricity supply. Decisions by S for S on countermeasures to be applied (if any) should also be included. <u>The initial press release must be cleared with S for S before issue.</u>

5.9 The following points should be borne in mind in the respective circumstances –

(a) <u>Confirmed that rumour is unfounded or that there is no</u> radiological release

It is important that press releases in these circumstances are issued quickly to stem panic. On rare occasions, a reactor may be tripped off by its protection system during operation of the This only indicates an abnormality or nuclear power plant. malfunction of the plant or equipment in the nuclear or conventional island but does not necessarily indicate the occurrence of a nuclear accident in which case a nuclear emergency would be declared (see paragraph 1.11 of Chapter 1). As such, even if the tripping of the reactor might possibly cause certain power interruption in Hong Kong (see Chapter 11), it should not be mistaken as an indication of a major nuclear emergency in progress. Likewise, the release of steam from a nuclear power plant should not be mistakenly identified as a radioactive plume since a similar phenomenon may also occur in the operation of fossil-fuel fire power station. CLP aims to inform customers via media of any interruptions to power supply within 30 minutes of their occurrence. Queries from the press media concerning the operational status of the GNPS/LNPS could be expected immediately.

(b) <u>Confirmed radiological release</u>

The key element of a press release in these circumstances is to provide reassurance that the Government is monitoring the situation and putting in place measures for public protection and to safeguard people's health. The public should be advised to stay calm and follow closely Government advice on what to do and what not to do.

5.10 The template of a few sample press releases is at *Annex 5.1 - 5.4*. The press release must be sent to all the media plus Government departments. Among the latter, it is essential that ENB, Food and Health Bureau (FHB), HKPF, HKO, EMSD, DH, AFCD, FEHD, WSD, Home Affairs Department (HAD) and Education Bureau (EDB) are given priority. This also applies to any subsequent press releases.

Media Strategy

5.11 In the event of an Off-Site Emergency at the GNPS/LNPS (when this plan would be at FULL ACTIVATION level) or other prolonged emergency there, the Director of Information Services will also convene the IPC. ISD will establish the Combined Information Centre (CIC) and the head of the CIC will be a member of IPC. IPC will advise CESG (or S for S if CESG is not convened) on the information strategy for departments to follow and on the release of information to the public and the most effective way to do so. It will focus on major changes to the situation, especially those which give rise to decisions made at CESG on the implementation of counter-measures, as well as the presentation of information.

5.12 The CIC is responsible for collating information from EMSC and various bureaux and departments and disseminating appropriate information to the media through press releases and responses to press enquiries. It will work closely with EMSC to receive information on all matters relating to the emergency and serve as the main agency interfacing with the public through the media.

5.13 Within the strategy laid down by CESG (or S for S) through IPC, the head of CIC will have the authority to approve press releases, following any clearance by S for S if necessary. The materials to be used in these press releases will be provided by the information section or subject officers either within departments, or the Government Secretariat or by EMSC.

5.14 It is essential that scientific and technical information in press releases is checked for scientific accuracy by the departments concerned. Scientific information should be presented in a manner which enhances the timely and accurate public understanding of the latest situation. Where appropriate, official information released by relevant international and national authorities and organizations may be cited. Nuclear emergency forecast could only be released to the public with the express approval of CESG or S for S, having consulted with HKO/EMSD/DH as appropriate concerning the accuracy. CESG and S for S, when considering the release of forecast information, should have regard to all relevant factors including public health and safety, and the need for dispelling unfounded rumours to prevent likely social instability.

5.15 Press releases may be developed from the template of the initial press releases as in *Annex 5.1 - 5.4* with appropriate modifications. Copies of the press releases should be sent to all media and government departments with priority given to ENB, FHB, HKPF, HKO, EMSD, DH, AFCD, FEHD, WSD, HAD and EDB.

HKSARGDBCP – Chapter 5

5.16 The head of CIC, with the agreement of EMSC, may authorise individual departments to respond to media enquiries within their respective ambits. Departments should immediately provide CIC and EMSC with copies of the questions and answers so given. Enquiries from legislators, members of the public, other stakeholders etc will continue to be dealt with and replied in the normal course by the subject bureaux or departments responsible. Bureaux and departments may consult EMSC as necessary and should keep EMSC and CIC posted of the reply issued.

Handling of media/public enquiries by CLP/HKNIC

5.17 In case of a nuclear emergency, the media will be naturally interested in knowing more about the situation and development of the incident. Apart from getting updates from the Government, they may also approach CLP for information about local power supply from the GNPS. As a shareholder and off-taker of the GNPS, CLP and HKNIC will liaise with the Government closely in media responses to assure accuracy of information disseminated and avoid causing any confusion to public.

Communication channels

5.18 Press releases should remain the mainstay of the provision of authoritative, official information to the public, and be disseminated through the usual means, including immediate posting on the Government's website and television and radio broadcast as soon as possible.

5.19 Other important channels for communicating the contents of the press release and other appropriate information to the public include –

- (a) press conferences by government officials supported by outside experts, which may be held on a daily basis if situation warrants to update the public on matters of genuine concern;
- (b) the dedicated website of the DBCP (<u>www.dbcp.gov.hk</u>) as the focal point during emergencies. It will also be a portal to other websites providing essential information, such as radiation monitoring data hosted by HKO (including measurement results of air samples and the hourly-updated ambient gamma radiation dose rates), water quality and supply information hosted by WSD, food safety information hosted by FEHD, health information hosted by the DH, emergency information hosted by Guangdong and other Mainland authorities, and information hosted by international organisations such as IAEA and WHO;

- (c) mobile app "MyObservatory"¹ run by HKO on smartphone platforms;
- (d) an emergency SMS message to all mobile phone accounts in Hong Kong in urgent and truly justified situations. This is made possible with support from telecom operators, but is subject to the time required for completing the transmissions to all; and
- (e) specialised hotlines targeting at specific groups of persons. For example, these may be set up by FEHD or Trade and Industry Department (TID) for importers or exporters of food and by AFCD for farmers who need advice on control measures on food and live food animals.

Overseas information

5.20 If there is an off-site release at the GNPS/LNPS, there will be intense overseas media interest. All ISD press releases will go, as a matter of course, to all overseas media interests represented in Hong Kong. ISD should arrange for copies to be sent to the Hong Kong Economic and Trade offices overseas and in the Mainland. The objective is to present an accurate picture of life in Hong Kong to forestall scares concerning Hong Kong as an economic and trading partner and as a tourist destination.

5.21 Within 24 hours of the incident, S for S (with assistance from Director of Protocol) should arrange a briefing to be given to Consulates in Hong Kong so that Consul and Consul-General can present an accurate picture of the event to their respective governments. In addition, Commerce and Economic Development Bureau (CEDB) may arrange a briefing for the various national chambers of commerce in Hong Kong.

¹ Links for downloading of the "MyObservatory" app are accessible through HKO's website (<u>http://www.weather.gov.hk/myobservatory_e.htm</u>).

Annex 5.1

Suggested DBCP Sample Press Release

This template of sample press release covers the following three scenarios -

- (1) Rumour Situation/Abnormal Radiation Level in HK
- (2) Incidents Other Than Site and Off-Site Emergency
- (3) Site and Off-Site Emergency

Structure of Press Release -

Part I-Introduction

- Confirmation of source of notification
- Emergency level
- Confirmation of whether there is radiological release

Part II- Current Situation

- Radiation level
- Plant status

Part III- Action Taken/To Be Taken by the Government

- Contingency planning
- Food and water safety
- Monitoring of situation

Part IV- How Will the Public be Affected

- Safety assurance
- Overall impact
- What to do and what not to do
- Food and water safety
- Power supply
- Public information

Annex 5.2

Scenario (1) – Rumour Situation/Abnormal Radiation Level in HK

Part I – Introduction

- Statement/Report issued at _____ hours on _____.
- From ______(hh:mm) to ______(hh:mm) on _______(), the *Government of the Hong Kong Special Administrative Region (HKSARG)/Hong Kong Observatory (HKO) received a number of *reports/and enquiries from *local residents/press media/residents near *Daya Bay *alleging/suspecting the occurrence of incident at *Guangdong Daya Bay/Lingao Nuclear Power Station (GNPS/LNPS). According to these reports,
 - * there was a release of gases/fumes from the nuclear power station.
 - * there was a fire/explosion at the nuclear power station.
 - * people were evacuated from the station.
 - * some people from the station were taken to hospital.
- *CLP Power Hong Kong Limited (CLP) confirmed that supply of electricity to Hong Kong from Daya Bay has not been interrupted. The *<u>Government of the</u> <u>Hong Kong Special Administrative Region (HKSARG)/Electrical and</u> <u>Mechanical Services Department (EMSD)</u> has contacted the <u>*Guangdong</u> <u>Authority/Hong Kong Nuclear Investment Company (HKNIC)</u> and was advised that <u>*the operations of the GNPS/LNPS was completely normal. /Unit</u> <u>of the*GNPS/LNPS was shut down for maintenance/refuelling/there was a</u> <u>reactor trip at Unit</u> <u>of the*GNPS/LNPS.</u>
- *Information available to us does not indicate occurrence of any nuclear incident at the <u>*GNPS / LNPS</u>/The incident did not result in any abnormal radiological release to the environment.

Part II – Current Situation

Radiation Level

- The radiation levels in Hong Kong as detected by the HKO's network of radiation monitoring stations are normal.
- *Some slight fluctuations in readings have been recorded by the HKO's network of radiation monitoring stations. Investigations showed that these fluctuations are caused by * <u>changes in the local weather conditions/the heavy rain affecting the territory</u> and are natural in origin.
- *Some slight fluctuations in readings have been recorded by the HKO's network of radiation monitoring stations. We are looking into the cause of the fluctuations and will release further information when results are available.

Plant Status

- * The operation of the <u>*GNPS/LNPS</u> is normal.
- *An incident has occurred at _____ (hh:mm) on ______ (Date) in Unit __ of the <u>*GNPS/LNPS</u>. The nuclear reactor was shut down automatically as a safety measure in the course of the incident.
- *The nuclear reactor is now at a safe shutdown condition.
- The background radiation level outside the power station is normal.
- The cause of the incident is under investigation in the power station.

Part III – Action Taken/To be Taken by the Government

- <u>*There is no need to activate the Daya Bay Contingency Plan for the incident/The Daya Bay Contingency Plan has been activated at level at hours.</u>
- *As a precautionary measure, we are closing down the Mirs Bay and Ping Chau area and will be assisting the visitors to return to the city.
- The *<u>HKSARG/HKO</u> is closely monitoring the radiological situation. Once abnormality is detected or known, we will inform the public in the first instance.

Part IV – How will the Public be Affected

Safety Assurance

- The Government and the Guangdong authorities have established comprehensive bilateral emergency co-operation arrangements that Hong Kong will be informed immediately of any unlikely occurrence of a nuclear accident at the GNPS/LNPS and information will be exchanged as quickly as possible.
- The nuclear reactors at the GNPS/LNPS are equipped with multiple protection systems to ensure nuclear safety and have a sound operation record.
- The Government has put in place a comprehensive Daya Bay Contingency Plan to deal with any unlikely occurrence of a nuclear accident at the GNPS/LNPS to protect the general public.

Overall Impact/What to Do

- *At present, we are still checking to confirm the information before it can be released to the public. We understand the concern of the public and are doing our best to monitor the situation. Once the situation has been clarified, we shall speak to the public in the first instance.
- *The incident would not affect the Hong Kong Special Administrative Region.
- Those who are planning to visit the Daya Bay area of Guangdong should consider withholding the journey until the situation is clarified.
- We are closely monitoring the latest situation at the *<u>GNPS/LNPS</u> and collect the information provided by relevant Government Departments and <u>*CLP/HKNIC</u> to

HKSARGDBCP – Chapter 5

find out the development of the incident. The information available to us is in agreement with that obtained from the Guangdong authorities.

• There is no need to worry and the public can continue normal way of life as usual.

Power Supply

- *Although the incident has tripped off Unit _____ of the <u>*GNPS/LNPS</u>, the electricity supply in Hong Kong is not affected by the incident as there are sufficient reserve capacity in the power system.
- *The incident caused a drop in power system frequency necessary to initiate load shedding for maintaining the system frequency and stability. It resulted in power interruption to ______ (areas).
- *The electricity supply has already been fully restored at _____ (date/ time)/ The power companies are in the process of restoring the supply to consumers.
- *Unit ______ at the GNPS and Unit ______ at the LNPS are still operating to supply electricity to the grid.

Public Information

• Members of the public should stay calm and may keep themselves posted at the DBCP website (www.dbcp.gov.hk). The Government will release updated information regularly. There is no need to call up <u>*government department/HKO</u> because this will only disrupt their operation.

* Delete as appropriate.

- End -

Annex 5.3

Scenario (2) – Incidents Other than Site and Off-Site Emergency

Part I – Introduction

• Statement/Report issued at _____ hours on _____.

*<u>Initial</u>

- There has been an incident at the *<u>Guangdong Daya Bay/Lingao Nuclear Power</u> <u>Station (GNPS/LNPS)</u> at Daya Bay in the Guangdong Province. The incident occurred at _____ (hh:mm) on _____ ().
- The Guangdong authorities has notified the Government of the Hong Kong Special Administrative Region (HKSARG) that <u>*Emergency Standby/Plant</u> <u>Emergency status</u> has been declared at the <u>*GNPS/LNPS</u> at ______ (hh:mm) on ______ (). The notification was received at ______ (hh:mm) on ______ ().

*Follow-Up

- According to the Guangdong authorities, the situation at the *<u>GNPS/LNPS*is still</u> at *Emergency Standby/Plant Emergency Status/the nuclear incident at the *<u>GNPS/LNPS</u> is over/terminated/has resumed normal operation at (hh:mm) on .
- There has been -
 - * (i) no release of radioactivity
 - * (ii) a minor release of radioactivity
- Present indications are that the situation *<u>has stabilised and will not deteriorate</u> <u>further/will deteriorate further</u>.

Part II – Current Situation

Radiation Level

- Higher than normal levels of radioactivity
 - * (i) have not been detected in Hong Kong.
 - * (ii) have been detected at _____ (area).
- The prevailing winds are likely to carry any radioactivity
 - * (i) away from Hong Kong
 - * (ii) towards Hong Kong
 - * (iii) near to Hong Kong

Plant Status

- *An incident has occurred at _____ (hh:mm) on ______ (Date) in Unit __ of the <u>*GNPS/LNPS</u>. The reactor was shut down automatically as a safety measure in the course of the incident.
- *The nuclear reactor is now at a safe shutdown condition.
- *The radiation level outside the power station is normal.
- *The cause of the incident is under investigation in the power station.

Part III – Action Taken/To be Taken by the Government

Contingency Plan

- The Daya Bay Contingency Plan is partially activated. *All our emergency response departments are in operation to monitor the radiation levels in our environment, food and water supplies and goods, vehicles and travellers coming from the vicinity of the GNPS/LNPS.
- As a precautionary measure, we are closing down the Mirs Bay and Ping Chau area and will be assisting the visitors to return to the city.
- It is extremely unlikely that we shall need to introduce any emergency response measures in the Hong Kong.

Food

- Imported food and lives food animals from Guangdong is closely monitored to ensure that they are safe for consumption.
- Radioactivity is not found in food samples. They are safe for consumption.

Water

- On-line monitoring of raw water from Guangdong Province and routine raw and treated water supplies in Hong Kong did not detect any increase in radioactivity level. The treated water supply in Hong Kong is perfectly safe for consumption.
- The Water Supplies Department will continue to monitor the quality of raw water imported from Guangdong Province and the quality of raw and treated water supplies in Hong Kong.

<u>Monitoring</u>

- We are closely monitoring the latest situation at the <u>*GNPS/LNPS</u> and collect the information provided by Government Departments and CLP Power Hong Kong Limited Company/Hong Kong Nuclear Investment Company to find out the development of the incident. The information available to us is in agreement with that obtained from the Guangdong authorities and from the International Atomic Energy Agency.
- The *<u>HKSARG/Hong Kong Observatory (HKO)</u> is closely monitoring the radiological situation. Once any abnormality is detected or known, we will inform the public in the first instance.

Part IV – How will the Public be Affected

Safety Assurance

- The Government and the Guangdong authorities have established comprehensive bilateral emergency co-operation arrangements that Hong Kong will be informed immediately of any unlikely occurrence of nuclear accident at the GNPS/LNPS and information will be exchanged as quickly as possible.
- The nuclear reactors at the GNPS/LNPS are equipped with multiple protection systems to ensure nuclear safety and have a sound operation record.

Overall Impact/What to Do

- The levels of radioactivity detected will not require the public to take any action.
- The public does not need to be worried. You may continue with your normal way of life as usual.
- Those who are planning to visit the Daya Bay area of Guangdong should consider withholding the journey until the situation is clarified.

Power Supply

- *Although the incident has tripped off Unit ____ of the *<u>GNPS/LNPS</u>, the electricity supply in Hong Kong is not affected by the incident as there are sufficient reserve capacity in the power system.
- <u>*The electricity supply has already been fully restored at (date/ time)/The</u> power companies are in the process of restoring the supply to consumers.
- *Unit _____ at the GNPS and Unit _____ at the LNPS are still operation to supply electricity to the grid.

Public Information

- *A further statement will be made at ./A Press Briefing Centre has been set up at .
- Members of the public should stay calm and may keep themselves posted at the DBCP website (www.dbcp.gov.hk). The government will release updated information regularly. There is no need to call up <u>*government</u> <u>departments/HKO</u> because this will only disrupt their operation.

Delete as appropriate.

Annex 5.4

Scenario (3) – Site and Off-Site Emergency

Part I – Introduction

• Statement/Report issued at _____ hours on _____.

*<u>Initial</u>

- There has been an incident at the <u>*Guangdong Daya Bay/Lingao Nuclear Power</u> <u>Station (GNPS/LNPS)</u> at Daya Bay in the Guangdong Province. The incident occurred at ______ (hh:mm) on ______ ().
- The Guangdong authorities has notified the Government of the Hong Kong Special Adminitrative Region (HKSARG) that <u>*Site/Off-Site Emergency status</u> has been declared at the <u>*GNPS/LNPS</u> at ______ (hh:mm) on ______
 (). The notification was received at ______ (hh:mm) on ______

().

*<u>Follow-Up</u>

• According to the Guangdong authorities, the situation at the *<u>GNPS/LNPS * is</u> still at Site/Off-site Emergency status/*has been escalated to Off-site Emergency status/*has been downgraded to *Site/Plant Emergency status at (hh:mm) on (date).

*<u>Initial</u>

- There has been
 - * (i) no release of radioactivity
 - * (ii) a minor release of radioactivity
 - * (iii) a major release of radioactivity to the environment

*<u>Follow-Up</u>

- According to the Guangdong authorities, the release of radioactivity to the environment has *<u>lasted for hours/stopped at (hh:mm)</u> on (date).
- Present indications are that the situation *<u>has stabilised and will not deteriorate</u> <u>further/will deteriorate further</u>.

Part II – Current Situation

Radiation Level

- Higher than normal levels of radioactivity –
 * (i) have not been detected in Hong Kong.
 * (ii) have been detected at ______ (area).
- The prevailing winds are likely to carry any radioactivity
 - * (i) away from Hong Kong
 - * (ii) towards Hong Kong
 - * (iii) near to Hong Kong

Plant Status

- An incident has occurred at _____ (hh:mm) on ______ (Date) in Unit _____ of the *<u>GNPS/LNPS</u>. The reactor was shut down automatically as a safety measure in the course of the incident.
- The reactor was shut down due to
 - *(a) <u>leakage/loss of cooling water in the primary circuit;</u>
 - *(b) <u>steam generator tube rupture;</u>
 - *(c) <u>loss of site electricity supply;</u>
 - *(d) <u>equipment</u> <u>failure in the system</u> (details of incident)
- Actions have already been taken by the operators and emergency staff of the plant to deal with the incident.
- The cause of the incident is under investigation in the power station.
- There has been <u>*no/minor/major</u> radiological release to the environment as a result of the incident and the radiation level outside the power station is <u>*normal/increased slightly above normal level/increased to the extent that countermeasures be taken within km of the site boundary.</u>

Part III – Action Taken/To be Taken by the Government

Contingency Plan

- The Daya Bay Contingency Plan is in full activation. All our emergency response departments are in operation to monitor the radiation level in our environment, food and water supplies and goods, vehicles and travellers coming from the vicinity of the GNPS/LNPS to protect public health and safety.
- An emergency team has been assembled to assess the potential hazards. The Government has enhanced both land and aerial radiation monitoring in the territory.
- The following <u>*precautionary measures/countermeasures</u> have been/will be introduced
 - * <u>Evacuation/sheltering *has been/will be</u> implemented on the island of Ping Chau in Mirs Bay at _____ (hh:mm) on _____ (). Furthermore, clearance of the Mirs Bay area up to a distance of 20 km from the *<u>GNPS/LNPS</u> *<u>has been/will be</u> implemented at _____ (hh:mm) on _____ (). We <u>*have completed assisting/are</u> continuing to assist the visitors to return to the city.
 - *Monitoring controls have been implemented to cover food and water to ensure that they are safe for consumption.

Food Safety

<u>*Radioactivity has not been found in food samples. They are safe for consumption/*Radioactivity was detected in consignments of imported *vegetables/livestock/fish/poultry/eggs/meat/milk/fruit/grains</u>

<u>at the</u> Control Point. They were seized and destroyed and properly disposed of.

- *So far, only isolated XX samples were found to be contaminated, with marginally elevated levels and they have been removed from the local food supply.
- *Health certificates are requested to ensure that food and live food animals imported from the Guangdong are safe for human consumption.

Water Safety

- Water Supplies Department has immediately mobilised its monitoring teams and activated all radiation screening centres to monitor closely raw water supply from Guangdong Province and potable water in local supply and distribution system to ensure its safety.
- So far, the monitoring results of raw water imported from Guangdong Province impounding reservoirs, water treatment works and consumer taps detect <u>*no sign of radioactive contamination/no sign of significant</u> <u>radioactive contamination</u>.
- The radioactivity levels of the treated water supply are well below the safety limits recommended by the International Atomic Energy Agency. The radiological quality of drinking water in Hong Kong is perfectly safe for human consumption and continues to comply with the World Health Organization's "Guidelines for Drinking-water Quality".
- People from Ping Chau and Mirs Bay areas and those Hong Kong residents returning from areas within _____ km from the *<u>GNPS/LNPS</u> are being monitored as a precautionary measure to ascertain whether they have been radiologically contaminated and to provide appropriate treatment or counseling. The following Monitoring Centres have been opened for the purpose –
 - (1) Fanling Swimming Pool
 - (2) Yuen Long Swimming Pool
 - (3) Tai Po Swimming Pool
 - (4) Lai Chi Kok Park Swimming Pool or Sham Shui Po Park Swimming Pool
 - (5) Sai Kung Swimming Pool
 - (6) Shatin Jockey Club Swimming Pool
 - (7) Chai Wan Swimming Pool
 - (8) Kowloon Park Swimming Pool
 - (9) Tai Wan Shan Swimming Pool
 - (10) Pao Yue Kong Swimming Pool
 - (11) Morrison Hill Swimming Pool
 - (12) Kwun Tong Swimming Pool
 - (13) Tung Chung Swimming Pool

- ➤ We are well prepared and the Government has stockpiled thyroid blocking agent in our emergency response departments ready for distribution to emergency responders and people evacuating from close proximity to the GNPS/LNPS as case may be when there is significant release of radioactive iodine.
- ➤ We have and will continue to step up the monitoring of food, live food animals and water for radiological contamination on import from Guangdong at the Boundary Control Points and at wholesale and retails levels.

<u>Monitoring</u>

- We are closely monitoring the latest situation at the <u>*GNPS/LNPS</u> and collect the information provided by relevant Government Departments and CLP Power Hong Kong Limited/Hong Kong Nuclear Investment Company to find out the development of the incident. The information available to us is in agreement with that obtained from the Guangdong authorities and from the International Atomic Energy Agency.
- The <u>*HKSARG/Hong Kong Observatory (HKO)</u> is closely monitoring the radiological situation and maintain close communication with our Guangdong counterpart on the development of the incident. We will keep the public informed of the latest information.
- <u>*A further statement will be made at</u>./A Press Briefing Centre has been set <u>up at</u>.

Part IV – How will the Public be Affected

Safety Assurance

- The Government and the Guangdong authorities have established a comprehensive bilateral emergency co-operation arrangements that Hong Kong will be informed immediately of any unlikely occurrence of nuclear accident at the GNPS/LNPS and information will be exchanged as quickly as possible.
- The nuclear reactors at the GNPS/LNPS are equipped with multiple protection systems to ensure nuclear safety and have a sound operation record.

Overall Impact/What to Do

- There is no cause for undue alarm. We urge the public to stay calm.
- The levels of radioactivity detected -
 - *(i) will not require the public to take any action.
 - *(ii) may require the public to take some simple precautionary/protective actions as detailed in the sections below.
- Those who are planning to visit the Daya Bay area of Guangdong should consider withholding the journey until the situation is clarified.

• *The evacuation in Ping Chau and Mirs Bay is a <u>*precautionary</u> <u>measure/countermeasure.</u> The levels of radioactivity detected do not require the general public elsewhere to evacuate or to take any action.

Food Safety

- *Food and live food aminals are safe for consumption.
- *So far, only isolated food/livestock/fish/poultry/eggs/meat/milk/fruit/grains samples were found to be contaminated, with marginally elevated levels and they have been removed from the local food supply.
- As a good hygiene practice, please wash and remove the outer skin of fruits and outer leaves of vegetables before consumption.

There is no need to stock up food or bottled water.

Water Safety

• There is no threat posed to our drinking water with the radioactivity levels of water supply being well below the safety limits recommended by the International Atomic Energy Agency. The radiological quality of the water supply in the territory remains perfectly safe for human consumption and continues to comply with the World Health Organization's "Guidelines for Drinking-water Quality".

Power Supply

- *Although the incident has tripped off Unit ____ of the <u>*GNPS/LNPS</u> the electricity supply in Hong Kong is not affected by the incident as there are sufficient reserve capacity in the power system.
- *The incident caused a drop in power system frequency necessary to initiate load shedding for maintaining the system frequency and stability. It resulted in power interruption to _____ (areas).
- *The electricity supply has already been fully restored at ______ _(date/ time)/The power companies are in the process of restoring the supply to consumers.
- Unit ______ at the GNPS and Unit ______ at the LNPS are still operating to supply electricity to the grid.

Public Information

• Members of the public should stay calm and may keep themselves posted at the DBCP website (www.dbcp.gov.hk). The government will release updated information regularly. There is no need to call up <u>*government</u> <u>departments/HKO</u> because this will only disrupt their operation.

* Delete as appropriate.

CHAPTER 6

PLUME COUNTERMEASURES: EVACUATION, SHELTERING AND THYROID BLOCKING

Introduction

6.1 The principal countermeasures against plume exposure pathways are evacuation, sheltering and thyroid blocking -

(a) Evacuation

Evacuation is one of the most commonly considered urgent protective actions for people located in close proximity in the event of nuclear or radiological emergency. Timely evacuation can prevent exposures via all possible exposure pathways against all types of radioactive substances by removing individuals from the proximity of the emergency. However, evacuation may be dangerous for special groups in the population, such as nonambulatory patients, elderly and disabled. Logistic challenges may be faced under adverse weather or traffic conditions.

(b) <u>Sheltering</u>

Sheltering can also provide effective protection against exposure via major exposure pathways in suitable circumstances. For example, evacuation and thyroid blocking measures may not be practicable during inclement weather such as rainstorm, especially for vulnerable groups of the population. Rapid approach and passage of the plume may also be countered by immediate sheltering. Sheltering is relatively easier to implement but the protection is not total and cannot be sustained over long periods of time. General guidelines for sheltering can be found at *Annex 6.1*.

(c) <u>Thyroid Blocking</u>

Radioactive iodine is among the most common fission products released in a nuclear accident. People in close vicinity to the accident site and emergency responders may be exposed to significant levels of radioactive iodine. Infants and young children are the more susceptible groups. Thyroid blocking agent, taken before the arrival of the plume or within a few hours of the arrival of the plume, can effectively block the thyroid gland's uptake of radioactive iodine and so reduce the risk of thyroid cancer.

The Government has stockpiled thyroid blocking agent for emergency use. If needed, the Government will give announcements, distribute the thyroid blocking agent for use by specific groups of the public and provide usage instructions.

DH has provided general guidelines on thyroid blocking at Annex 6.2.

6.2 The taking of the above countermeasures should be based on the Generic Criteria promulgated by IAEA as set out in *Annex 1.4* (relevant parts reproduced in *Annex 6.3*).

20 km Emergency Planning Zone l (EPZ1)

6.3 The DBCP provides for the possible taking of plume exposure pathway countermeasures in the 20 km EPZ1 on a detailed planning basis, covering Ping Chau at about 12 km from the GNPS/LNPS and the Hong Kong waters of Mirs Bay within 20 km of the GNPS/LNPS. Given the difficulties of access and the closeness of the area to the GNPS/LNPS, evacuation of Ping Chau will be considered as a priority precautionary measure at the PARTIAL or FULL ACTIVATION level, corresponding to the conditions of site emergency or off-site emergency at the GNPS/LNPS. The decision on when to evacuate will be made by S for S in consultation with ITF, on advice of HKOMAC, DH, EMSD and HKPF. Operational command of the preparations for evacuation and the evacuation itself will be led by HKPF.

6.4 Ping Chau has a permanent population of less than 10. It is part of the Tai Po District and an extension to the Plover Cove (Extension) Country Park. On summer weekends and at holiday periods, several hundred people may be on the island. The maximum recorded is 1 800. The 24-hour Police Post on Ping Chau will look after the residents and visitors on the island. One of the twelve stations of the HKO's Radiation Monitoring Network is located in Ping Chau which continually sends data to HKO (see Chapter 4). A map of the island is at *Annex 6.4*.

Objective

6.5 To effect a timely evacuation of Ping Chau and Mirs Bay, and other appropriate countermeasures, such that the radiological impact to evacuees, and to persons assisting them by possible radioactive releases during nuclear emergencies is minimised.

Alerting System

6.6 The alerting system for the DBCP is described in Chapter 3. The specific alerting system for countermeasures in EPZ1 is at *Annex 6.5*.

6.7 The activation of the DBCP at either PARTIAL or FULL ACTIVATION levels will automatically trigger preparations to be made to evacuate Ping Chau and Mirs Bay. There will be no separate notification of departments with responsibilities under this chapter to prepare for the evacuation.

6.8 At PARTIAL or FULL ACTIVATION level, Police Headquarters Command & Control Centre (PHQCCC) will immediately notify Marine Regional Command & Control Centre (MAR RCCC) which in turn will immediately notify Marine Outer Waters District and the Police Post on Ping Chau which will then make preparation for evacuation. PHQCCC will keep departments promptly informed of the developing situation (particularly of the numbers of people on Ping Chau) and make specific requests. These departments should in turn keep PHQCCC informed of their readiness to respond. The Police Liaison Officer in EMSC should keep EMSC controller fully apprised of the situation and provide estimates of the time at which evacuation could begin and the duration of the evacuation (for guidance see *Annex* 6.6).

6.9 The decision to evacuate Ping Chau will be notified using the alerting chart at *Annex 6.5*, which is also applicable to sheltering at Ping Chau (paragraph 6.24) and evacuation of Mirs Bay (paragraph 6.27).

6.10 The decision to evacuate Ping Chau, together with the reasons, should be communicated promptly by EMSC to the Guangdong authorities to forestall panic there. The Guangdong coast opposite is within the Guangdong outer zone for plume emergency countermeasures (sheltering only).

Public Information

6.11 ISD will coordinate publicity on the arrangements for EPZ1 as set out in Chapter 5. The prime concern of the publicity is to stress that the arrangements are precautionary and there is no need for action elsewhere. Police officers will display prominently notices, provided by AFCD, at appropriate ferry landing piers concerning the closure of the country park at Ping Chau.

Assessment of Countermeasures

6.12 HKOMAC, in consultation with DH and EMSD, will evaluate the radiological and meteorological situation to determine whether evacuation or sheltering (which may be followed by evacuation after the plume is passed) will result in lesser radiation dose, and will accordingly advise S for S' ITF through EMSC. In particular, DH will advise on the possible impact of the plume on human health.

6.13 In most cases when this plan is implemented early, it should be possible to evacuate people as a purely precautionary move without them receiving any significant radiation dose. In certain circumstances, it may not be necessary to evacuate people at all.

6.14 Bad weather in Mirs Bay could delay evacuation. HKO will advise HKPF on meteorological and sea conditions there. PHQCCC, after consulting MAR RCCC, will advise EMSC and HKOMAC if the weather or sea conditions may present difficulties in evacuation. If there are such difficulties, HKOMAC (with DH) will advise on the need for sheltering.

6.15 Based on the assessment of the projected radiation doses to thyroid, DH will advise EMSC on the need for thyroid blocking by people on Ping Chau, in Mirs Bay and those who are involved in implementing evacuation or sheltering there. Thyroid blocking agents are kept on Ping Chau and on police vessels. EMSC will relay this advice to the organisations concerned - PHQCCC, AFCD and GFS.

Preparations for Countermeasures on Ping Chau

6.16 Police officers on Ping Chau will inform MAR RCCC of the estimated numbers of persons on the island. They will sound a siren to alert people on the island to assemble at one or more of the designated places -

- (a) Ping Chau Police Post;
- (b) the ex-military camp adjacent to the Police Post; and
- (c) AFCD office next to Lam Uk.

6.17 The assembly will facilitate the orderly evacuation of the island or, if this is not immediately possible, sheltering. There is no requirement for people to shelter inside these buildings unless it is ordered.

6.18 PHQCCC will consider the resources required to evacuate the island. Dependent upon the numbers, people can be evacuated using GFS

helicopters; Marine Police resources; other government fleet resources (e.g. C&ED launch); private resources (e.g. Tung Ping Chau – Ma Liu Shui kaito ferry operator), the use of which will be coordinated with the assistance of the Marine Department (MD) and Transport Department (TD) (and EMSC, if appropriate); or a combination of the above.

6.19 PHQCCC will inform departments what resources may be required. GFS helicopters should be placed on standby and Marine Police resources brought to the edge of the EPZl to await the order to commence evacuation. If necessary, FSD's assistance will be summonsed for rescue operations. If there are a large number of people on the island, Police Tactical Unit (PTU) may standby for crowd control duties there. They would be transported to the island by GFS helicopters once the order to evacuate was given. Approximate times to effect evacuation are given at *Annex* 6.6.

6.20 Departmental Radiological Protection Officers (DRPOs) will advise on precautionary measures required, if any, for persons taking part in the evacuation.

6.21 PHQCCC will determine which evacuation discharge points will be used. The designated ones, together with land transportation requirements, are -

Evacuees	Evacuation Discharge Points	Transport to public transport facilities	Transport to Monitoring Centres (if needed) ^(1 - see notes)
Helicopter evacuation	Sai Kung Marine Police Base (Helipad – IS 05)	Sai Kung	Sai Kung Swimming Pool
Marine evacuation of Ping Chau	Sha Tau Kok Pier Ma Liu Shui Pier	Sha Tau Kok Shatin	Tai Po Swimming Pool Shatin Jockey Club Swimming Pool
Evacuation of Mirs Bay	Southwest of Lamma Island (2 - see notes)	-	Chai Wan Swimming Pool Pao Yue Kong Swimming Pool Kwun Tong Swimming Pool

Notes

- ¹ Mobile Monitoring Centres (MCs) may be set up at discharge points, obviating the need for transporting people to elsewhere. If swimming pools are needed, EMSC will determine which ones to open (see Chapter 8). For winter arrangements, see *Annex 8.1*.
- ² PHQCCC, with the assistance of EMSC if requested, will arrange sea transport to convey evacuees to a discharge point on Hong Kong Island and coordinate with GLD and TD arrangements to ensure sufficient land transport. PHQCCC will advise AMS and CAS if assistance is required for screening/marshalling evacuees at the discharge points.

HKSARGDBCP – Chapter 6

6.22 PHQCCC will keep Fire Services Communications Centre (FSCC), AMS and CAS informed of the number of evacuees who could be set down at each evacuation discharge point. This will facilitate their planning for radiation monitoring and the setting up of MCs, which may be needed if evacuees from Ping Chau or Mirs Bay may be contaminated. The decision will be made by EMSC (see Chapter 8).

Evacuation of Ping Chau

6.23 Once the decision of evacuation is made, PHQCCC will inform departments (paragraph 6.9 above and Annex 6.5) and oversee the immediate execution. Priority should be given to pregnant women, young children, the disabled, the old and their helpers. Radiation readings, if any, taken by Police vessels will be reported to MAR RCCC for transmission to HKOMAC for assessment. PHQCCC will report progress on the evacuation to EMSC on an hourly basis or as required.

Sheltering on Ping Chau

6.24 S for S, in consultation with ITF, will decide whether to implement and when to cease temporary sheltering on Ping Chau based on advice from HKOMAC described in paragraph 6.12 above and taking into account practical difficulties in effecting immediate evacuation. Sheltering would only likely to be ordered at the FULL ACTIVATION level.

6.25 Once the decision is made, PHQCCC will inform departments accordingly (paragraph 6.9 above and *Annex 6.5*). Sheltering will take place at the designated locations described in paragraph 6.16 where the people have assembled. Police officers will ensure windows and doors are closed and the external ventilation systems and air exchange setting of air conditioners are switched off. DH will advise on any further precautionary measures which may be required.

6.26 After the passage of the plume, S for S, in consultation with HKO, DH, EMSD and other members of ITF, will advise PHQCCC whether or not to proceed with the evacuation as described in paragraph 6.23 above.

Evacuation of Mirs Bay

6.27 This evacuation will be executed immediately once the order to evacuate or shelter on Ping Chau is given by S for S in consultation with ITF. Detailed instructions for this evacuation are contained in each department's contingency plan. In outline, PHQCCC will initiate action to notify vessels within the EPZl in Mirs Bay to leave the area and to inform them of other action they should take. MD will arrange for appropriate radio messages to be broadcast through the Maritime Rescue Coordination Centre and provide a copy

HKSARGDBCP – Chapter 6

for ISD to prepare media announcements. Government vessels in the area (from HKPF, MD, C&ED, etc.) will inform vessels directly using PA equipment. PHQCCC will direct the deployment of government vessels (from HKPF, MD, etc.) at the southern end of Mirs Bay to alert vessels not to enter EPZI.

6.28 If radiation monitoring of vessels is required, EMSC will decide on the need for scanning arrangements and the opening of MCs (see paragraphs 6.12, 6.21 and Chapter 8). If needed, Police and other government vessels will direct evacuated vessels to the anchorage point at the southwest of Lamma Island for monitoring. For vessels arriving from Guangdong or elsewhere through EPZI, Immigration and Customs clearance will be performed there.

Plume Countermeasures elsewhere in Hong Kong

6.29 Based on latest risk assessment (Chapter 1), plume countermeasures should not be required elsewhere in Hong Kong outside EPZ1 as the distance is such that the relevant Generic Criteria for countermeasures (paragraph 6.2 above) is highly unlikely to be exceeded in an accident at the GNPS/LNPS. Nevertheless, detailed planning of countermeasures within EPZ1 would provide a useful basis in expanding the scope of application as appropriate should circumstances so warrant.

6.30 As illustration, CESG (or S for S with the support of ITF), taking into account advice of HKOMAC, DH and EMSD, may consider the following measures as necessary –

- (a) Appropriate advice may be given to the general public to stay indoors where possible during the passage of a plume across the territory, even when the projected dose is below the relevant Generic Criteria accepted for evacuation or sheltering. Generally speaking, the passage of a plume may last for few hours or more, depending on the meteorological conditions and the magnitude of the radiological release.
- (b) DH may advise EMSC on the need of the public or a part of it to undertake thyroid blocking based on scientific evidence at the time and the relevant Generic Criteria (Annex 6.3). EMSC will oversee appropriate distribution arrangements. DH is responsible for the stockpiling of sufficient amount of thyroid blocking agent for this purpose and advises on related storage and management.

Annex 6.1

General Guidelines on Sheltering in a Nuclear Emergency

Sheltering, i.e. staying in a house or building with windows and doors closed and outside air vents shut, can be an effective emergency response to a radiological release. Because of wind and other weather conditions, a plume arising from a brief release of radioactive substances could pass through the area very quickly. In that situation, sheltering would provide the best protection.

2. Sheltering may also be the preferred action in cases where bad weather, for example a rainstorm, prevents efficient evacuation. You might be told to shelter only until the weather conditions allow the evacuation could be effected.

3. If you are instructed to remain indoors because of a nuclear emergency, you should -

- Keep family and pets inside.
- Close all windows and doors.
- Turn off heaters, air exchange setting of air conditioners and any other air exchange ventilation systems.
- Listen to radio and TV or visit Daya Bay Contingency Plan website for emergency information.
- Avoid using telephones, including cell phones, to prevent overloading the system and interfering with emergency use.

Annex 6.2

Administration of Thyroid Blocking Agent

This document is for emergency response personnel who need to perform rescue operations under the radioactive plume; and for specific groups of people in close vicinity to the accident site who are advised by the Government to take thyroid blocking agents in the very unlikely event of nuclear accidents.

Purpose for using thyroid blocking agent

In the very unlikely event of a nuclear accident affecting Hong Kong, radioactive substances, including isotopes of iodine may be released into the air (the plume). Radioactive iodine deposited on one's skin and clothing (external exposure) can be removed by washing with water and soap, by taking off the external clothing or by wiping or blotting with paper towel.

2. If the radioactive iodine is inhaled (internal exposure), it will be taken up and accumulated by the thyroid gland, leading to an increased risk of thyroid cancer, particularly in children. Taking a thyroid blocking agent **closely before or as soon as exposure begins** can block the thyroid gland and reduce accumulation of radioactive iodine in the thyroid.

3. A thyroid blocking agent does not protect against any other types of radioactive substances released. It does not protect against external radiation. It is not a radiation antidote.

4. A thyroid blocking agent is stable iodine which can be used either as potassium iodide (KI) or potassium iodate (KIO₃). Each tablet contains the recommended daily dose of iodine for adult for maximum protection of the thyroid gland. KI is the preferred alternative, since KIO₃ has the disadvantage of being a stronger intestinal irritant.

When to take the tablet

5. The use of thyroid blocking agent is entirely voluntary. When accident conditions warrant it, advice to take thyroid blocking agent will be given by the Government through the Emergency Monitoring and Support Centre (EMSC), on the advice by the Director of Health (DH).

6. Thyroid blocking agents are available for distribution on the advice of the Government, to emergency responders who need to perform rescue operations under the plume; to evacuees from Ping Chau and Mirs Bay; and to people under the radioactive plume in the very unlikely event of a nuclear accident.

HKSARGDBCP – Chapter 6

7. In view of the possible side effects people should only take the tablet when advised by the Government. The tablet should only be taken after reading and fully understanding the directions given on the information card.

8. It should be taken **as soon as possible after the Government advises you** or your department of the need to do so.

9. Take only **one single dose.** More doses will not offer additional protection. Larger doses will increase the risk of side effects.

Who should NOT take the tablet

10. People with the following medical conditions should **NOT** take the tablet :

- (a) known iodine sensitivity;
- (b) previously treated for active thyroid diseases (including goitres and auto-immune thyroid disease) because of an increased risk of relapse of thyrotoxicosis that may require definitive treatment;
- (c) hypocomplementemic vasculitis;
- (d) dermatitis herpetiformis;
- (e) myotonia congenital.

Drug Description

11. KI is a white round flat tablet. Each tablet of KI contains 130 mg of potassium iodide.

Dose

12. It is important that children, pregnant women or breastfeeding women take the tablet when advised by the Government. This is because the fetus and the young children are particularly sensitive to the effects of radioactive iodine.

13. A single dose is sufficient. This is adequate to protect from inhaled radioactive iodine present in a passing plume.

14. The dose level depends on the age. For infants, be precise and accurate with the dose level of KI given. Follow the regimen and instruction below:

Age	Dose Level (1 tablet contains 130 mg KI)
>12 years - Adults	1 tablet per day
3 years to 12 years	l/2 tablet per day
1 month to 3 years	l/4 tablet per day ¹
Birth to 1 month	1/8 tablet per day ²

¹ Dissolve 1 tablet in 20 ml of water and take 5 ml (ignore any residue) ² Dissolve 1 tablet in 40 ml of water and take 5ml (ignore any residue)

Tablets can be crushed and mixed with water, milk, orange juice, flat soda, raspberry syrup or infant formula. Shake well to make sure the powder dissolves.

Tablets can be taken with food or with an empty stomach.

15. **Breastfeeding women**, when advised by the Government, should take the recommended dose for adults. Her baby receiving breast feeding should also be given KI at the recommended age-specific dosage.

Side Effects

16. **Newborn babies** (< 1 month) should have their thyroid hormone levels monitored after the use of KI. A consultation with a paediatrician within the first week after the use of KI is advisable.

17. **Pregnant women** who have taken KI, should inform their doctor and have the thyroid function of their newborn babies checked.

18. The incidence of significant adverse reactions from low-dose short-term administration of potassium iodide is expected to be low. Usually, side effects may occur when people take higher doses for a long period. You should not take more than the recommended dose or take it for longer than you are told.

19. Possible side effects include skin rashes, swelling of the salivary glands and "iodism" (metallic taste, burning sensation of the mouth and throat and sore teeth and gums, symptoms of a head cold and sometimes stomach upset and diarrohea).

20. A few people may have an allergic reaction with more serious symptoms. These could be fever and joint pains, or swelling of parts of the face and body and at times severe shortness of breath requiring immediate medical attention.

21. Taking iodine may rarely cause over-activity of the thyroid gland, underactivity of the thyroid gland or enlargement of the thyroid gland (goitre).

What to do if side effects occur

22. If the side effects are severe or if you have an allergic reaction, call a doctor or attend the Accident & Emergency Department of a hospital.

Storage

23. Store in a cool dry place. Tablets should be protected from air, heat, light and moisture. The package should be kept dry and foil packets intact. Keep out of reach of children.

Generic criteria of projected dose for use of thyroid blocking agent

Reference:

Report of the Radiological Protection Advisory Group 26 October 2011 Criteria for Use in Preparedness and Response for a Nuclear or Radiological Emergency, General Safety Guide No. GSG-2, IAEA 2011

Generic criteria		Examples of protective actions and other response actions
$H_{Thyroid}$	50 mSv in the first 7 days	Iodine thyroid blocking
E H _{Fetus}	100 mSv in the first 7 days 100 mSv in the first 7 days	Sheltering; evacuation; decontamination; restriction of consumption of food, milk and water; contamination control; public reassurance

 H_T - Equivalent dose in an organ or tissue T

E - Effective dose

Annex 6.3

Generic Criteria for Protective Actions and Other Response Actions in Emergency Exposure Situations to Reduce the Risk of Stochastic Effects

Reference: Criteria for Use in Preparedness and Response for a Nuclear or Radiological Emergency, General Safety Guide No. GSG-2, IAEA 2011

A. Generic criteria of projected dose for urgent protective actions and other response actions

Generic criteria		Examples of protective actions and other response actions
$H_{Thyroid}$	50 mSv in the first 7 days	Iodine thyroid blocking
E H_{Fetus}	100 mSv in the first 7 days 100 mSv in the first 7 days	Sheltering; evacuation; decontamination; restriction of consumption of food, milk and water; contamination control; public reassurance

 H_T - Equivalent dose in an organ or tissue T

E - Effective dose

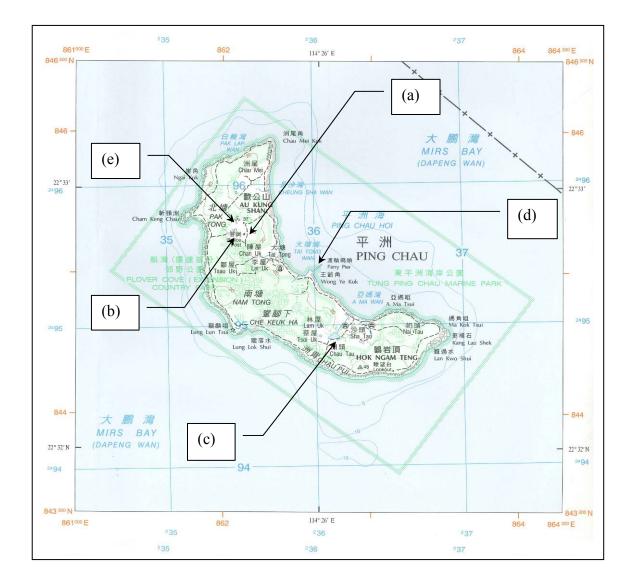
B. Relevant Default Operational Intervention Levels (OIL)

OIL	Value	Response action (as appropriate) if the value is exceeded
Environme	ental measurement	
OIL1	 Gamma (γ) 1000 µSv/h at 1 m from surface or a source 2000 counts/s direct beta (β) surface contamination measurement⁴ 50 counts/s direct alpha (α) surface contamination measurement ⁵ 	 Immediately evacuate or provide substantial shelter ¹ Provide for decontamination of evacuees ² Reduce inadvertent ingestion ³ Register and provide for a medical examination of evacuees If a person has handled a source with a dose rate ≥ 1000 µSv/h at 1m ⁴ provide an immediate medical examination

Value	Response action (as appropriate) if the value is exceeded
ental measurement	
 Gamma (γ) 1 μSv/h at 1 m from surface 20 counts/s direct beta (β) surface contamination measurement ⁵ 2 counts/s direct alpha (α) surface contamination 	Consider providing iodine thyroid blocking ⁶ for fresh fission products ⁷ and for iodine contamination if replacement for essential ⁸ local produce or milk is not immediately available
	 mtal measurement Gamma (γ) 1 μSv/h at 1 m from surface 20 counts/s direct beta (β) surface contamination measurement ⁵ 2 counts/s direct alpha

- 1. Inside closed halls of large multi-storey buildings or large masonry structures and away from walls or windows.
- 2. If immediate decontamination is not practicable, advise evacuees to change their clothing and to shower as soon as possible.
- 3. Advise evacuees not to drink, eat or smoke and to keep hands away from mouth until hands are washed.
- 4. This external dose rate criterion applies only to sealed dangerous sources and does not need to be revised in an emergency.
- 5. Performed using good contamination monitoring practice.
- 6. Only for several days and only if replacement food is not available.
- 7. Fission products that were produced within the last month, thus containing large amounts of iodine.
- 8. Restricting essential foods could result in severe health effects (e.g. severe malnutrition), and therefore essential foods should be restricted only if replacement food is available.

Annex 6.4

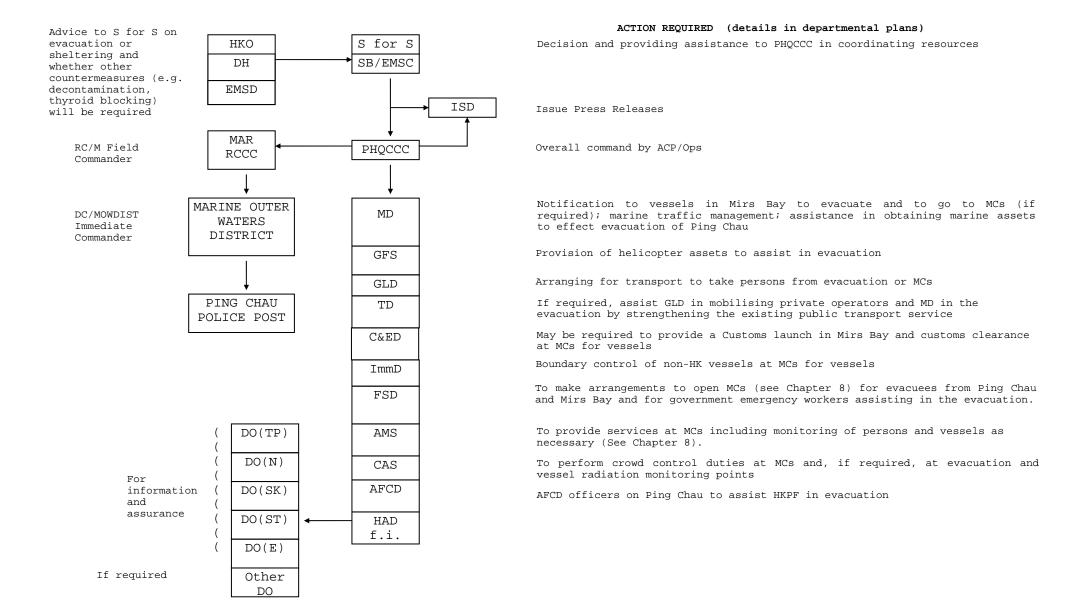


Location Map of Ping Chau

- (a) Ping Chau Police Post
- (b) the ex-military camp adjacent to the Police Post
- (c) the AFCD office next to Lam Uk
- (d) Ping Chau Ferry Pier
- (e) Helicopter Landing Site P26

Annex 6.5

EPZ1 (Ping Chau Island and Mirs Bay) Alerting System Chart



Annex 6.6

Time Lapse from Alert to Ma Liu Shui Pier	Persons Lifted	Fleet Resources	Persons Lifted Running Total
4 hours	920	HKPF(Marine) (MNDIV & MEDIV) <u>C&ED</u> (Marine Enforcement Division)	920
8 hours	920	HKPF(Marine) (MNDIV & MEDIV) <u>C&ED</u> (Marine Enforcement Division)	1 840

Ping Chau Time Frame for Evacuation by Sea Using HKPF and C&ED Fleet Resources

Note 1

Above figures assume fair weather conditions. Bad weather conditions would reduce pax carriage by up to 50% (e.g. 460 pax in the first 4 hours). Bad weather might also increase time frames. (Tropical cyclones may restrict action to sheltering in lieu of evacuation)

Note 2

For many days in the year, helicopter evacuation of Ping Chau will be more practical and realistic in view of the small numbers involved. Designated helicopter landing site – P26 will be used as marked in Annex 6.4.

Note 3

There are only less than 10 permanent residents on the island. They are not always present on Ping Chau, which is popular as a resort area especially during the summer months at weekends when visitors arrive for leisure pursuits. The above transient population figures represents the busiest summer holiday weekends, when up to 1 800 visitors will spend their holiday there.

CHAPTER 7

BOUNDARY CONTROL MEASURES: PERSONS AND GOODS

Introduction

7.1 In general, the health risk arising from nuclear emergencies is usually restricted to the individual persons exposed directly to radioactive sources, such as the plume, ground shine or contaminated food and water. In the event of an off-site emergency at GNPS/LNPS, there is a possibility that the plume might cause certain radiological contamination of persons and goods in areas in close vicinity.

7.2 According to professional advice of the international health authorities, unlike pathogens of infectious diseases, radiological contamination is usually not readily transferable. It will not multiply over time. On the contrary, it will reduce significantly over time and distance owing to radioactive decay and basic personal hygiene measures. It is very unlikely for persons and goods, even if they are directly contaminated at locations outside the nuclear stations, to "contaminate" or cause harm to others. Therefore, in general, a radiological contamination of a person is more of an individual health risk, rather than a public health risk affecting the general population.

7.3 Moreover, activation of the on-site and off-site contingency plans by the plant operators and Mainland authorities will prevent and mitigate to a large extent such radiological contamination (through evacuation, sheltering and decontamination). There are checkpoint arrangements under the Mainland authorities' plans to monitor outbound traffic from the accident site.

7.4 In sum, the public health risk to the Hong Kong population due to inbound persons and goods should be minimal in most cases, and there should be no general need to carry out mandatory measures at the points of entry. However, as a matter of prudence, the DBCP provides for a mechanism to pursue possible mandatory measures at the points of entry, which may be invoked where warranted. This is set out in the ensuing paragraphs. As regards possible assistance to contaminated persons, which may either be part of the mandatory measures or be provided on a voluntary basis to address individual health concerns or worries, it will be discussed in Chapter 8. As regards possible contamination of food and water, ingestion pathway countermeasures are separately discussed in Chapter 9.

Boundary control measures

7.5 In a nuclear emergency, relevant international organizations will respond to it according to their own mandates as well as a Joint Plan.¹ The International Atomic Energy Agency (IAEA) plays a major overall coordinating role. Among various international organizations in support, the World Health Organization (WHO) has the directing and coordinating authority on international health work. The information and advice disseminated by these organizations need to be taken into account by national authorities in responding to the emergency.

7.6 The purpose and the scope of the International Health Regulations 2005 (IHR2005) of WHO are to prevent, protect against, control and provide a public health response to the international spread of disease in ways that are commensurate with and restricted to public health risks², and which avoid unnecessary interference with international traffic and trade³. Consistent with its broad scope, IHR2005 covers not only communicable diseases but also public health risks caused by biological, chemical and radiological contamination⁴. Public health emergencies, including those involving radiation and related health risks, are subject to the coordination and response-related requirements and mechanisms in the IHR2005⁵. Part V of IHR2005 stipulates the appropriate boundary measures that WHO member states may implement on travellers, goods and conveyances passing through the points of entry, such as, medical examination, inspection, isolation, decontamination, treatment and refusal of entry.

7.7 WHO has advised that only a subset of events involving radiation would present public health risks that would in turn trigger the relevant provisions in IHR2005⁶. Our general assessment set out above (paragraphs 7.1-7.4) is consistent with WHO's advice. One mechanism is for Director-General of WHO, after being notified by a country of a rare but very serious event as such, to determine, after consultation with an Emergency Committee of external experts, whether the event constitutes a public health emergency of international concern before issuing time-limited temporary recommendations

¹ See Joint Radiation Emergency Management Plan of the International Organizations, sponsored by European Commission, European Police Office, Food and Agriculture Organization of the United Nations, International Atomic Energy Agency, International Criminal Police Organization, International Maritime Organization, Nuclear Energy Agency of the Organisation for Economic Cooperation and Development, Pan American Health Organization, United Nations Environment Programme, United Nations Office for the Co-ordination of Humanitarian Affairs, United Nations Office for Outer Space Affairs, World Health Organization and World Meteorological Organization in co-operation with the International Civil Aviation Organization and United Nations Scientific Committee on the Effects of Atomic Radiation.

² Public Health Risk as defined in IHR (2005) means a likelihood of an event that may affect adversely the health of human populations with an emphasis on one which may spread internationally or may present a serious and direct danger.

³ International Health Regulations 2005 (IHR 2005) Second Edition, World Health Organization

⁴ See p42 of Appendix B of the Joint Plan in footnote 3.

⁵ See p45 of Appendix B of the Joint Plan in footnote 3.

⁶ See p44 of the Joint Plan in footnote 3.

for the application of appropriate health measures by Member States⁷. The Director of Health (D of Health) will follow closely WHO's advice and any temporary recommendations under Article 15 of IHR2005 regarding a response to a nuclear accident in considering the necessary enactment of subsidiary legislation under Section 9 of the Prevention and Control of Disease Ordinance (Cap. 599) to support the appropriate Government actions.⁸ Following this procedure would ensure compliance with our international obligations under the purview of WHO.

7.8 The above notwithstanding, at the PARTIAL ACTIVATION or FULL ACTIVATION level, the EMSC, in consultation with the HKOMAC and D of Health, may seek the advice of the S for S's ITF or the CESG, as the case may be, who may decide to institute prescribed boundary control measures for contaminated persons and goods as set out at *Annex 7.1*. In so doing, the ITF or the CESG will take full account of the WHO's temporary and other recommendations, advice or guidance by other international organisations including the IAEA, and locally the HKOMAC's assessment of the risk of radiation fallout on Hong Kong and D of Health's advice on public health protection.

Public Information

7.9 ISD will coordinate publicity in Hong Kong, as set out in Chapter 5, on the boundary arrangements. Given the small risk as assessed above in the vast majority of cases, the thrust is to explain the absence of public health risks and the need to follow the advice and recommendations of IAEA, WHO and other international organisations.

7.10 In case of pursuit of mandatory control measures, the emphasis of publicity will be Government's commitment to protecting the people of Hong Kong and treating those in need and compliance with international obligations, as appropriate. EMSC will inform PEACO of the implementation of boundary controls for incoming persons and goods. At the local level, Boundary Liaison Officers will keep their Guangdong counterparts informed of the situation and enlist their assistance in regulating people flows. C&ED and Trade and Industry Department (TID) may need to make arrangements to answer queries from importers (Chapter 12). SB and CEDB may also arrange briefings for consulates and national chambers of commerce in Hong Kong (Chapter 5).

⁷ Article 12 and Article 15 of IHR 2005.

⁸ Section 9 of Cap. 599 reads : "(1) The Director may, for the purposes of preventing the introduction into, the spread in and the transmission from, Hong Kong of any disease, by order published in the Gazette, prescribe any measure to be applied in the light of any temporary recommendation made by WHO pursuant to articles 15, 17 and 18 of the International Health Regulations. (2) An order under subsection (1) is subsidiary legislation."

Annex 7.1

Possible arrangements for mandatory control measures

Introduction

7.1.1 In the rare event that mandatory control measures are justified, following the advice and temporary recommendations of WHO under IHR2005 to address a possible public health risk or otherwise, frontline departments will take corresponding actions to monitor and identify radiological contamination of inbound persons and goods. The following paragraphs outline the possible arrangements, with details set out in departmental plans.

7.1.2 The level of contamination to monitor will follow D of Health's directive (including basing on the advice and the temporary recommendations of WHO under IHR2005). One possibility is to tie in with the general IAEA dose criteria for decontamination (paragraph 1.32). The relevant Operational Intervention Level (OIL), based on the Generic Criteria promulgated by IAEA as set out in *Annex 1.5*, is detailed in *Annex 7.2*.

7.1.3 In practice, given the abundance and volatility of the different fission products in nuclear reactors, the priority of radiological monitoring at off-site locations will be gamma dose rate and beta contamination. The equipment should be calibrated to trigger at a level equivalent to a beta surface contamination level of **1000 counts per second (cps)** as measured by a portable surface contamination monitor averaged over 100 sq cm of the body surface, or at a level of 1 μ Sv/h as measured by a portable gamma dose rate meter at 10 cm from body surface. This level of contamination on the skin, as measured by the standard hand-held surface contamination monitoring instruments procured for the purposes of the DBCP with instrument coefficient of about 30 for moderate to high energy beta emitting radionuclides (such as Cs-137 and Sr-90), if not removed, may incur a skin dose of the order of 10 mSv.

Control of Inbound Travellers

7.1.4 At the FULL ACTIVATION level or earlier, when advised by EMSC with input from DH according to the alerting procedures at *Annex 7.3*, the Auxiliary Medical Service (AMS) will mobilize to take up the radiation monitoring duties at the points of entry and set up Monitoring Centres (MCs) in situ as soon as possible, with necessary support from the Immigration Department (ImmD) where necessary.

7.1.5 The general arrangements for conducting radiation monitoring will be as follows -

- (a) Through an appropriate mechanism using notices, public address systems and declaration forms as appropriate, travellers from areas within 20 km of the GNPS/LNPS will be asked to queue up at designated areas. Radiation scanning will be conducted there.⁹
- (b) With walk-through screening portals, the persons should be instructed to walk at a slow pace through the detector panels. If the equipment is triggered, the person should be given a verification scanning using a portable surface contamination monitor.
- (c) With portable surface contamination monitor, readings should be taken at 1 - 2 cm distance of hair, chest, back, palms and front of thighs. If the reading averaged over about 30 seconds at any of these locations exceeds 1000 cps, the person should be considered as contaminated.
- (d) Details of reading results and place of origin of journey of each contaminated person will be recorded and results sent to AMS HQ. Consolidated results will be forwarded to DH and HKO as required (normally hourly). A summary will be sent to EMSC.
- (e) Persons found contaminated will be given the option of returning to Guangdong. Otherwise they will be admitted to Hong Kong subject to meeting normal immigration requirements. Decontamination of these persons will follow.
- (f) Contaminated persons will be directed to MCs set up in situ, and, where necessary, sent to other MCs with showering facilities and/or Emergency Radiation Treatment Centres (ERTCs) as appropriate. The Government Logistics Department (GLD) will provide transport, the estimated demand for which should be notified to GLD by AMS, copied to EMSC. MCs will carry out decontamination procedures. Injured persons, who may also be radiologically contaminated and requiring medical attention, will be conveyed by ambulances to public hospitals. ERTCs will provide further medical assistance as needed. (See Chapter 8 for details.)
- (g) Random radiation monitoring of persons coming from elsewhere in Guangdong Province may be conducted.
- (h) Accompanied luggage will be checked simultaneously for surface contamination with the owners. If found contaminated, it may be

⁹ Subject to circumstances as may be warranted, radiological scanning might be conducted of all inbound travelers by walk-through screening portals. Declaration forms might still be required to record the travel history.

decontaminated or otherwise be disposed of in accordance with the Waste Disposal Action Plan (Chapter 10).

(i) If a person is found contaminated and the conveyance carrying the person is seeking entry into Hong Kong, there will also be radiation checking of the conveyance. The conveyance operators or the Food and Environmental Hygiene Department (FEHD) will carry out decontamination as needed.

Control of Imported Goods

7.1.6 Throughout the emergency arising from an accident at Daya Bay, it is intended to keep the points of entry operating normally. One major exception is that all vehicles carrying food or live food animals to Hong Kong will be diverted by the Guangdong authorities to the Man Kam To Control Point (see Chapter 9). Special arrangements may also be needed to facilitate cross-boundary assistance (see Chapter 14).

7.1.7 At the FULL ACTIVATION level or earlier, when advised by EMSC under the alerting procedures at *Annex* 7.3, C&ED HQ will instruct officers in charge at the points of entry to implement the radiation monitoring programme for the control of incoming goods and lorry drivers at the points of entry. Full details are set out in the departmental plan.

7.1.8 The general arrangements for conducting radiation monitoring of goods and lorry drivers will be as follows -

- (a) Through an appropriate mechanism using notices, public address systems and declaration forms as appropriate, C&ED will arrange that lorries and goods from areas within 20km of the GNPS/LNPS are directed to designated booths¹⁰.
- (b) Radiation checking of lorry drivers will be conducted by C&ED before immigration clearance at the designated booths.
- (c) If the lorry drivers are found contaminated, C&ED will make a thorough radiation checking of the goods from lorries. Details of the reading results and place of origin of journey of each contaminated person will be recorded and results sent to C&ED HQ. Consolidated results will be forwarded to DH, HKO and AMS as required (normally hourly) and a summary will be sent to EMSC.
- (d) Random checks will be made of the other goods and lorries from the areas within 20km of the GNPS/LNPS, and from elsewhere in

¹⁰ Subject to circumstances as may be warranted, radiological scanning of all inbound lorries might be conducted. Declaration forms might still be required to record the travel history.

Guangdong. Consolidated results will be forwarded to C&ED HQ, DH and HKO; and a summary will be sent to EMSC.

- (e) Contaminated goods will not be permitted to enter Hong Kong and will be returned to the Guangdong side.
- (f) In the event that contaminated goods cannot be returned, they will be decontaminated or otherwise be disposed of in accordance with the Waste Disposal Action Plan (Chapter 10).
- (g) Contaminated empty lorries will be decontaminated by FEHD using high pressure hoses of water wagon.
- (h) Contaminated lorry drivers will be given the option of returning to Guangdong, but would otherwise be admitted to Hong Kong subject to meeting normal immigration requirements. Their subsequent monitoring and decontamination processes are set out in paragraph 7.1.5.

Annex 7.2

Response action (as appropriate) OIL Value if the value is exceeded Skin contamination OIL4 Gamma (γ) 1 μ Sv/h at Provide for skin • . decontamination¹ and reduce 10cm from the skin inadvertent ingestion² 1000 counts/s direct • beta (β) skin Register and provide for a • contamination medical examination measurement³ 50 counts/s direct alpha • (α) skin contamination measurement³

Operational Intervention Level 4 (OIL4)

- 1. If immediate decontamination is not practicable, advise evacuees to change their clothing and to shower as soon as possible.
- 2. Advise evacuees not to drink, eat or smoke and to keep hands away from mouth until hands are washed.
- 3. Performed using good contamination monitoring practice.

SB/EMSC Issue press release to the public and all government departments PHQCCC ISD CP Set up MCs in situ to conduct radiation monitoring of inbound persons and AMS passenger conveyances. ACP/Ops C&ED Monitor goods, lorries and lorry drivers. Support AMS in the monitoring of inbound travellers and passenger conveyances DDC ImmD where necessary. BORDIST HKPO Take over and process contaminated postal articles at points of entry. FSD Assist in MC operations, convey injured contaminated persons and undertake decontamination measures where calamities are involved. CAS Escort contaminated persons. Assist in the monitoring of inbound travellers where necessary. Monitor imported food and live food animals and hose down empty contaminated FEHD conveyances (vehicles). EPD Advise on disposal of contaminated waste. GLD Provide transport to take contaminated persons to Monitoring Centres GL Provide laboratory services. Follow closely any WHO advice and temporary recommendations under Article 15 DH of IHR2005 regarding response to nuclear accident in considering the necessary enactment of subsidiary legislation to support the appropriate government actions. HKO f.i. HAD f.i.

BOUNDARY CONTROL MEASURES: ALERTING CHART

Annex 7.3

CHAPTER 8

ASSISTANCE TO CONTAMINATED PERSONS: MONITORING CENTRES AND EMERGENCY RADIATION TREATMENT CENTRES

Introduction

8.1 During an offsite emergency at the GNPS/LNPS, the public concern during and immediately following the release of radioactive materials is possible radiological contamination of individuals in different circumstances, including the following –

- (a) Evacuees and emergency responders returning from Emergency Planning Zone 1 (EPZ1) (Chapter 6) – the contamination risk is small as evacuation is normally implemented as a precautionary measure before passage of the plume;
- (b) General members of public within Hong Kong outside the 20-km EPZ1, especially those in the north-eastern part of the territory (Chapter 6) they might show concern about radiation generally and fear that they might have been contaminated, especially during the passage of a plume. The contamination likelihood outside the 20-km EPZ1 is very remote given our risk assessment of possible accidents at the GNPS/LNPS;
- (c) Visitors from the Mainland and returning Hong Kong residents at the points of entry who have been to the close vicinity of Daya Bay (Chapter 7) – a few might have been radiologically contaminated and have individual health concern that should be addressed. However, many others might be worried even though they have not been contaminated; and
- (d) A few Hong Kong residents who work in the nuclear power stations at the GNPS/LNPS and may wish to return to Hong Kong to seek treatment it is possible that they might also have suffered from other injuries during a nuclear accident.

8.2 The public health risk of such radiological contamination is minimal in most cases, as discussed and addressed in Chapter 7.

8.3 In terms of emergency response, the emphasis is on providing assistance, where appropriate and necessary, to individuals who have been affected or who believe themselves to be affected, which is the focus of this chapter. The following considerations are relevant –

- (a) The health risk is confined to an individual concerned who is at liberty to seek treatment or otherwise;
- (b) In Hong Kong's healthcare system, an individual with personal health concern may always call on the Accident and Emergency (A&E) departments of public hospitals;
- (c) In most cases, simple actions like changing clothes, washing exposed skin or showering can significantly reduce radiological contamination without the need for tertiary care in a hospital setting; and
- (d) During a nuclear emergency, it is not difficult to envisage that some are seeking help only owing to fears or worries (after all, radioactive fallout cannot be seen, smelt or felt).

8.4 The Government should provide assistance and facilitation to those with genuine needs and refrain from over-reacting and thus fuelling unnecessary worries. Nevertheless, in some cases, some simple radiation scanning can provide quick reassurance, nib any unwarranted fear in the bud and relieve public hospitals of unnecessary pressure. A balance should be struck.

Strategy

8.5 In terms of emergency preparedness, the DBCP has made provision for the setting up of the following dedicated facilities, as circumstances may warrant –

- (a) **Monitoring Centres** (MCs) by AMS and others at appropriate locations (e.g. at the points of entry or evacuation discharge points) to provide radiation scanning and, if needed, perform simple decontamination procedures and provide counselling; and
- (b) **Emergency Radiation Treatment Centres** (ERTCs) in designated public hospitals, to provide tertiary healthcare to those with persistent radiological contamination with or without other injuries (Annex 8.4.5).

8.6 In the rare case that the mechanism set out in Chapter 7 resulted in the targeting of mandatory measures (including radiation monitoring, decontamination and treatment) on inbound travellers who are potentially subject to radiological contamination, MCs and ERTCs will be part of the operational arrangement to provide support. Such operations will be coordinated by EMSC in line with the reference arrangements set out in *Annex 7.1*. 8.7 Otherwise, such dedicated services may be provided on a voluntary basis as necessary and appropriate to facilitate assistance to those in need and to relieve the normal healthcare system of unwarranted pressure and avoid serious disruption to normal A&E and hospital services.

8.8 Accordingly, there should be no requirement for the opening of the MC facilities at OBSERVATION, READY or PARTIAL ACTIVATION Level, as any radioactive release is confined to the plant or the site (a point that should be emphasized in public communications). Anyone with medical illness may attend the A&E departments of public hospitals in the normal course. The HA and FSD should closely monitor the situation and update EMSC, FHB and DH. Any observation on the public sentiments should be reported to EMSC, e.g. by DH and ImmD on any concern expressed by inbound travellers, by ISD on media reports, by District Offices on community feedback, etc. EMSC will keep FHB and DH posted of the overall situation.

8.9 At the FULL ACTIVATION Level, there should be more intensive monitoring and alertness of the situation by all parties concerned. Off-site release may possibly cause radiological contamination in the close vicinity. HKOMAC will provide an assessment to DH and EMSC. There may be heightened calls for opening MCs at relevant points of entry to provide reassurance radiation scanning (and, if necessary, decontamination and counselling services) to those who are worried due to prior travel to the close vicinity of Daya Bay, as well as in the community following the passage of the plume (even though the dose level may be below the criteria for intervention – see Chapter 6). As in para. 8.8, all parties concerned should closely monitor the situation and update EMSC, FHB and DH. On the advice of HKO, DH, HA, FHB etc on the radiological situation and demand, S for S' ITF will determine on the need and justifications for the opening of MCs. EMSC will assess the resources available (factors set out in Annex 8.1) and advise S for S' ITF on the opening in terms of priorities, numbers and locations.

8.10 If evacuation of Ping Chau is carried out at either the PARTIAL ACTIVATION or FULL ACTIVATION level as decided by CESG or S for S' ITF, there will be a case for setting up an MC at the evacuation discharge point to conduct radiation scanning, simple decontamination and counseling to evacuees and emergency responders if needed. This should be part of the whole evacuation operation. HKPF will advise EMSC on the demand.

8.11 HKO may also operate an MC at its own discretion at its King's Park laboratory solely for its mobile radiation monitoring teams.

8.12 ERTCs at designated public hospitals will operate on a need basis, following admission of any patients in need through A&E departments or MCs in running.

Opening of MCs

8.13 Once the decision to open MCs has been made, EMSC will advise the Fire Services Communications Centre (FSCC) which will inform relevant departments using the alert chart at *Annex 8.2*.

8.14 MCs may be set up by AMS in-situ where people in need are located (e.g. at the points of entry or evacuation discharge points), usually with the support of mobile decontamination units run by FSD. Where necessary, MCs may also be set up in designated swimming pools of the LCSD and other government facilities. See *Annex 8.1*.

8.15 At the MCs, people who are, or believe themselves to be, radiologically contaminated are checked by AMS personnel for surface contamination. In general, injured or sick persons will be monitored at MCs as far as practicable before being sent to hospitals, provided that the monitoring process will not unduly delay or affect life saving actions or the necessary medical treatments. Life saving and medical treatment of injuries and illnesses shall take precedence over radiation monitoring and decontamination. People with surface contamination (above 1 000 counts per second (cps))¹ should go through a dry decontamination procedure as detailed in *Annex 8.3*. This includes removal of external clothing and wiping the exposed skin with damp cloth or adhesive tapes. The procedure should be able to remove some 90% of contamination in most situations.

8.16 Persons still found to be contaminated after the above procedure will be sent to showering in the same or another MC with such facilities, and are then rechecked. Those still found contaminated despite three showering rounds are referred to ERTCs in designated public hospitals.

8.17 The CAS will control the order outside MCs for the public. DH will provide medical counselling teams, where required.

8.18 Further guidelines on MC operations can be found in *Annex 8.4*.

Closure of MCs

8.19 The decision to close MCs will be made by EMSC based on demand, following a similar procedure for their opening. The FSCC will communicate the decision using the alerting chart at *Annex 8.2*.

8.20 The AMS officer in charge of an MC will ensure that all staff, equipment and all the facilities of the centre are checked for contamination before finishing duty and that waste is properly labelled for disposal according to EPD's Waste Disposal Action Plan. The actual closure of the centre will be completed by FSD and the premises handed back.

¹ See OIL4 in Annex 7.2.

ERTCs

8.21 HA has two permanent designated ERTCs at Tuen Mun Hospital and Pamela Youde Nethersole Eastern Hospital. If required and at two hour's notice, other acute hospitals with A&E facilities can support the two ERTCs. Each ERTC or A&E can handle 1 to 2 contaminated persons per hour. These ERTCs will -

- (a) provide treatment to injured people who, if the condition of injury permits, have undergone initial decontamination at the earliest time at MCs after the rescue is completed; and
- (b) provide radiological decontamination of people whose contamination remain after going through the procedures at MCs;
- (c) provide facilities for monitoring the internal contamination and for treatment of people when medically indicated.

8.22 The HA's Chief Executive, contacted through the HA Head Office Duty Officer, will have overall control of ERTCs. He will ensure that the PHQ Casualty Enquiry Unit is informed of the details of admissions to ERTCs.

Public Information

8.23 ISD will coordinate publicity concerning the provision of medical and heath assistance as set out in Chapter 5. The thrust of this publicity is to underline the minimal risk of radiological contamination of persons prior to an off-site release, to minimise unjustified use of the usual public health system owing to unfounded fears or worries, and to advise on the proper use of MCs and ERTCs when put into operation.

8.24 ISD should ensure that all government departments are informed of the location of MCs for government emergency responders. Information Officers in departments which have them should ensure that such press releases are brought to the immediate attention of the Departmental Radiation Protection Officers (DRPOs).

Annex 8.1

Resource Factors for Opening Monitoring Centres

Locations

- 8.1.1 Following EMSC's coordination (paragraph 8.9), AMS may set up MCs in-situ where people in need are located (e.g. at the points of entry or evacuation discharge points). Where possible, FSD will set up mobile decontamination shelters with showering facilities in support. The MCs may be used by the public and government emergency responders, subject to EMSC's advice.
- 8.1.2 In case FSD's mobile decontamination shelters at an in-situ MC have a capacity limit or are fully deployed, MCs may also be set up at designated LCSD swimming pools in support, as tabulated below.

Designated MCs	Possible Users	Alternate MCs 1 Nov – 31 Mar
Fanling Swimming Pool	Travellers returning from Guangdong through the land boundary points of entry between Hong Kong and Shenzhen	N.A.
Yuen Long Swimming Pool	Travellers returning from Guangdong through Lok Ma Chau	Fanling Swimming Pool
Tai Po Swimming Pool	Evacuees from Ping Chau and other areas (and as a back up for Fanling Swimming Pool)	Lai Chi Kok Park Swimming Pool / Sham Shui Po Park Swimming Pool ¹
Sai Kung Swimming Pool	Evacuees to Sai Kung Marine Police Base	Lai Chi Kok Park Swimming Pool / Sham Shui Po Park Swimming Pool ¹
Shatin Jockey Club Swimming Pool	Evacuees to Ma Liu Shui Pier	Lai Chi Kok Park Swimming Pool / Sham Shui Po Park Swimming Pool ¹
Chai Wan Swimming Pool	Evacuees from Mirs Bay	Kowloon Park Swimming Pool
Tai Wan Shan Swimming Pool	Travellers returning from Guangdong through MTR Hung Hom Station and Hong Kong China Ferry Terminals	Kowloon Park Swimming Pool

HKSARGDBCP – Chapter 8

Pao Yue Kong Swimming Pool	Evacuees from Mirs Bay	Morrison Hill Swimming Pool
Kwun Tong Swimming Pool	Evacuees from Mirs Bay	Morrison Hill Swimming Pool
Tung Chung Swimming Pool	Travellers returning from Mainland and overseas through the HK International Airport	Lai Chi Kok Park Swimming Pool ¹ (Alternate MC : 1 September to 31 October)

Note:

- Lai Chi Kok Park Swimming Pool or Sham Shui Po Park Swimming Pool will be the frontline alternate MC in winter (Either one of the swimming pools will be closed for annual maintenance in winter). Morrison Hill Swimming Pool and Kowloon Park Swimming Pool are second line MCs and will only be used when absolutely necessary.
- ² Kennedy Town, Mui Wo, Kwai Shing and North Kwai Chung Swimming Pools can also be used as reserved MCs.
- 8.1.3. Further MCs may be set up at the swimming pools stated in Note 2 of paragraph 8.1.2 above in consultation with LCSD. If the situation warrants and as a last resort for government emergency responders with due regard to the possible impact on emergency services, further MCs may be set up at the following fire stations².

HONG KONG

Sai Wan Ho Fire Station	20 Wai Hang Street, Sai Wan Ho.
Sheung Wan Fire Station	2 Western Fire Services Street, Sheung Wan.
Kong Wan Fire Station	14 Harbour Road, Wan Chai.
KOWLOON	
Tsim Sha Tsui Fire Station	333 Canton Road, Tsim Sha Tsui.
Kowloon Bay Fire Station	5 Lam Hing Street, Kwun Tong.
NEW TERRITORIES	
Sha Tin Fire Station	26-28 Yuen Wo Road, Sha Tin.
Tsing Yi Fire Station	11 Tsing Yi Heung Sze Wui Road, Tsing Yi.
Sheung Shui Fire Station	8 Tin Ping Road, Sheung Shui.

² Because of limited size and throughput capacity, MCs at fire stations may not always be appropriate. The advice of the FSD Liaison Officer in EMSC should be sought.

Yuen Long Fire Station		Station	2 Fung Kam Street, Yuen Long.
Fire	Services	Training	123 Fan Kam Road, Pat Heung, Yuen
Schoo	ol		Long.

8.1.4. It is advisable not to open MCs in the path of the plume.

Throughput capacity

8.1.5 It takes approximately three minutes to monitor one person. When fully operational, each centre can monitor 80 persons per hour.

Departmental Resources

- 8.1.6 The response time for AMS personnel to report to the location of a MC to be opened would be one hour and another hour would be required to complete the setting up of the MC.
- 8.1.7 If all MCs were ordered to be opened at the same time, the task would consume a considerable portion of FSD's resources, posing a serious reduction in fire cover. Hence, a progressive opening of centres is advisable in order to reduce demands for FSD resources and to enable full mobilisation of AMS and CAS volunteers to run the centres.

Annex 8.2

ACTION REQUIRED (details in departmental plans) EMSC Issue press release (locations, purpose, etc.) to the public and all ISD government departments FSCC Initial overall command of opening MCs Command Control of ambulance resources and PHQCCC control of AMS Command of police priorities AMS resources at points of entry Continuous monitoring of plume coverage and actual and projected radiological HKO and effects Oi/c of MCs Assist in disposal of contaminated waste with the level of contamination below 75,000 Bg/kg FEHD LCSD Access to swimming pools, check the availability of water Cordoning, crowd control, water from fire hydrants CAS Direct contaminated persons to the appropriate MC TmmD Provide medical counselling at MCs and advise EPD on disposal of radioactive wastes. DH GLD Provision of vehicles for transfer/referral of persons (if required) WSD Ensure provision of water EPD Advise on disposal of contaminated waste DSD Ensure operation of drainage system EMSD Ensure priority given to necessary maintenance HA Be warned of situation and to advise (thro' EMSC/FSD) to Mobile MCs at which hospital contaminated persons should be sent designated HAD evacuation f.i. discharge points Assist in maintenance of law and order inside and outside MCs (through DC and Police RCCCs DVCs).

Monitoring Centres Alerting Chart

MCs

Annex 8.3

Procedures for Dry Decontamination

- 1. Put on personal protective clothing (staff group B) and ensure that there is no eating, drinking or smoking in the area;
- 2. Cover the floor of the working area with plastic sheets fixed with adhesive tapes, display suitable message and signage for different gender and restrict access to the area;
- 3. If the subject is injured, conduct radiological monitoring before directing him/her to the hospital, provided that the monitoring process will not unduly delay or affect life saving actions or the necessary medical treatments;
- 4. Remind the subjects not to eat, drink, smoke or apply cosmetics and to keep their hands away from the mouth;
- 5. Conduct radiological monitoring and dry decontamination according to procedures as shown in the flowchart at *Annex* 8.7;
- 6. Perform surface contamination measurement (with original clothing on) on five locations on the body (hair, hands, chest, back, and front of thighs);
- 7. If the contamination level of any area exceeds 1 000 counts per second (cps), instruct the subject to perform the dry decontamination procedures as described below and depicted in figure 1. Otherwise, go to step 15 & 16;
- 8. Remove the outer clothing and place them in a polythene bag tag with an identification tag;
- 9. Wipe the contaminated skin and hair with clean paper towels in a direction downward away from the body;
- 10. Localized areas of dry or loose contamination on the inner clothing can be removed by pressing adhesive tape on such areas similar to how lint would be removed from clothing;
- 11. Place the paper towels and adhesive tapes in a polythene bag after use and treat as contaminated wastes;
- 12. Ask the subject to come forward to repeat the surface contamination measurement as in step 6 (with inner clothing on). If the level is below 1000 cps, go to step 15 and 16;
- 13. If the contamination level still exceeds 1 000 cps, refer the person to showering facilities, if necessary, with replacement clothing;
- 14. Place any other contaminated clothing and belongings in a polythene bag tagged with identification;
- 15. Fill out the monitoring measurement registration form;
- 16. Issue a receipt for the bagged clothing and personal items, if any, and

release the person, if necessary, with replacement clothing;

- 17. Move the bagged contaminated clothing and personal items to an isolated and secure location to be managed according to the procedures set up for management of such items under the DBCP;
- Wastes arising from the dry decontamination procedures are to be managed and disposed according to the Waste Disposal Action Plan (WDAP) of EPD;
- 19. Before returning the area to its normal functions, roll up and bag the floor sheet as contaminated waste, and monitor and decontaminate the area and all used equipment. Ensure that the contaminated wastes are properly managed and disposed of according to the WDAP of EPD.
- 20. When going off duty, centre staff should monitor their personal protective clothing for contamination according to the same standard of 1 000 cps before dressing down. If contamination is found, they should follow the decontamination procedures as given in step 8 to 17;
- 21. The advice of the Departmental Radiological Protection Officer should be sought in case of problems.



Fig 1 Dry decontamination

For liquid contamination – use a soft rag, paper towel or towelette and "blot" up any visible areas of liquid contamination.

For solid contamination – use a soft rag, paper towel or towelette and wipe

downwards, away from the

body

Source: Guidelines for Mass Casualty Decontamination During a HAZMAT/Weapon of Mass Destruction Incident, U.S. Army Chemical Biological, Radiological and Nuclear

School and U.S. Army Edgewood Chemical Biological Center, December 2008

Annex 8.4

Operation Guidelines of MCs

8.4.1 Detailed instructions for the operation of MCs are contained in each department's contingency plan. In-situ MCs are set up by AMS and put under the command of the senior AMS officer present. Where available, FSD may provide mobile showering units in support. For MCs at designated swimming pools, FSD will take overall responsibility for the initial opening, gaining entry to the facilities with the assistance of LCSD staff, setting up equipment and establishing the supply of additional water and exit hoses to be manned by CAS for AMS to make arrangements for dry decontamination. Once operational, the command will be put under a senior AMS officer.

8.4.2 The Officer-in-charge of each MC (Oi/c MC) will report to FSCC when he is ready to receive people. He will make regular reports to AMS HQ and FSCC, as appropriate, concerning the number of people monitored and their level of contamination. The respective HQ will forward consolidated summaries to EMSC. *Annexes 8.5* and *8.6* set out the report formats.

8.4.3 Prior to collecting potentially contaminated persons from the points of entry or evacuation discharge points to MCs, GLD transport will first report to the Oi/c MC for deployment.

8.4.4 A flow chart illustrating the process of monitoring is at Annex 8.7. Persons in need may be referred from the points of entry (see Chapter 8) or evacuation discharge points (see Chapter 6). Such referrals should be given priority over casual users. CAS personnel will perform marshalling duties, with support from the Police, if necessary. DRPOs should provide guidance concerning the necessity of monitoring government emergency workers. Persons who are found contaminated (above 1000 cps) will go through the dry decontamination procedures, and showering if necessary. Their contaminated clothing and belongings will be disposed of in accordance with the Waste Disposal Action Plan (see Chapter 10). DH will provide a counselling team (a doctor plus two nurses) to counsel individuals who are worried before they are discharged. Oi/c MCs should alert the counselling team the demand for counselling since only five teams can be provided. Some people may need to be directed to other MCs or clinics for counselling.

8.4.5 Those still found contaminated after three repeated showering rounds will be sent by GLD transport and escorted by CAS personnel to ERTCs at designated hospitals (para 8.21). For those who are injured as well as contaminated, FSD ambulances will be used instead.

Annex 8.5

SITREP BY ________MONITORING CENTRE TO AMS FSD HQ FSD HQ OR APPROPRIATE ________hrs to ______hrs on _______. ________hrs on _______. Officer in charge : ________. Telephone : ________Fax : _______. ________. SUMMARY 1. Numbers using centres in reporting period ________Manageable / not manageable? Ontaminated in Hong Kong _______. of whom numbers requiring dry decontamination/ showering _______ [number (if any) contaminated in Hong Kong ______]. Of whom numbers requiring referral to ERTCs _______ [number (if any) contaminated in Hong Kong ______]. 2. Discharge level _______ Bq/L average. Maximum in period ________ Bq/L. Estimate whether at present rate of usage

- 2. Discharge level _____ Bq/L average. Maximum in period ______ Bq/L. Estimate whether at present rate of usage discharge limits will be breached in the next hour (YES/NO). [If YES send sitrep immediately to EPD and DSD in addition to AMS or FSD HQ].
- 3. Estimate when centre can be closed.
- 4. Problems? [Indicate action being undertaken to solve problem and whether any assistance is required].

e.g. Crowd control, Dry decontamination supplies, Water supply, Maintenance, Transportation

5. Sentiment of people being monitored.

HKSARGDBCP – Chapter 8_

 DETAIL :
 Monitoring Centre Sitrep
 hrs to
 hrs on

 Usage of centre

Source of persons	Total in Category	Below Detectable Level	<1000 cps no action required	<1000 cps after dry decontamination	<1000 cps after showering	>1000 cps * after showering
Referrals from Imm D/ AMS at points of entry						
Ping Chau / Mirs Bay evacuees						
Other areas of Hong Kong (specify)						
Total						

* See overleaf for details

HKSARGDBCP – Chapter 8_

_____Monitoring Centre Sitrep_____hrs to_____hrs on

* Details of each person referred to Emergency Radiation Treatment Centre (send copy to Casualty Enquiry Unit at PHQCCC).

Name	ID	Age	Sex	Nationality	Sick / Injured Contaminated	Contamination Level		Country/Area of PRC/HKSAR in which person was contaminated	Emergency Radiation Treatment Centre sent to
						before dry decontaminat ion/ shower	after dry decontamin ation/		
							shower		
							Silower		

Annex 8.6

FSD AMS HQ Sitrep : MONITORING CENTRES

_____ hrs to _____ hrs on _____

Queries concerning this sitrep should be directed to ______ Telephone ______ Fax _____

SUMMARY

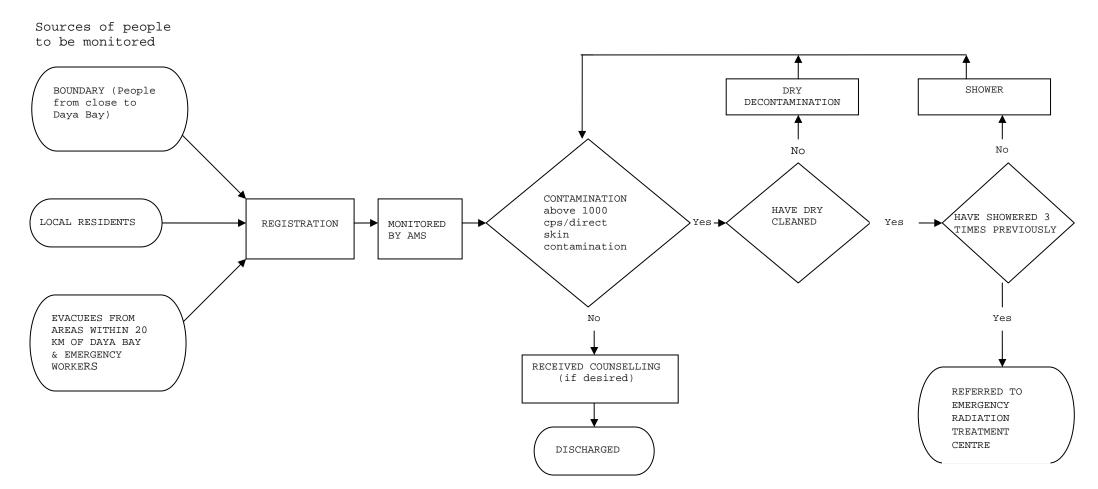
1. Usage of centres: (indicate by a * those centres opened in the reporting period, by a + those closed in the reporting period)

Name of Centre	Total usage of centre	No. of persons requiring dry decontamination/ showering	No. of persons referred to ERTCs	Remarks

- 2. Is it foreseen that any MC may exceed the discharge limit of 4000 Bq/L. If so advise preferred course of action with reasons.
- 3. Advice on necessity of opening or closure of further centres.
- 4. Major problems [Indicate action being undertaken and assistance required (if any)].
- 5. Sentiment of people being monitored.

PLEASE COPY TO HKO, DH AND FSD LIAISON OFFICERS FOR ASSESSMENT AND ADVICE DONE / INITIAL.

Annex 8.7



MONITORING CENTRE FLOW CHART

CHAPTER 9

INGESTION COUNTERMEASURES: FOOD, LIVE FOOD ANIMALS AND WATER

Introduction

9.1 In the event of an off-site emergency at the GNPS/LNPS, food and water may become radiologically contaminated during and following the passage of the plume. While plants and animals could become surface contaminated, tissue contamination could occur after inhalation, or after ingestion of radiologically contaminated nutrients (animals eating a large quantity of contaminated items can concentrate radioactivity in their tissues). This tissue contamination could continue, reducing over time, for some years. Surface contamination can be largely removed by washing but tissue contamination cannot be so removed.

9.2 To prevent and mitigate the possible impact on public health, ingestion countermeasures are to be implemented throughout Hong Kong, - the whole territory of which falls within the 85 km Emergency Planning Zone 2 (EPZ2) (Chapter 1), if the DBCP is at FULL ACTIVATION level (i.e. there is an off-site emergency at the GNPS/LNPS). Preparations will be required at the PARTIAL ACTIVATION level. In some circumstances, e.g. that of a small-scale limited release at the GNPS/LNPS, sample food monitoring may commence at this activation level of the DBCP. Similar measures would also be taken in Guangdong. In Guangdong, the Ingestion Emergency Planning Zone (EPZ) extends to 50 km from the GNPS/LNPS.

9.3 The prevailing Codex Alimentarius Commission (CAC) Guideline Levels¹ should be adopted in the monitoring and control of all food items (both locally produced and imported)². The radioactivity of the four common radionuclides (iodine-131 (I-131), caesium-134 (Cs-134), caesium-137 (Cs-137) and strontium-90 (Sr-90)) will be monitored. I-131, Cs-134 and Cs-137 are the main radionuclides representing health concern and most relevant in the acute phase of nuclear emergencies. Centre for Food Safety (CFS) will keep in view the discussion and recommendation of other relevant international authorities such as IAEA and WHO when considering whether other radionuclides should be monitored.

¹ Codex Guideline Levels for Radionuclides in Foods Following Accidental Nuclear Contamination for Use in International Trade (<u>www.codexalimentarius.org/</u>). In January 2012, the prevailing CAC Guidelines Levels for the group of radionuclides including I-131 and Sr-90 in food are 100Bq/kg while that for the group of radionuclides including Cs-134 and Cs-137 in food is 1000 Bq/kg.

² According to RPAG advice as accepted by the D of Health.

9.4 The decision to implement ingestion countermeasures will be made by the CESG or the S for S' ITF after considering advice from HKOMAC and the Controller, CFS of FEHD (Chapter 2). The decision will be advised through EMSC using the alerting procedures at *Annex 9.1*.

9.5 In the early and intermediate phases of the emergency, the monitoring of food will concentrate on fresh produce (milk, fresh vegetables and fruits, fresh water fish and marine fish) which are more prone to radiation contamination immediately after a nuclear incident. In the longer term, meat and grains will also be targeted. Details of the likely affected area and the predicted plume exposure pathway if any will be provided before commencement of food monitoring and updated as appropriate by HKO.

9.6 The division of responsibilities for the monitoring of food and live food animals is set out below –

	Imported (at points of entry)	Local	Wholesale Market	Retail Market
Live cattle, pigs and goats	FEHD	AFCD	FEHD at slaughterhouse	-
Poultry and birds	FEHD	AFCD	AFCD	FEHD
Fruit and vegetables	FEHD	AFCD at farms	AFCD at markets (including Yau Ma Tei Fruit Market & Yuen Long Tin Kwong Hui Vegetable Wholesale Market)	FEHD
Milk	FEHD	AFCD at dairies(raw milk)	FEHD at factories	FEHD
Meat and other kinds of food	FEHD	FEHD	FEHD	FEHD
Fish, shellfish	FEHD	AFCD at farms and culture zones	AFCD at markets (including Yuen Long Freshwater Fish Market)	FEHD

FEHD will provide necessary logistical support. GL will provide facilities for detailed analysis of radiation-contaminated samples.

Control of Food

9.7 In case of nuclear emergency at GNPS/LNPS, our primary objective is to ensure a stable supply of safe food items for the consumption of the general public.

9.8 Over 90 percent of Hong Kong's food supply is imported. The Mainland is our most important source of food supply, especially on fresh food items (*Annex 9.2*). With the support of the Central People's Government, supply of fresh food produce from the Mainland has always been steady. At the onset of an emergency at GNPS/LNPS, FHB and FEHD will closely monitor the food supply from the Mainland and will liaise with major food importers and distributors in Hong Kong to conduct scenario planning for the emergency involving sourcing of alternative food supplies and adjustment of stock levels etc.

(a) <u>Imported food from Mainland</u>

9.9 Since the Mainland is an important food source of Hong Kong, the Central People's Government has always placed much emphasis on maintaining the stability, quality and safety of agricultural products supplied to Hong Kong. Other than vegetables, the area within the 50km Ingestion EPZ of the Mainland accounts a small portion of fresh food supply to Hong Kong. Despite that, to ensure the stable supply of fresh agricultural food products to Hong Kong, the Mainland authorities have established an emergency working mechanism whereby supply could be adjusted to respond to unforeseen circumstances. Moreover, cooperation arrangements have been made for the Mainland authorities to monitor food produced within 50 km of the nuclear power stations at Daya Bay to stop contaminated food from exporting to Hong Kong.

(i) <u>Arrangements on the Guangdong side</u>

9.10 Guangdong authorities have agreed that the radiation control standards for food exported to Hong Kong will be those laid down in the CAC Guideline Levels. Food produced within the 50 km Ingestion EPZ in the areas covered by the plume will be monitored by the Guangdong Entry-Exit Inspection and Quarantine Bureau (GDCIQ) and food exceeding the CAC Guideline Levels will not be exported to Hong Kong. Food with radiation contamination below the Guideline Levels will be certified and will be allowed entry into Hong Kong.

9.11 GDCIQ will monitor food exports to Hong Kong at the Shenzhen side of Man Kam To Control Point (to which all food exports (except those by sea) will be directed), Aotou in Hui Yang County and Gangkou in Hui Dong County. As agreed between the Mainland and Hong Kong, GDCIQ will also monitor food for the four indicator radionuclides (Sr-90, I-I31, Cs-I34 and Cs-

137). Monitoring results will be exchanged with Hong Kong after the first 24 hours of the off-site emergency. Sr-90 results will follow some days later because of the time required for the analysis. In the event of an off-site emergency at GNPS/LNPS, the Guangdong authorities can issue certificates of origin for food originating from areas outside the 50 km Ingestion EPZ of the Mainland if necessary.

(ii) Arrangements on the Hong Kong side (also see Chapter 7)

9.12 Food imports by road will be diverted by the Guangdong side to the Man Kam To Control Point as described in paragraph 9.11 above. C&ED has overall responsibility for monitoring goods at points of entry. However, this responsibility is delegated to FEHD for fresh produce and live food animals. AFCD will also monitor all fresh produce arriving at wholesale markets. Details are in the relevant departmental plans. In outline, FEHD will check the certification of fresh produce, and according to a pre-determined sampling pattern, monitor the food using hand-held survey meters for bulk screening and use the NaI Contamination Monitoring Systems for sample screening. Samples with radiation level above the CAC Guideline Levels will be sent to the GL for detailed analysis of Sr-90, I-131, Cs-134 and Cs-137 levels. Resources will be concentrated on monitoring food from areas under the plume within the 50 km Ingestion EPZ of the Mainland. Random screening may also be applied to food from other areas.

9.13 The radiation control standards for imported food are the prevailing standards laid down in the CAC Guideline Levels. Food with radiation level exceeding the CAC Guideline Levels will be returned to Guangdong according to an agreement reached with GDCIQ. Compensation may be required if subsequent testing and arbitration reveals the radiation level of the food is below the CAC Guideline Levels.

9.14 Contaminated food which cannot be returned to Guangdong will be disposed of according to the Waste Disposal Action Plan (Chapter 10).

(b) Locally produced food

9.15 Under the ingestion countermeasures, AFCD will monitor food at the primary production level and in wholesale markets and FEHD will monitor food at the retail level and meat at the slaughterhouses and retail level, according to the division of responsibilities described in paragraph 9.6. The radiation control standards to be applied are also the prevailing ones laid down in the CAC Guideline Levels as for imported food. It is necessary to ensure the consistent application of the same standards to both imported food and locally produced food to ensure the overall food safety. AFCD will monitor the radiation level of local produce (mainly vegetables and poultry) to ensure that only those below CAC Guideline Levels are allowed into the market.

HKSARGDBCP – Chapter 9

9.16 Samples with radiation level detected above the CAC Guideline Levels will be further analysed by GL as imported food in paragraph 9.12. Food confirmed with radiation above the CAC Guideline Levels will be disposed of according to the Waste Disposal Action Plan (Chapter 10).

(c) <u>Imported food from places outside the Ingestion EPZ of the</u> <u>Mainland</u>

9.17 Imported food from places outside the 50km Ingestion EPZ of the Mainland would not be contaminated by an emergency at the GNPS/LNPS and no special measures need to be considered (see Chapter 15). Importers of food at the wholesale level will have to produce documentation of the place of origin of the food. As discussed in paragraph 9.11, the Guangdong authorities can issue certificates of origin for food originated from areas in Guangdong which are outside the 50 km Ingestion EPZ if necessary.

(d) <u>Exports of food</u>

9.18 Hong Kong is not a significant exporter (or re-exporter) of food. Nevertheless, it does export some food to serve a demand for oriental food, particularly in overseas Chinese markets. In the event of an off-site release, the prevailing CAC Guideline Levels would apply to such food and certification that the radiation level of the food is below the CAC Guideline Levels would probably be required, together with normal certification, by importing countries. FEHD is the authority for the issue of food export certificates. TID would assist FEHD in liaising with consulates to clarify their particular requirements and how these should be implemented.

Live Food Animals

(a) <u>Imported live food animals</u>

9.19 FEHD monitors the radiation level of live food animals imported from the Mainland for direct human consumption at Man Kam To Control Point. Livestock Contamination Monitoring Systems (CMS) have been installed for operational use by FEHD to monitor the radiation level of imported livestock (cattle, pigs and goats) at the boundary control points and Sheung Shui Slaughterhouse. CFS will also screen poultry at the boundary control points by using the hand-held Poultry CMS. It has been agreed with the Guangdong authorities that the judgment as to whether live food animals are contaminated will be based on the radiation level in the meat derived from these animals after slaughtering.

9.20 If the Livestock CMS or the Poultry CMS indicates that the live food animal might have been contaminated, the live food animal concerned would be slaughtered and its meat will be sent to the GL to determine whether the radiation level has exceeded the CAC Guideline Levels. In addition, meat from imported live food animals for direct human consumption will be sampled by FEHD for testing of radiation level, irrespective of whether they come from the 50km Ingestion EPZ. Samples above the CAC Guideline Levels will be sent to the GL for detailed analysis of Sr-90, I-131, Cs-134 and Cs-137 levels. If the results from GL confirm that the radiation contamination is above the CAC Guideline Levels, CFS will then liaise with the relevant Mainland authorities to arrange for the return of the affected live food animals to the original port of export. If the circumstances so require, CFS may arrange for the affected live food animals to be euthanised and disposed of under the Waste Disposal Action Plan (See Chapter 10).

(b) <u>Local live food animals</u>

9.21 AFCD will monitor radiation level of the locally raised live food animals similar to that performed by FEHD on imported ones. If a significant increase in radioactivity level is detected during monitoring, the live food animal concerned would be slaughtered and its meat will be sampled for testing of radiation level according to the CAC Guideline Levels.

Food Control Committee

9.22 In the wake of an off-site emergency at GNPS/LNPS, the Permanent Secretary for Food and Health (Food) will convene the Food Control Committee (FCC) to monitor the food supply, in particular that of fresh produce, to Hong Kong. The FCC membership currently comprises representatives from FHB, FEHD, AFCD, TID and C&ED. Representatives from other departments will be invited to join when necessary.

9.23 In the unlikely event of shortage of certain food items (including milk, milk products and bottled water) as a result of the application of the CAC Guideline Levels, and such shortages cannot be reduced or averted by practicable means, the IAEA standards (which are less stringent than the CAC Guideline Levels) applicable to the particular radionuclide of concern in the affected food item may be adopted for food control on the direction of the CESG which will take into account the advice of FCC and DH. The relevant OIL, based on the Generic Criteria promulgated by IAEA as set out in *Annex 1.5*, is detailed in *Annex 9.4*. The IAEA standards will keep the effective dose to any person below 10 mSv per annum, which is unlikely to incur either short-term or long-term health detriments. RPAG has already recommended, and D of Health accepted the general adoption of IAEA standards for ingestion counter-measures, subject to domestic considerations in application (paragraph 1.30 (i) of Chapter 1)

Response plan to address food shortages

9.24 The Central Government attaches great importance to the stable supply of agricultural by-products to Hong Kong as well as the quality and The Mainland has put in place a contingency safety of such products. mechanism to maintain a stable food supply to Hong Kong, which can cope with the normal annual demand as well as that under unforeseen circumstances. To ensure stability in food supply to Hong Kong, FHB has also established a liaison mechanism with the relevant Mainland authorities (the Ministry of Commerce, the State General Administration of Quality Supervision, Inspection and Quarantine, etc.) for exchanging and collating information on matters such as food supply and safety, particularly in relation to food and public health incidents that may cause concern to both places. In the very unlikely event that there is a foreseen shortage of certain fresh food items due to a disruption of supply from Guangdong, FHB will, under the direction of FCC, liaise with relevant Mainland Authorities to identify alternative sources from areas outside Guangdong. FHB will also liaise with the food trade to ensure communication throughout to facilitate early alternative sourcing from overseas if required, or alternative sourcing of chilled and frozen food products to maintain a steady supply of food.

Water

9.25 It is most unlikely that the contamination levels in water - either in the reservoirs in Hong Kong or Shenzhen or in the Dongjiang (East River) - could approach the radiation control standard in any conceivable nuclear accident at GNPS/LNPS. The control value for water as agreed with the Guangdong side³ is given in *Annex 9.3*.

9.26 Water from Guangdong supplied to Hong Kong is monitored by the Guangdong side at the inlet of the aqueduct and at Shenzhen Reservoir, and by Hong Kong with water sampling and real-time On-line Water Contamination Monitoring Systems set up at the Muk Wu Pumping Station near Man Kam To. When the DBCP is at the PARTIAL or FULL ACTIVATION level, Hong Kong will increase its frequency of monitoring to four hourly intervals, which correspond to the enhanced sampling times on the Guangdong side plus the time taken for the water to flow from the inlet of the aqueduct supplying water to Hong Kong. Guangdong will monitor water daily, but in the event that contamination exceeds 50% of the control value Guangdong side will increase its monitoring frequency to four hourly.

9.27 Should the contamination level exceed the control standard, the water supply from Guangdong to Hong Kong will be temporary suspended until such time as the control standard is no longer exceeded. If this were to

³ These bilateral standards, being more stringent than the corresponding IAEA OILs in *Annex 9.4* are given precedence, according to RPAG advice. In the event of shortage of water as a result of the application of the more stringent bilateral standards, and such shortages cannot be alleviated by practicable means, OIL6 for water may be adopted instead on direction of the CESG taking into account of the advice of DH.

cause an acute water shortage, Hong Kong could request Guangdong to resume supply earlier. If WSD were to contemplate making such a request, consultation should be initiated immediately with EMSC and ITF through the WSD Liaison Officer. WSD would then take measures so far as is practicable to mitigate the radiation level in water by way of water treatment or dilution with non-contaminated or less contaminated water.

9.28 At the PARTIAL and FULL ACTIVATION levels, WSD will arrange sampling at reservoirs in Hong Kong, the inlets and outlets of water treatment works, water catchment areas and consumer taps. Results will be shared with HKOMAC and DH and an analytical summary given to EMSC. If contamination is found, WSD will consider the application of countermeasures, such as -

- (a) rejection of inflow affected by radioactive plume;
- (b) arranging for water to be drawn off preferentially from noncontaminated or least contaminated sources;
- (c) adjustment of treatment processes to reduce radioactivity in treated water; and
- (d) water rationing.

9.29 Contaminated water treatment sludge will be disposed of according to the Waste Disposal Action Plan (See Chapter 10).

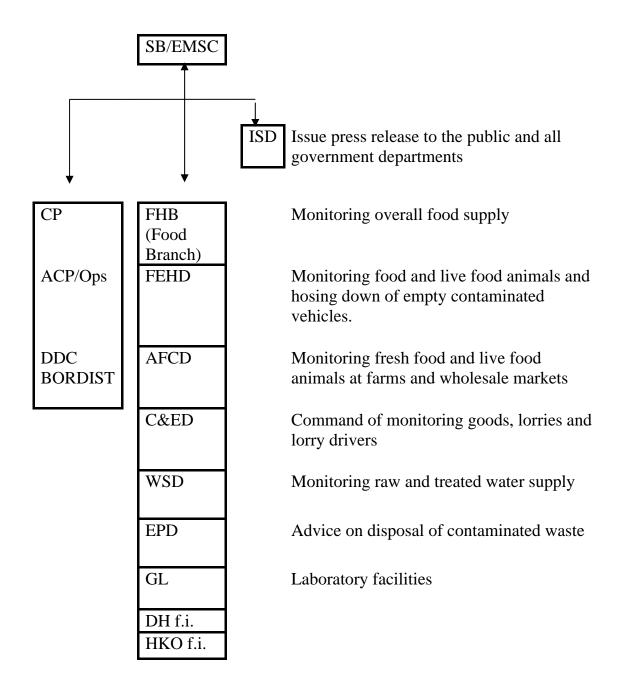
Public Information

9.30 ISD will coordinate publicity in Hong Kong, as set out in Chapter 5, on the ingestion counter-measures. This publicity will stress the precautionary nature of the arrangements, the efforts made by the Guangdong and Hong Kong authorities to prevent the import and sale of contaminated items and the stringency of the control measures, such that there should be no ill-health effects for eating any produce in Hong Kong. EMSC will inform PEACO of the implementation of ingestion countermeasures at the points of entry. AFCD, FEHD and WSD will publish and update the relevant surveillance information on their as well as the DBCP's websites.

9.31 C&ED, TID, FEHD and AFCD may need to make arrangements to answer queries from food importers on the documentation requirements of the Emergency (Radiological Contamination) Regulation, if this is invoked. Similarly, they may need to make arrangements to keep food exporters informed of overseas restrictions on HK imports. AFCD may need to make arrangements to provide information to farmers (including fish farmers) regarding harvesting of products and future planting or rearing.

Annex 9.1

INGESTION COUNTERMEASURES: ALERTING CHART



Annex 9.2

Sources of supply of fresh food and live food animals (2010)

Type of fresh food and live food animals	Produced locally	Imported from the Mainland (from an area within 50 km from the nuclear power stations in Daya Bay)	Imported from the Mainland (other areas)	Imported from overseas
Vegetables (tonnes)	2.5%	18.9% ⁴	71.6% ⁴	7%
Live pigs (heads)	5.2%	4.3%	90.5%	0%
Live cattle (heads)	0%	0%	100%	0%
Live goats (heads)	0%	0%	100%	0%
Live chicken (heads)	61.4%	5.3%	33.3%	0%
Live freshwater fish (tonnes)	3.8%	$0\%^{4}$	$89.8\%^4$	6.4%
Live marine fish (tonnes)	23.4%	11.5%		65.1%
Milk, milk products and frozen confections (tonnes)	27%	12.5%		60.5%

⁴ Estimation based on the distribution of sources as indicated in the accompanying documents of food consignments inspected at import level by the Centre for Food Safety.

Cs-134

Cs-137

Annex 9.3

Control Value for Water

Radionuclide (x)	Derived Intervention Level for drinking water (DIL _x) (Bq/L)
Sr-90	100
I-131	1000

500

600

Raw water from Guangdong or from reservoirs in Hong Kong is treated for potable supply. This treatment process may remove a proportion of the radionuclides present, depending on their form and state in water. The control value C_x for raw untreated water for a particular radionuclide x is given by the formula:-

$Cx = \underline{DIL}_{x}$	where e_x is the removal efficiency for
$1 - e_x$	the radionuclide x in the treatment process
	used in Hong Kong. $0 < e_x < 1$.

In addition, the sum of ratios of measured activity of radionuclides to their respective control values for raw water should not exceed unity.

Because of the length of time required to test for Sr 90, it has been agreed with Guangdong that initial control will rest with the control values of the other three indicator radionuclides.

Default Screening Operational Intervention Levels (OILs) for Food, Milk and Water Concentrations from Laboratory Analysis

OIL	Value	Response action (as appropriate) if the value is exceeded
Food,	milk and water concentration	ns from laboratory analysis
OIL5	 100 Bq/kg gross beta (β) or 5 Bq/kg gross alpha (α) 	 Above OIL5: Assess using OIL6 Below OIL5: Safe for consumption during the emergency phase
OIL6	 As listed in Table 10 of GSG-2* OIL6 is exceeded if $\sum_{i} \frac{C_{f,i}}{\text{OIL6}_{i}} > 1$where C_{f,i} is the concentration of radionuclide i in the food, milk or water (Bq/kg); OIL6_i is the concentration of radionuclide i from Table 10 of GSG-2* (Bq/kg). 	 Stop consumption of non-essential food, milk or water and conduct an assessment on the basis of realistic consumption rates. Replace essential food, milk and water promptly, or relocate people if replacement of essential food, milk and water is not possible. For fission products (e.g. containing iodine) and iodine contamination, consider providing iodine thyroid blocking if replacement of essential food, milk or water is not immediately possible. Estimate the dose to those who may have consumed food, milk or rainwater from the area where restrictions were implemented to determine if medical screening is warranted.

* Criteria for Use in Preparedness and Response for a Nuclear or Radiological Emergency, IAEA Safety Standards, General Safety Guide No. GSG-2, 2011.

Note: The OILs should be revised as soon as it is known which radionuclides are actually involved. The OILs should also be revised, if necessary, as part of the preparedness process, to be more consistent with the instruments to be used during the response. However, the default OILs in this table can be used without revision to make a conservative assessment immediately.

CHAPTER 10

DISPOSAL OF RADIOLOGICALLY CONTAMINATED WASTE

Introduction

10.1 The disposal of radiologically contaminated waste would only be required if the DBCP is at FULL ACTIVATION level and there are radiologically contaminated waste arising from one or more of the following sources –

- (a) Points of entry (Chapters 7 and 9) in the form of contaminated luggage of incoming persons or contaminated goods, including imported food;
- (b) Monitoring Centres (MCs) (Chapter 8) in the form of contaminated belongings or clothing of persons;
- (c) Water Treatment Works (Chapter 9) in the form of contaminated sludge;
- (d) Sewage pumping stations and sewage treatment works in the form of contaminated screenings, grits and sludge;
- (e) Contaminated live food animals (including the animals from the same source) and their tissues; and
- (f) Other locations

For example -

Wholesale and retail markets	- contaminated food including imported and local live food animals (Chapter 9)
Laboratories	- samples after analysis
Government departments	- disposable clothing
Hospitals	- contaminated articles including swab, dressing and disposable clothing

10.2 The departments whose activities under the DBCP give rise to radiologically contaminated waste have the responsibility for ensuring that it is properly disposed of. The Waste Disposal Action Plan, produced by the EPD, outlines the essential requirements and procedures for the safe collection and disposal of these contaminated wastes.

Disposal of Contaminated Waste (except sludge from water treatment works and sewage treatment works)

10.3 Departments with radiologically contaminated waste to dispose of will provide the Departmental Waste Disposal Officer of EPD (DWDO-EPD) with information on the waste arising including the quantity, types of waste, degree of contamination and physical location, etc. DWDO-EPD will advise on the disposal route, which in most situations would be in landfills or by discharge into the sewer, with dilution as necessary. Advice will also be given on the collection requirements based on the amount of radioactivity and the associated risk to the waste collection crew based on the International Commission on Radiological Protection guidance levels. DWDO-EPD can advise on the use of contractors familiar with the handling of radiologically contaminated material.

10.4 Solid waste with the level of contamination below 75 000 Bq/kg may be treated as normal municipal or trade waste. FEHD and contractors can help in the collection and handling. The requirements and procedures for the safe collection and disposal of these contaminated wastes are detailed in the Waste Disposal Action Plan produced by the EPD.

10.5 If the level of contamination of the waste arising exceeds 75 000 Bq/kg (the definition of 'radioactive substance' under the Radiation Ordinance), it is possible to dispose of such low-level radioactive waste in landfills by burying it in trenches covered with one metre of non-radiologically contaminated material. DWDO-EPD will advise on which landfill to use. Collection and transportation would be by licensed contractors familiar with the handling of radioactive material. If government response staff are called upon to perform this task, they should be provided with disposable clothing not less than that specified for Staff Group B personnel as set out in Chapter 13. Advice from DH on human health can be sought by DWDO-EPD, should the level of radioactivity be high.

Disposal of Contaminated Sludge from Water Treatment Works

10.6 WSD will be responsible for the proper collection and disposal of the contaminated sludge. For dewatered sludge, the arrangements in paragraphs 10.3 to 10.5 will be adopted. For liquid sludge, WSD will provide information on the quantity and activity levels of the contaminated sludge to DWDO-EPD. If the Derived Intervention Levels of drinking water (as set out in *Annex 9.3*) are not exceeded, no special arrangements will be necessary. If the level of 4 000 Bq/L is not exceeded, disposal may be into a sewer. If the level exceeds 4 000 Bq/L, a disposal option similar to that for discharging contaminated water from MCs can be used. Liquid sludge will bypass the sewage treatment works and be discharged straight into the sea causing short-term pollution. EPD (on environmental impact) and DH (on human health) should also be consulted in this situation, which would be unlikely in the extreme. If decision has been made to discharge contaminated liquid waterworks sludge of a level exceeding 4 000Bq/L direct into the sewer, WSD will inform DSD and DSD will then arrange necessary flow diversion from the nearest downstream sewage pumping station/sewage treatment works straight into the sea.

10.7 Coordination and supervision of the sludge disposal will be by WSD.

Disposal of Contaminated Wastes from Sewage Treatment Works and Sewage Pumping Stations

10.8 DSD will be responsible for the proper collection and disposal of contaminated sludge, screenings and grits removed from sewage pumping stations and sewage treatment works. Upon opening of the MCs with discharge of exit water not exceeding the activity level of 4 000 Bq/L, DSD will provide information on the quantity of the contaminated wastes to DWDO-EPD for advice on the disposal route. Advice from DH on human health can be sought by DWDO-EPD, should the level of radioactivity of the contaminated wastes be high. Coordination and supervision of the disposal of contaminated wastes will be by DSD.

10.9 For discharge of exit water exceeding 4 000 Bq/L from the MCs, DSD will divert the contaminated exit water that get mixed with sewage collected from other areas of the sewerage catchment direct to the sea or river at the appropriate downstream sewage pumping station or sewage treatment works causing short-term pollution to the environment.

CHAPTER 11

ELECTRICITY GENERATION AT THE GNPS/LNPS

Introduction

The GNPS at Daya Bay comprises 2 x 984 megawatt electrical 11.1 (MWe) PWRs of French design. The first unit of GNPS entered commercial operation in February 1994; the second in May 1994. The power output from the two units of the GNPS is fed into the Hong Kong-Guangdong grid. Of the some 14 billion units of the annual power output from GNPS, 70% is consumed in Hong Kong, meeting about 22% of the total electricity demand of Hong Kong, and about 30% of electricity demand of CLP's consumers in 2010. The remaining 30% of the output is consumed in Guangdong. The LNPS Phase 1 comprises 2 x 990 MWe PWRs of French design. The first unit of LNPS Phase 1 entered commercial operation in May 2002; the second unit in January 2003. LNPS Phase 2 comprises 2 x 1,080 MWe PWRs, of which the design is an improved version based on the French PWRs at the GNPS. The first unit and second unit of LNPS Phase 2 entered commercial operation in September 2010 and August 2011 respectively. All power output from the LNPS is delivered only to the Guangdong Province.

Brief Description of the Reactors at the GNPS/LNPS (A schematic drawing of one unit of the GNPS is at *Annex 11*)

11.2 Inside the fuel assemblies in the reactor core, Uranium-235 fissions into smaller atoms releasing neutrons and energy in the form of heat. The neutrons can be used to initiate further fissions in a controlled chain reaction. Control is achieved by the use of control rods, which when fully inserted, absorb the neutrons produced and thus stop the chain reaction; the power output can be varied by varying the degree of insertion of the control rods. Pressurised water is pumped through the reactor core. The water in this, the Primary Circuit, serves two purposes: first, it moderates the speed of the neutrons so that fission can take place, and second, it extracts the heat from the reactor core. This hot pressurised water is then pumped to a heat exchanger where it transfers heat to the water in the separate Secondary Circuit. This water becomes steam and is directed out of the reactor building (the 'nuclear island') to the turbine hall (on the 'conventional island') where it drives a steam turbine to generate electricity.

Safety Systems of the Reactors

11.3 When Uranium-235 undergoes fission it is split into two smaller atoms which may themselves be radioactive. The safety systems are designed

to ensure that this radioactive mixture does not escape into the environment. The first barrier is the ceramic pellets inside a zirconium alloy cladding, in which the uranium fuel and the fission products are sealed.

11.4 The reactor vessel and the primary circuit constitute the second barrier; both are designed to withstand very high pressure. In addition, should the fuel assemblies overheat, say because of a loss of coolant, the moderating effects of the pressurised water would reduce, thus reducing the rate of the fission chain reactions and hence the heat produced. Additional cooling systems would be brought into play and Boric Acid would be introduced into the primary circuit water to assist in quickly reducing the rate of the fission chain reactions. The possibility of having an accident of coolant loss and thus causing damage is greatly reduced by mechanisms to detect any loss, to inject more water into the system for cooling and to shut the reactor down.

11.5 The third barrier is the reactor building itself, which is made of 90 cm of pre-stressed concrete, lined with a 6 mm leak-tight steel liner. Should there be an escape of radioactive material from the primary circuit it would be contained in the reactor building. As any such leakage would be hot and pressurised, automatic cooling systems would be activated which would simultaneously reduce the heat and pressure inside the building and flush out much of the radioactive material. This cooling water would be contained in tanks for later disposal.

11.6 As an additional safeguard, should pressure in the reactor building approach its design limit of 5 bar (5 atmospheres), then there is a mechanism to vent the gases to reduce the pressure. The gas would exit through valves to a sand filter which would filter out most of the radioactive material before the gas passes into the atmosphere.

11.7 The above is a description of the major safety features. There are other measures and many are duplicated; for example, there are several pumps to pump the coolant round the primary circuit and there are several pumps to inject Boric Acid into the coolant in the primary circuit. Around the plant at key points there are radioactivity detectors to monitor the integrity of plant operations

11.8 The units at each power station are constructed in a twin unit arrangement. This enables the two units to share certain auxiliary facilities in a common nuclear auxiliary building. The engineered safeguards of the two units in each power station are carefully spaced and protected by physical barriers. There are physically separated control rooms and multiple reactor protection systems in place to facilitate the automatic or manual shutdown of the units in the unlikely event of a serious accident.

Regulation by Mainland Authorities

11.9 The safe operation of the GNPS/LNPS is subject to stringent oversight by Mainland authorities in accordance with relevant laws and regulations. The National Nuclear Safety Administration under the Ministry of Environmental Protection is responsible for licensing and siting nuclear power plants, ensuring nuclear safety, carrying out safety inspections and participating in the emergency response to accidents within a nuclear power plant, among other things. China Atomic Energy Authority under the Ministry of Industry and Information Technology is responsible for emergency response to an offsite nuclear emergency at the national level (through its National Nuclear Emergency Response Office) and liaison with IAEA.

Electricity Generation at the GNPS/LNPS

11.10 As briefly described in paragraph 11.2 above, electricity is generated at the GNPS/LNPS by steam driving the turbines on the conventional island. The water and steam in this, i.e. the secondary circuit, do not come into direct contact with the pressurised water in the primary circuit and so do not carry any radioactive material. In general, the processes by which electricity is generated are essentially the same as in a conventional fossil fuel power station.

11.11 If a fault develops on the conventional island, there are procedures to rectify the fault, including the shut down of the nuclear reactor. If the turbines were to develop a fault when running at full power, then it might be necessary to shut the reactor down quickly. To the outside observer there would be a huge release of steam into the atmosphere which might also happen during certain commissioning tests at the station. Such an event could happen once or twice in a year, but there would be no release of radioactivity – as the steam came from the secondary circuit and various auxiliary cooling systems. Although not a nuclear incident, it could be perceived as one. Hence the assessment process described in Chapter 3 is important.

Electricity Supply to Hong Kong

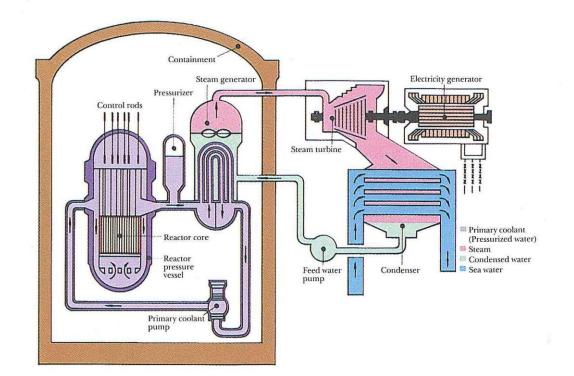
11.12 CLP's electricity supply network is interconnected to Hong Kong Electric's supply system and also to the power system in Guangdong Province. The power output from the GNPS is fed into the interconnected power systems of CLP and Guangdong Province. About 70% of the power output from the GNPS will be consumed in Hong Kong. The CLP System Control Centre continuously monitors the power output from the GNPS and all other power stations supplying electricity to its consumers. It will detect immediately any interruption to the supply from the GNPS. The alerting procedures to inform the Government are described in Chapter 3.

HKSARGDBCP – Chapter 11

11.13 When there are tripping of generating units in GNPS/LNPS affecting the electricity supply to Hong Kong, in most cases, CLP will immediately utilize the spinning reserve available in the interconnected power systems to ensure the electricity supply in Hong Kong will not be affected. Only under extreme circumstances may there be a need to shed non-essential load over certain areas in CLP and Hong Kong Electric's supply system with a view to maintaining the system stability and electricity supply to essential services. If load shedding does occur, the system will stabilize very soon and electricity supply to the affected areas will be restored within 30 minutes.

11.14 It would be unlikely that consumers in Hong Kong would experience any significant interruption to their power supply should there be a nuclear emergency at the GNPS/LNPS leading to loss of generation as described in paragraph 11.13 above. In areas subject to load shedding, FSD might be required to attend to people stuck in lifts and the Police might be required to attend to the problems caused by traffic signals not working. Departmental DBCPs need to make provision to cope with a short period of loss of power (say 30 minutes) on some areas in Hong Kong.

Annex 11



Schematic Drawing of One Unit of the Guangdong Nuclear Power Station

The primary coolant circuit of the reactor is completely isolated from the secondary circuit of the turbine so there are two independent circulating water systems

Source of the Schematic drawing: HKNIC

CHAPTER 12

LEGAL POWERS AND COMPENSATION

Legal Powers

12.1 To carry out a wide range of functions and duties as required under the DBCP, departments may make use of their existing legal powers in various regimes covering security, rescue, food safety, public health, consumer protection, radiation health and safety, etc. Only in some extreme circumstances would additional emergency powers be required.

12.2 Further emergency powers may need to be provided for where warranted, for example, to require food importers or distributors to provide radiological screening information, or to designate an area to prohibit entry and undertake decontamination. In this light, we have prepared a draft Emergency (Radiological Contamination) Regulation (at *Annex 12*¹), which may be enacted by the Chief Executive in Council under s.2(1) of the Emergency Regulations Ordinance (Cap. 241) when, and only when, there is an occasion of emergency or public danger in the domestic context of Hong Kong.

12.3 The possibility of invoking this procedure is very remote, and may be considered by CESG at FULL ACTIVATION level, taking account of the advice of relevant parties on various aspects, including public health by DH, public order by HKPF, accident consequences by HKO and legal aspects by DoJ. The Regulation can immediately come into effect upon being made by the CE in Council.

Compensation

12.4 Claims for compensation by anyone within or outside the Mainland suffering nuclear damage caused by a nuclear incident at the GNPS/LNPS can be lodged in the Mainland against the operator of the nuclear plant. The operating permits of the GNPS and LNPS are jointly held by the respective plant owners and their operator, Daya Bay Nuclear Power Operations and Management Co. Ltd (DNMC). DNMC is located at Science and Technology Building, Shangbu Zhong Road Shenzhen. Guangdong Nuclear Power Joint Venture Co. Ltd. is the owner of the GNPS and Ling Ao Nuclear Power Co. Ltd. is the owner of LNPS Phase 1, both offices of which are located at Nuclear Power Co. Ltd. is the owner of LNPS Phase 2 and is located at Science and Technology Building, Shangbu Zhong Road, Shenzhen.

¹ The text at Annex 12 remains a draft at the present stage subject to necessary refinements and proper legislative procedures for enactment.

HKSARGDBCP – Chapter 12

12.5 The relevant laws and regulations include Article 70 of "The Law on Tort Liability" (《中華人民共和國侵權責任法》)², "Reply to Questions on the Liabilities of Compensation for Damages resulting from Nuclear Incidents" (《國務院關於核事故損害賠償責任問題的批覆》)³ and "Reply to the Ministry of Nuclear Industry, the National Nuclear Safety Administration and the State Council Atomic Energy Board in respect of Handling Nuclear Third Party Liability". (《國務院關於處理第三方核責任問題給核工業部、國家核安全局、國務院核電領導小組的批覆》)⁴.

12.6 The operator of the nuclear plant should bear liability in a single nuclear incident up to RMB 300 million. The operator is obliged to maintain insurance and appropriate financial security to meet the liability for compensation. If compensation to be paid by the operator is over the limit, the Government of PRC will provide financial allowance to a maximum amount of RMB 800 million. Further allowance may be granted at the discretion of the State Council after assessment.

12.7 Victims are entitled to claim compensation from the operator of the nuclear plant within three years from the date on which they have knowledge or should have knowledge of the nuclear damage. Such claims must be brought within ten years from the date of the nuclear incident.

12.8 A claim for compensation can be lodged at the people's court of the place where the nuclear incident occurred or where the operator is situated⁵. Since the GNPS/LNPS and the operator is situated in Shenzhen, it would be proper to apply for compensation in the People's Court in Shenzhen.

² "The Law on Tort Liability"(《中華人民共和國侵權責任法》) was adopted by Standing Committee of National People's Congress on 26 December 2009 and effective from1 July 2010. Article 70 provides that where a nuclear accident occurs to a civil nuclear facility and causes any harm to another person, the operator of civil nuclear facility shall assume the tort liability unless it can prove that the harm is caused by a situation such as war or by the victim intentionally.

³ "Reply to Questions on the Liabilities of Compensation for Damages resulting from Nuclear Incidents"(《國務院關於核事故損害賠償責任問題的批覆》)was promulgated by the State Council on 30 June 2007.

⁴ "Reply to the Ministry of Nuclear Industry, the National Nuclear Safety Administration and the State Council Atomic Energy Board in respect of Handling Nuclear Third Party Liability"(《國務院關於 處理第三方核責任問題給核工業部、國家核安全局、國務院核電領導小組的批覆》) was promulgated by the State Council on 29 March 1986.

⁵ According to Article 29 of the "Civil Procedure Law of PRC" (《中華人民共和國民事訴訟法》), a lawsuit brought on a tortious act shall be under the jurisdiction of the people's court of the place where the tort is committed or where the defendant has his domicile.

Annex 12

DRAFT

Emergency (Radiological Contamination) Regulation

(Made by the Chief Executive in Council under section 2 of the Emergency Regulations Ordinance (Cap. 241))

1. Interpretation

In this Regulation—

- *authorized officer* (獲授權人員) means a person authorized under section 2(1) and includes persons holding or acting in the offices set out in the Schedule;
- *competent authority* (主管當局) means a person appointed under section 2(2);
- foodstuff (R L) includes any edible substance produced for human consumption and shellfish, but does not include livestock;
- *live fish* (活魚) means fish that are alive in water, but does not include shellfish;
- *livestock* (禽畜) includes any of the following that is bred for human consumption—
 - (a) live animals;
 - (b) live fish;
 - (c) live birds;
- *prescribed contamination level* (受輻射污染) means, in relation to any purpose, the limit of radiological contamination determined under section 2 for that purpose;
- *radiologically contaminated foodstuff* (受輻射污染的食品) means foodstuff with a level of radiological contamination exceeding the prescribed contamination level;
- *radiologically contaminated livestock* (受輻射污染的禽畜) means livestock with a level of radiological contamination exceeding the prescribed contamination level;
- *radiologically contaminated material* (受輻射污染的物料) means any inanimate object with a level of radiological contamination exceeding the prescribed contamination level.

2. Authorized officer

(1) The Secretary for Security may authorise a person by name or office to be an authorized officer for the purpose of this Regulation.

(2) The Secretary for Security may appoint a person by name or office to be the competent authority for the purpose of this Regulation.

3. Radiological contamination limits to be determined by competent authority

The competent authority must determine the permitted limits of radiological contamination.

4. **Powers of authorized officers**

- (1) An authorized officer may—
 - (a) carry out radiation scanning of any person, foodstuff, livestock or material believed to be radiologically contaminated;
 - (b) test any foodstuff, livestock or material to determine whether it is radiologically contaminated;
 - (c) mark or otherwise identify any radiologically contaminated foodstuff, radiologically contaminated livestock or radiologically contaminated material;
 - (d) take control of any car park, open space or waters to isolate foodstuff, livestock or material believed to be radiologically contaminated and prohibit any person from entering the car park, open space or waters without the permission of an authorized officer;
 - (e) take control of any open space, place or building to—
 - (i) carry out radiation scanning; or
 - (ii) undertake decontamination processes,

and prohibit any person from entering the open space, place or building;

- (f) designate an area to isolate foodstuff, livestock or material believed to be radiologically contaminated;
- (g) designate an area to carry out radiation scanning or to undertake decontamination processes;
- (h) seize, detain, remove, investigate and dispose of foodstuff, livestock or material believed to be radiologically contaminated;
- (i) direct a person believed to be radiologically contaminated to undergo a decontamination process;
- (j) direct a driver of a vehicle believed to be radiologically contaminated or to contain radiologically contaminated foodstuff, radiologically contaminated livestock or radiologically contaminated material to take the vehicle to a point designated by the officer and to have the vehicle and its contents undergone a decontamination process;
- (k) direct a person in charge of a vessel, aircraft or train believed to be radiologically contaminated or to contain radiologically

contaminated foodstuff, radiologically contaminated livestock or radiologically contaminated material to take the vessel, aircraft or train to a point designated by the officer and to have the vessel, aircraft or train and its contents undergone a decontamination process;

- (1) enter farms or other non-residential places where foodstuff or livestock is normally kept to check the radiation levels of the foodstuff and livestock;
- (m) detain a vehicle, vessel, aircraft or train and refuse to permit it to enter Hong Kong if the officer believes the vehicle, vessel, aircraft or train contains foodstuff, livestock or material believed to be radiologically contaminated.
- (2) A person who fails to comply with a direction given under subsection (2) commits an offence and is liable on conviction to a fine at level 2 and to imprisonment for 2 years.
- (3) A person who is required to submit foodstuff, livestock or material believed to be radiologically contaminated to undergo a decontamination process is not entitled to claim compensation for any damage or injury arising out of that process.

5. Investigation powers

- (1) An authorized officer may require a person to give details of any substances or articles on board a vessel, aircraft, hovercraft or marine structure.
- (2) An authorized officer—
 - (a) may require a vessel, aircraft, hovercraft or marine structure to stop;
 - (b) may require the attendance—
 - (i) of the master, captain or commander of a vessel, aircraft or hovercraft;
 - (ii) of the person in charge of a marine structure; and
 - (iii) of any other person who is on board a vessel, aircraft, hovercraft or marine structure;
 - (c) may require a person on board a vessel, aircraft, hovercraft or marine structure to assist the officer in the discharge of the officer's functions;
 - (d) may require—
 - (i) the master, captain or commander of a vessel, aircraft or hovercraft; and
 - (ii) the person in charge of a marine structure,

to take it and its crew to the port which appears to the officer to be the nearest convenient port, or may take it there himself or herself.

6. Controls on imports

- (1) An importer of foodstuff or livestock must give an authorized officer the particulars specified in subsection (2) for each consignment—
 - (a) on arrival at a land border control point; or
 - (b) at a wholesale food market.
- (2) The particulars to be given under subsection (1) are—
 - (a) the source of supply;
 - (b) the quantity;
 - (c) the type of produce;
 - (d) the date and time of arrival in Hong Kong;
 - (e) the name of the consignor, consignee, supplier and producer; and
 - (f) whether or not the consignment has undergone radiation screening at a point of entry to Hong Kong or at a farm.
- (3) An importer who contravenes subsection (1) commits an offence and is liable to a fine at level 2 and to imprisonment for 2 years.
- (4) An importer who provides false or misleading information under subsection (1) commits an offence is liable to a fine at level 2 and to imprisonment for 2 years.
- (5) A magistrate may order the forfeiture of any foodstuff or livestock seized in relation to an offence under subsection (1) whether or not a person is convicted of the offence.

7. Prohibition of import of radiologically contaminated foodstuff, etc.

- (1) A person must not import radiologically contaminated foodstuff, radiologically contaminated livestock or radiologically contaminated material into Hong Kong.
- (2) A person who contravenes subsection (1) commits an offence and is liable to a fine at level 2 and to imprisonment for 2 years.
- (3) A magistrate may order the forfeiture of any foodstuff, livestock or material seized in relation to an offence under subsection (1) whether or not a person is convicted of the offence.

8. Prohibition of possession of radiologically contaminated foodstuff, etc.

- (1) A person must not possess radiologically contaminated foodstuff, radiologically contaminated livestock or radiologically contaminated material.
- (2) A person who is aware that radiologically contaminated foodstuff, radiologically contaminated livestock or radiologically contaminated material has entered Hong Kong must inform an authorized officer of the fact.

(3) A person who contravenes subsection (1) or (2) commits an offence and is liable to a fine at level 2 and to imprisonment for 2 years.

9. Offences

- (1) A person who—
 - (a) refuses to hand over foodstuff, livestock or material suspected or believed by an authorized officer to be radiologically contaminated;
 - (b) refuses to allow an authorized officer to examine or measure foodstuff, livestock or material; or
 - (c) refuses to move radiologically contaminated foodstuff, radiologically contaminated livestock or radiologically contaminated material of which the person is in possession, charge or control when instructed to do so by an authorized officer,

commits an offence.

- (2) A person who knowingly possesses radiologically contaminated foodstuff, radiologically contaminated livestock or radiologically contaminated material commits an offence.
- (3) A person who refuses to undergo radiation scanning or a decontamination process as directed by an authorized officer commits an offence.
 - (4) A person who commits an offence under this section is liable to a fine at level 2 and to imprisonment for 2 years.

Schedule

Authorized Officers for the Purposes of this Regulation

Senior Agricultural Officer

Agricultural Officer

Senior Field Officer

Senior Fisheries Supervisor

Field Officer I

Field Officer II

Fisheries Technical Officer I

Fisheries Technical Officer II

Senior Fisheries Officer

Fisheries Officer

Fisheries Supervisor I

Fisheries Supervisor II

Principal Veterinary Officer

Senior Veterinary Officer

Veterinary Officer

Members of Customs and Excise Service as set out in Schedule 1 to the Customs and Excise Services Ordinance (Cap. 342)

Members of the Auxiliary Medical Service as set out in Schedule 1 to the Auxiliary Medical Service Ordinance (Cap. 517)

Members of the Civil Aid Service as set out in Schedule 1 to the Civil Aid Service Ordinance (Cap. 518)

Members of Fire Services as set out in the Sixth Schedule to the Fire Services Ordinance (Cap. 95)

Health Inspectors as set out in section 2 of Public Health and Municipal Services Ordinance (Cap. 132) employed by Food and Environmental Hygiene Department

Members of Immigration Service as set out in the Schedule 1 to the Immigration Service Ordinance (Cap. 331)

Police Officer under section 3 of Police Force Ordinance (Cap. 232)

Officer of Post Office under section 2 Post Office Ordinance (Cap. 98)

Clerk to the Executive Council

COUNCIL CHAMBER [date]

Explanatory Note

The purpose of this Regulation is to confer emergency powers in respect of the emergency situation caused by radiological contamination in Hong Kong.

- 2. Section 1 contains definitions that are necessary for the interpretation of the Regulation.
- 3. Section 2 empowers the Secretary for Security to make authorization and appointment for the purpose of the Regulation.
- 4. Section 3 empowers the competent authority to determine the permitted limits of radiological contamination for the purpose of exercise of powers under the Regulation.
- 5. Section 4 sets out powers that may be exercised by an authorized officer. The powers include the conduct of radiation scanning, testing of radiological contamination, taking control of premises, seizure of radiologically contaminated matters and other powers relevant for the control of radiological contamination. A person who fails to comply with any direction issued in connection with the exercise of powers commits an offence.
- 6. Section 5 confers investigation powers on authorized persons, who may require operators of a conveyance to provide details about articles on board the conveyance and to provide further assistance.
- 7. Section 6 imposes controls on imports of foodstuff or livestock, and requires the importers to provide prescribed information in relation to the foodstuff or livestock. An importer who fails to provide the information, or provides false or misleading information, commits an offence.
- 8. Section 7 prohibits the import of radiologically contaminated foodstuff, livestock or other materials. A person who contravenes the prohibition commits an offence.
- 9 Section 8 prohibits the possession of radiologically contaminated foodstuff, livestock or other materials, and requires a person who is aware of any import of radiologically contaminated foodstuff, livestock or other materials to inform an authorized officer of that fact. A person who contravenes the provisions commits an offence.
- 10. Section 9 sets out further offences in relation to requirements imposed for control of radiological contamination.

CHAPTER 13

STAFFING AND RESOURCES

General Protective Guidelines for Operational Staff

(a) <u>Introduction</u>

13.1 These guidelines are prepared for the radiological protection of those operational staff whose duties specified in the DBCP may bring them into situations where they might be exposed to enhanced level of radiation or radioactive contamination. Based on advice from international experts from the UKAEA and IAEA and latest risk assessment, it has been concluded that it is extremely unlikely that any worker anywhere in Hong Kong would be exposed to dose levels exceeding 50 mSv which is the single year dose limit for occupational exposure. These general guidelines are formulated on that basis.

13.2 These guidelines may only need to apply when the DBCP is at FULL ACTIVATION level. Each department with responsibilities under the DBCP will draw up its own departmental procedures to meet its specific operational needs, based on these guidelines. Each department will also appoint a Departmental Radiological Protection Officer (DRPO) who will undergo special training. He will have assisted in drawing up the department's contingency plan to ensure that radiological protective principles form part of the operational procedures of the contingency plan and will keep those procedures under review. In a nuclear emergency, he will provide advice on the application of the department's guidelines and on which protective measures to implement. He will monitor any dose received by the staff of his department to ensure that dose limits are not exceeded. If necessary, he will seek further advice from DH.

(b) <u>General Protective Guidelines</u>

13.3 Any operation involving exposure to radiation should be carefully planned in accordance with the fundamental principles of radiological protection as set out by the International Commission on Radiological Protection (ICRP) in the 2007 Recommendations of the International Commission on Radiological Protection (ICRP Publication No.103). These fundamental principles are -

- (i) The principle of justification any decision that alters the radiation exposure situation should do more good than harm;
- (ii) The principle of optimization of protection the likelihood of incurring exposure, the number of people exposed, and the

magnitude of their individual doses should all be kept as low as reasonably achievable, taking into account economic and societal factors; and

(iii) Application of reference dose - In emergency exposure situations, the reference levels represent the level of dose or risk, above which it is judged to be inappropriate to plan to allow exposures to occur, and for which therefore protective actions should be planned and optimised. The reference dose for emergency response personnel under DBCP should be of the order of 50 mSv for the emergency response operations up to one year. This is consistent with the prescribed dose limit for occupational exposure of workers under planned exposure situations, which is 20 mSv per year averaged over five years with the provision that the dose should not exceed 50mSv in any single year. In order to protect the embryo/fetus or infant, females who have declared that they are pregnant or are nursing should not be involved in emergency actions involving high radiation doses. The reference dose for embryo/fetus should be of the order of 1 mSv, which is equivalent to the dose limit applicable to the embryo/fetus of occupationally exposed workers under planned exposure situations.

13.4 The basic protective measures to reduce doses due to external radiation are -

- (a) shortening the time of the operation;
- (b) increasing distance from a source; and
- (c) shielding.

While shielding is desirable in reducing exposure, it must be noted that doing the job in half the time is just as effective as halving the dose-rate by shielding. Working further away from a source is as effective as doing a job in less time. In all situations, these three factors must be considered altogether.

13.5 To reduce doses due to intake of radioactive substances into the body, the basic protective measures are -

- (a) shortening time of operation;
- (b) preventing surface contamination;
- (c) reducing inhalation of air-borne contaminants; and
- (d) preventing ingestion of contaminated food.

13.6 For each operation, the DRPO should decide on the optimal procedure to be adopted. Depending on the nature of duties in the DBCP, operational staff can be classified into three groups -

- (a) Staff Group A (SGA) those who are required to work in Mirs Bay and on Ping Chau, which are less than 20 km from GNPS/LNPS and where plume countermeasures may need to be taken;
- (b) Staff Group B (SGB) those who are required to work in areas where physical contact with contaminated persons and/or materials may be probable but plume countermeasures are not required. These areas, which are at least 20 km from Daya Bay, include the various Hong Kong/Shenzhen boundary control points, through train/ferry arrival points in Hong Kong, MCs, entry points of food and live food animals, laboratories and hospitals; and
- (c) Staff Group C (SGC) those to be deployed in Hong Kong as part of the Government's overall response with respect to the DBCP but who are at least 20 km from GNPS/LNPS and who are not required to come into physical contact with contaminated people and/or materials.

The protective equipment to be provided for these groups is set out in *Annex 13*. and an inventory list will be incorporated into respective departmental plans. With the advance in technology, new radiation monitoring equipment and protective equipment may emerge in the market, e.g. high throughput panel or portal detectors for screening travellers, vehicles and goods. The DRPO may approach DH, EMSD and HKO, coordinated by SB, for expert advice for equipment and gear that can satisfy their operational needs and arrange procurement from their own departmental envelopes. Opportunity should particularly be taken to consider such needs in planning for new or upgrading infrastructure.

13.7 In the application of protective measures, DRPOs should exercise their own discretion in the choice of individual items for personal protection, with due regard to the specific circumstances of exposure and nature of work. The wearing of protective clothing at times and places when its use is not warranted could cause adverse public reaction leading to panic. This particularly applies to the wearing of masks or respirators in public. The use of protective clothing is not actually required in areas where plume countermeasures have not been implemented or when there is no indication that significant contamination would be encountered. It is understandable that staff may feel uncomfortable not taking protective measures when they are called to perform emergency duties under the DBCP. DRPOs must make a careful appraisal of staff morale versus public sentiments in deciding when to order the wearing of protective clothing.

13.8 In general, in public areas, protective clothing should not be worn until there is actual evidence of the detection of enhanced levels of radiation, approaching those requiring countermeasures to be introduced in Hong Kong. Even then it may not be necessary to apply these protective measures to all workers in a particular class; for example, if radiological contamination is found on some persons at Sha Tau Kok Control Point, it may not be necessary for officers at all points of entry to wear protective clothing and almost certainly not for such officers at entry points away from the boundary with Guangdong. However, if workers are entering Emergency Planning Zone 1 (EPZI), which are remote areas, for the purpose of monitoring the situation or evacuating persons from the area, it may be prudent for staff to wear protective clothing from the outset of the FULL ACTIVATION level of the plan if it is likely that the area will shortly be affected by the radioactive plume.

13.9 Thermoluminescent dosimeters (TLD), which record an individual's cumulative dose should be worn underneath the protective clothing. At the end of each operation, the outer clothing (including protective clothing) should be checked for contamination. If found contaminated, it should be collected and disposed of in accordance with the Waste Disposal Action Plan (see Chapter 10). Women with confirmed or suspected pregnancy should seek advice from the DRPO on additional precautions which they should take. This could include being posted away from work that would expose the foetus to radiation dose exceeding 1 mSv. In the unlikely event that a person's cumulative dose exceeds 20 mSv (the average annual dose limit for workers), the DRPO in consultation with the Hospital Authority will, if and when necessary, arrange for a medical check-up and follow-up checks.

13.10 Special instructions have been issued to laboratory staff on the handling of radiologically contaminated material. These guidelines are to prevent the laboratory staff from becoming contaminated and to prevent cross-contamination of samples.

13.11 A programme of explanations of the Departmental guidelines should be instituted by departments. The DRPO should play a key role in this, supported by DH, HKO, SB and CSB as appropriate. In this way, operational staff with duties to perform under the DBCP will be fully informed of the safety aspects of their jobs and be more willing to perform these essential duties in the unlikely event of an accident at the GNPS/LNPS.

Training of Staff

13.12 Each department head should appoint a senior officer as the Departmental Training Co-ordinator to develop and co-ordinate an appropriate training programme. This programme should be approved by the Head of Department and a copy forwarded to SB for information. An important

component of this training should be to give staff an appreciation of the risks involved and the protective measures which can be taken to guard against them. Assistance can be sought from HKO, DH, SB and CSB as appropriate. The programme should be updated regularly to take account of changes in the DBCP. The training schedule should be reviewed annually to ensure that appropriate training courses are provided for newly transferred staff and refresher courses given to existing staff.

13.13 HKO will arrange specialist courses for DRPOs (paragraph 13.2) and, as necessary, specialist courses on radiation monitoring and radiological protection for staff involved in the operation of the DBCP. HKO, with support from SB, DH, EMSD and others, may seek continuous improvements in the contents of the DRPO and specialist courses to tie in with the DBCP, follow the latest international standards and practices and take into account any new developments.

Exercises to Test the DBCP

13.14 Full-scale command and control exercises to test the DBCP have been held in November 1990, May 1993, December 1996 and February 2001. The DBCP has been revised to take account of the lessons learned in these exercises. A major interdepartmental exercise is being planned for early 2012. Subject to post-exercise review, future exercises may be held, generally on a triennial basis, with the objective of testing the overall adequacy and effectiveness of the DBCP.

13.15 It should be noted that the preparation, execution and evaluation of such full-scale exercises is a major undertaking. There may also be similar requirements under the Emergency Response System (Chapter 1) for other contingency plans or specific assignments (e.g. WTO Ministerial Conference in 2005 and Olympic equestrian competition in 2008). SB maintains an important oversight of the overall planning of various exercise requirements and ensures proper coordination and scheduling taking into account available resources and prevailing priorities.

13.16 Communication exercises and drills to test the effectiveness of the alerting system and other aspects of the emergency communication should be held on an annual basis and co-coordinated by SB. Participants should not be informed of the exact timing of the exercise. Ideally cross-boundary links should be tested with the participation of the Guangdong authorities and GNPJVC/DNMC.

13.17 On their own initiatives, departments concerned should carry out operational drills or small-scale inter-departmental exercises to test various operational aspects of the DBCP annually or biennially, and keep SB posted of their annual schedule in advance. Suitable subjects could include -

(a) establishment of Monitoring Centres (MCs);

- (b) boundary procedures: checking of food, live food animals, goods, people and conveyances;
- (c) evacuation of Ping Chau and Mirs Bay; and
- (d) enhanced radiation monitoring.

13.18 Table-top exercises could be organised between full-scale command and control exercises by SB among the primary organisations included in the DBCP to consider a hypothetical emergency situation and to give their response to it. Again this should be coordinated with other exercises to be planned for other contingency plans or otherwise under the Emergency Response System (paragraph 13.15).

Resources

13.19 Many items of equipment required for use in the DBCP can be used in the ordinary operation of the department or in other emergencies. Examples of the former would include office equipment, stationery, transport, bags, storage containers, gowns, some disposable clothing etc.; of the latter, fax equipment, rainwear and boots, blankets, etc. GLD to maintain a common stock of essential items stored by various contingency plans (including the DBCP).

13.20 The list of equipment required to monitor radioactivity and their location is maintained by the respective departments. Departments concerned should regularly maintain, calibrate and replenish the gear and equipment up to satisfactory working conditions. Up-to-date inventory lists of gear and equipment should be kept in their respective departmental plans and sent annually to SB and GLD for information and consolidation. A directory of all radiation monitoring equipment and consumables is held by GLD. If redeployment is required in an emergency, they can be arranged through GLD, HKO and EMSC. Additional transportation can be obtained through GLD (for land transport), GFS (for air transport) and MD (for sea transport). Requests for blankets, meals etc. should be sent to SWD, and requests for general supplies and the supply of emergency items and non-standard stores, to GLD. Additional specialised equipment may be available through IAEA in an emergency (see Chapter 14).

Annex 13

	Department/ Organisations concerned	Duties	(a) for each person	(b) for each team or major office	(c) for each station
STAFF GROUP	HKPF, MD, GFS, C&ED in Mirs Bay	To inform vessels in Mirs Bay to evacuate and to	1 TLD 2 pairs of overshoes	2 direct read out dosimeters	1 dosimeter reader
A	CCLD III WII's Day	assist in the evacuation (Chapter 6)	 2 pairs of overshoes (unless rubber boots already provided) 1 Coverall with hood to cover hair 	Iodine tablets, sufficient for 2 days' use	Set A3
	AFCD, HKPF, FSD,GFS on Ping Chau	To evacuate people from Ping Chau (Chapter 6)	 pair of disposable gloves half-face respirator with iodine absorbent canister 	Set A2	
	GFS, HKO on Ping Chau and in Mirs Bay	To conduct aerial monitoring and to draw samples from Ping Chau/Mirs Bay (Chapter 4)	Set A1	Set A2	Set A3

List of Protective Equipment

* Portable Air Sampler may be requested if situation warrants.

Protective Equipment

	Department/ Organisations concerned	Duties	(a) for each person	(b) for each team or major office	(c) for each station
STAFF GROUP B	AMS, CAS, C&ED, GLD, ImmD, MD, FSD, HKPF at	To assist in the monitoring duties of the evacuees of Ping Chau and Mirs Bay	 TLD pairs of overshoes (unless rubber boots 	2 direct read out dosimeters	1 dosimeter reader
	evacuation discharge points or vessel scanning points	on discharge (Chapters 6 and 8) vessel	 already provided) 1 cloth cap or PVC cap cover 1 half-face dust-mask (e.g. N95 type or comparable) 1 pair of disposable gloves 1 long-sleeve overall or PVC overall/raincoat 	Set B2	Set B3
	ImmD, AMS, FSD, HKPF at points of entry (Note: only applicable to points of entry at which and when contaminated persons may arrive)	To check travellers and luggage arriving from within 20 km of GNPS/LNPS (Chapter 7)		Set B2	Set B3
	C&ED, HKP, FEHD at points of entry	To check goods, mail and food entering HK from within 20/50 km of GNPS/LNPS (Chapters 7 and 9)	Set B1 Set B1	Set B2	Set B3
	FEHD at Sheung Shui Slaughterhouse, Man Kam To and Lok Ma Chau	To check live food animals entering Hong Kong (Chapter 9)	Set B1	Set B2	Set B3

	Department/ Organisations concerned	Duties	(a) for each person	(b) for each team or major office	(c) for each station
STAFF GROUP B	FEHD at point of entry	To hose down empty contaminated vehicles entering HK from areas within 20 km of GNPS/LNPS (Chapters 7 and 9)	Set B1* * PVC Overall PVC overall/raincoat should be worn. Half-face dust- mask can be used if it is worn behind face screen		
	GLD at point of entry	To provide transport for conveying contaminated persons to other MCs/ERTC (Chapter 7)	Set B1		
	WSD	To draw water samples, to operate treatment works, isolate catchwaters and intakes in East and North East New Territories (Chapter 9)	Set B1		
	AFCD, FEHD, HKO, at various places in Hong Kong	To draw food, live food animals or environmental samples for analysis (Chapters 4 and 9)	Set B1	Set B2	Set B3

Protective Equipment

Protective Eq	uipment
----------------------	---------

	Department/ Organisations concerned	Duties	(a) for each person	(b) for each team or major office	(c) for each station
STAFF GROUP B	AMS, CAS, DH, FSD, HKPF at MCs	To monitor persons suspected of being radiologically contaminated (Chapter 8)	 TLD pairs of overshoes (unless rubber boots already provided) cloth cap 		
	DSD, LCSD at MCs	To set up and close MCs and monitor safety standards (Chapter 8)	 pair of disposable gloves lab gown or robe half-face mask (e.g. surgical mask) 		
	FEHD, GL, HKO, WSD in laboratories	To analyse samples (Chapter 9)	Set B4		
	HA hospitals (ERTC)	To provide medical treatment for injured/contaminated persons (Chapter 8)	Set B4	 3 surface contamination monitors 12 direct reading pocket dosimeters (for each ERTC and other A/E) 	

,

	Department/ Organisations concerned	Duties	(a) for each person	(b) for each team or major office	(c) for each station
STAFF GROUP B	FSD (Ambulancemen)	To convey injured/ contaminated persons to ERTC (Chapters 6 and 7)	Set B4		
	DSD at sewage pumping stations	To handle the disposal of contaminated sluge, screenings and grit (Chapter 10)	Set B4		
	DSD at sewage treatment works	To make necessary flow diversions for discharge of outflow of exit (Chapter 10)	Set B4		
	WSD at water treatment works	To handle the disposal of contaminated sludge (Chapter 10)	Set B4		

Protective Equipment

	Department/ Organisations concerned	Duties	(a) for each person	(b) for each team or major office	(c) for each station
STAFF GROUP C	EPD, (and strategic landfill operators), FEHD	To perform duties in connection with the disposal of radiologically contaminated waste (Chapter 10)	No special protective equipment required [however if material is contaminated to a level above the classified limit for radioactive substances, protective equipment provided for SGB outdoor staff should be provided (i.e. sets B1, B2 and B3)].		ioactive
	EMSD	Equipment maintenance	No special protective	equipment required.	

CHAPTER 14

CROSS-BOUNDARY AND EXTERNAL LIAISON AND ASSISTANCE

Cross-boundary Liaison

14.1 During a nuclear emergency at the GNPS/LNPS, cross-boundary liaison on the accident will be between SB (HKO being the first point of contact, to be taken over by EMSC when it is activated) and PEACO. Details of the information to be exchanged are set out in Chapter 3. The exchange of radiation monitoring results is elaborated in Chapter 4. During an off-site or site emergency, this two-way exchange of information should take place no less than once every six hours. If there are any significant changes, notification of the change should be as soon as possible.

Cross-boundary Assistance

14.2 The provision of cross-boundary assistance will be governed by the bilateral agreements between Hong Kong and Guangdong making reference to the "IAEA Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency". Requests for assistance from Guangdong will be made in writing or by fax by PEACO to SB and a reply should be given within six hours.

14.3 The nature of cross-boundary assistance which may be requested would vary with the nature of the emergency. The degree of assistance could vary from the provision of individual experts, to a joint operation using specialised emergency personnel, to facilitating the passage of personnel or equipment. Specifically, requests could be made for assistance in the provision of -

- (a) fire-fighting resources;
- (b) ambulance resources;
- (c) emergency personnel or equipment; and
- (d) helicopters to transport the above.

14.4 The request would be considered by S for S who would consult the Civil Service Bureau and the Head of Departments from which assistance would be derived, and, if necessary, CESG. If the request is acceded to, the support may be given gratis or on a reimbursement basis. Participation by individuals in the assistance group would be totally voluntary and the relevant Civil Service Regulations be observed. 14.5 S for S will designate one person as the Commander of the Hong Kong assistance group. The assistance will be provided for specified tasks. The Commander will obtain his instructions on performing these tasks from the Guangdong side and may not act at his own discretion during the operation. In the event he cannot accept such instructions, he should consult S for S and the assistance group may be withdrawn. Data or materials obtained by the assistance group must not be sent back to Hong Kong without the written consent of the Guangdong side. EMSC will inform the departments whose assistance is offered, PHQCCC (who will inform the Police Border Liaison Officer (DDC BORDIST)), Director of Immigration and Commissioner of Customs and Excise concerning the assistance group. DDC BORDIST will coordinate special arrangements to facilitate the passage of the group into Guangdong.

14.6 As appropriate, reference may also be drawn to the contingency plan for "Emergency Responses Operations Outside the Hong Kong Special Administrative Region" (Chapter 1), especially if assistance to Hong Kong residents on the Mainland is involved.

14.7 Symmetrical conditions apply to the Hong Kong side requesting assistance from the Guangdong authorities.

Assistance given to Guangdong in Hong Kong

(a) <u>Radiation monitoring</u>

14.8 Under the Guangdong off-site emergency plan, the Guangdong authorities propose to monitor sea contamination in the middle of Mirs Bay and track the course of the radioactive plume using aircraft. Permission for both activities within Hong Kong should be obtained from SB. This would normally be given.

(b) <u>Medical treatment</u>

14.9 It is possible that injured, possibly contaminated, Hong Kong residents will be conveyed to Hong Kong for treatment after a nuclear incident at the GNPS/LNPS either across the land boundary or by utilising existing medevac arrangements to the GFS Headquarters. Every effort should be made to minimise delay in the completion of Immigration, Customs or other formalities. If necessary, these could be conducted in hospital. The Chief Executive of HA, the SBDO (or EMSC, if this is operating), DH and HKOMAC should be informed of the imminent arrival of any possibly radiologically contaminated persons seeking treatment (see Chapters 3 and 8).

Assistance from external organisations

14.10 In the event of a major nuclear accident with possible off-site consequences, international organisations such as IAEA, WHO, International Civil Aviation Organisation and others may take actions in accordance with their mandates and the Joint Radiation Emergency Management Plan of the International Organizations¹. Among other things, they may assess the situations and give advice to governments and authorities around the world. Concerned bureaux and departments will follow the developments closely and take into account the advice in considering necessary measures in the local circumstances.

14.11 In particular, IAEA is the leading United Nation agency in nuclear matters. During an emergency, it plays an important role in collating and disseminating information and giving authoritative advice. IAEA can also coordinate considerable logistical, analytical and material support from many countries. S for S, in consultation with the key bureaux and departments of the DBCP, will determine what assistance may be required and forward appropriate requests to IAEA through the China Atomic Energy Authority.

14.12 In the event that WHO makes temporary recommendations under Article 15 of the International Health Regulations 2005 regarding response to nuclear accident, the Director of Health will follow closely developments on this front in considering the necessary enactment of subsidiary legislation under Section 9 of the Prevention and Control of Disease Ordinance to support the appropriate actions (Chapter 7).

14.13 In normal times, it is important that relevant bureaux and departments will continue to keep abreast of the programmes and services in nuclear emergency preparedness and response offered by their counterpart international and overseas organizations and developments in the international community.

¹ Developed by European Commission, European Police Office, Food and Agriculture Organization of the United Nations, International Atomic Energy Agency, International Criminal Police Organization, International Maritime Organization, Nuclear Energy Agency of the Organisation for Economic Co-operation and Development, Pan American Health Organization, United Nations Environment Programme, United Nations Office for the Co-ordination of Humanitarian Affairs, United Nations Office for Outer Space Affairs, World Health Organization, World Meteorological Organization, in co-operation with the International Civil Aviation Organization and United Nations Scientific Committee on the Effects of Atomic Radiation.

CHAPTER 15

RESPONSE TO A NUCLEAR EMERGENCY OUTSIDE DAYA BAY

Introduction

15.1 The preceding chapters focus on a possible nuclear accident at the GNPS/LNPS at Daya Bay, which is some 50km from the urban area of Hong Kong. A nuclear power plant accident which occurs at a place outside Daya Bay might also possibly affect Hong Kong to different extents, depending on its geographical location, severity and the association with Hong Kong in terms of supply of food and water, trade in goods, travel of persons, etc.

15.2 Distance is the best protection for radiation. For Hong Kong, the nearest nuclear power station on the Mainland beyond Daya Bay is about 130 km away. Others are farther away¹. The general assessment following international standards is that all these nuclear power stations outside Daya Bay carry a much smaller threat and the risk to Hong Kong is very low. Plume exposure is extremely remote, while we should be more alert to any contaminated food, goods and travellers coming to Hong Kong.

Objective and Application

15.3 This chapter covers nuclear power stations outside Daya Bay with the same objective of providing a flexible response to mitigate or reduce the possible effect to the health and safety of the Hong Kong population in the event of a nuclear accident which results in the off-site release of radioactive materials.

15.4 For a nuclear accident outside Daya Bay, responsible bureaux and departments will monitor the situation, assess the possible impacts and implement necessary measures according to their respective roles and authorities. The general scheme of the DBCP may remain valid to apply the different parts with appropriate adjustments. Relevant pointers are set out in the ensuing paragraphs.

Emergency Response Structure

15.5 The Government emergency response structure as set out in Chapter 2 remains equally applicable. The remoteness of an accident location would suggest a smaller need to convene CESG, which is responsible to advise the Chief Executive who would direct Hong Kong's response in major

¹ An indicative map showing the locations of the nuclear power stations in East Asia is at *Annex 15*.

incidents. In lesser emergencies as such, S for S is responsible for the implementation of the DBCP with support of ITF and underpinned by $EMSC^2$.

Notification of a Nuclear Incident

15.6 For a nuclear emergency outside Daya Bay, the focus is less on being notified in the first instance, as accidents that attract our genuine concern for emergency response would involve major off-site release of radioactive substances, which should have taken time to develop from an on-site situation. In the nature of any nuclear incident of such severity, there should have been good notice from the various notification channels and wide report in the international media.

15.7 The focus of notification is more on getting up-to-date information for consequence assessment as the accident develops. SB maintains liaison with China Atomic Energy Authority (CAEA) in Beijing to seek up-to-date information about nuclear accidents that might happen in other parts of the Mainland.

15.8 It is also useful to seek and receive information from the authorities of the place where the accident occurs, to monitor the assessments made by major international and national bodies with specific mandates and capabilities (such as IAEA, WHO, CAEA, the United States Nuclear Regulatory Commission and the French Radioprotection and Nuclear Safety Institute), and to follow the media reports. HKO, DH and EMSD are the core departments that will follow the developments closely and keep Duty Officer of SB or EMSC informed. HKOMAC³ will play a coordinating role in providing information and advice regarding radiation monitoring and assessment to EMSC. S for S, will through EMSC, maintain an oversight of the situation and determine the need for any relevant bureaux or departments to assist in seeking information at a higher level.

15.9 In this regard, under IAEA Action Plan on Nuclear Safety endorsed in September 2011, IAEA is working on arrangements to provide Member States, international organizations and the general public with timely, clear, factually correct, objective and easily understandable information during a nuclear emergency on its potential consequences, including analysis of available information and prognosis of possible scenarios based on evidence, scientific knowledge and the capabilities of Member States. SB will monitor progress of this IAEA initiative to benefit from any improvements in the notification arrangements in due course.

² If EMSC is not be activated (paragraph 15.13 refers), the situation will be tackled according to Tier One or Tier Two Response of the Emergency Response System (Chapter 1).

³ If HKOMAC is not be activated (paragraph 15.13 refers), the duties should be discharged by HKO through its daily routine arrangements.

Activation Levels of Contingency Plan

15.10 As set out in Chapter 1, the activation levels of the DBCP represent different tiers of emergency measures commensurate with the degrees of risks to Hong Kong, which correspond with the IAEA's four-category system for classifying nuclear emergencies of the GNPS/LNPS (paragraph 1.11).

15.11 Naturally, such one-to-one correspondence will generally not be applicable to a nuclear accident outside Daya Bay, as the risk to Hong Kong will vary according to the distance.

In applying the DBCP to a nuclear accident outside Daya Bay, the 15.12 activation levels OBSERVATION, READY, (i.e. four PARTIAL ACTIVATION and FULL ACTIVATION) will remain, but the activation of each level will be considered on a case-by-case basis by S for S, subject to an assessment of the possible risk directly posed to Hong Kong (dependent on the nature and severity of the nuclear incident, the distance from Hong Kong, and the meteorological conditions, among other things) as advised by HKOMAC in consultation with DH and EMSD. For example, an Emergency Standby or Plant Emergency situation in a nuclear power plant at a distance away from Hong Kong generally should not call for activation of the DBCP. Even a Site Emergency or Off-Site Emergency situation might only require activation at the OBSERVATION or READY level if the risk to Hong Kong is assessed to be insignificant.

15.13 Moreover, given the great variety of possibilities and uncertainties involved in a nuclear incident outside Daya Bay, the impact on Hong Kong and hence the necessary response could vary to a large extent. For each activation level, the different measures provided for may be applied with different degrees of rigour and supplemented by appropriate means dependent on the actual situation to handle, not necessarily in the same way as in an accident at Daya Bay. Some pointers are given below.

Radiation Monitoring and Assessment

15.14 The radiation monitoring and assessment work by relevant professional departments is a very important part of the DBCP. For an accident at a distance away, HKO will consider stepping up the monitoring of local environmental radiation level as necessary. It is also essential to follow the monitoring and assessment results, as well as reports of the plant conditions, released by IAEA and other relevant authorities overseeing the situation. Such efforts may be pursued at the OBSERVATION or READY level of the DBCP.

Response Measures

15.15 To deal with any off-site releases possibly affecting Hong Kong, various measures may need to be considered for implementation but the

emphasis and focus may vary from case to case, dependent on the assessment of the actual risk. In this regard, the Secretary for Security will be assisted by ITF and advised by HKOMAC (in consultation with EMSD and DH). In turn, DH may seek advice from Radiological Protection Advisory Group on human health matters relating to the radiological consequences that might eventuate from radioactive releases from nuclear facilities, and in particular, the countermeasures that should be adopted having regard to the widely applied principle that the risks should be reduced to a level which is as low as reasonably practicable.

(a) <u>Plume countermeasures</u>

15.16 Given the planning basis as set out in paragraph 15.2, we generally do not see the need for implementation of plume countermeasures, e.g. evacuation, sheltering or thyroid blocking, as the plume is extremely unlikely to reach Hong Kong at a level representing a threat to human life, health and safety.

(b) <u>Ingestion countermeasures</u>

15.17 Nuclear accidents happening outside Daya Bay might cause contamination of the surroundings and enter the food chain. Depending on the relationship with Hong Kong in food supply, i.e. the amounts and types of food imported by Hong Kong, ingestion pathway countermeasures targeting food items of a certain origin may need to be implemented as necessary. FEHD will consider enhancing food monitoring when the nuclear accidents are of public health relevance to Hong Kong.

15.18 The need for stepped-up monitoring on water supply and countermeasures on water supply should be very small, but may be implemented where circumstances so warrant.

(c) <u>Boundary control measures</u>

15.19 For a nuclear emergency occurring at a distance from Hong Kong, one principal issue to address is the possible arrival of travellers, goods and conveyances which might have been radiologically contaminated.

15.20 In perspective, it will take a major nuclear outbreak to pose a risk conquering the distance to Hong Kong. In such cases, the matter will be a matter of global concern. As evidenced in the Fukushima accident, international organisations such as IAEA, WHO, International Civil Aviation Organisation and others will take actions in accordance with their mandates and the Joint Radiation Emergency Management Plan of the International Organizations. Among other things, they will assess the situations and give advice to governments and authorities around the world. Concerned bureaux and departments will follow the developments closely and take into account the advice in considering necessary measures in the local circumstances. Where

actions are required, the points of entry concerned may not necessarily be confined to land crossings and may cover the port, airport and other points of entry depending on the circumstances.

15.21 In the event that the WHO makes temporary recommendations under Article 15 of International Health Regulation 2005 regarding response to nuclear accident, the Director of Health will follow closely developments on this front in considering the necessary enactment of subsidiary legislation under Section 9 of the Prevention and Control of Disease Ordinance (Cap 599) to support the appropriate Government actions. As discussed in Chapter 7, the public health risk of radiological contamination of persons and goods in an accident of Daya Bay is minimal. For nuclear accident even farther away, the public health risk is even smaller. The mechanism of invoking boundary control measures and providing health assistance to contaminated persons as discussed in Chapter 7 and 8 are equally applicable to a nuclear accident outside Daya Bay.

Public Information

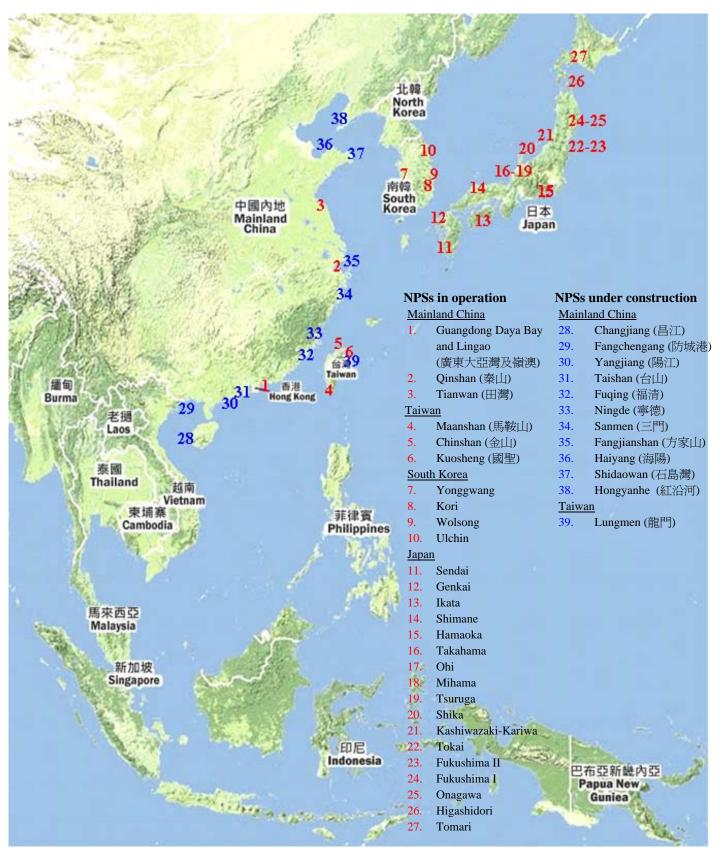
15.22 Significant nuclear accidents with trans-boundary impacts would definitely be an issue of keen media interest. It is particularly important for the Administration to provide timely, accurate and appropriate information to the general public. The public information arrangements as set out in Chapter 5 would be equally applicable.

15.23 Regarding any Hong Kong residents who happen to be visiting or plan to visit the place where the accident occurs, the 24-hour hotline (+852 1868) operated by the Assistance to Hong Kong Residents Unit of the Immigration Department will have a primary role to play. Under the existing Outbound Travel Alert System which covers some 85 popular travel destinations for Hong Kong residents, the Administration will assess the risk and possible threat to the Hong Kong residents at the relevant places, and will issue an Outbound Travel Alert should there be signs of threat (including nuclear incidents) in a place that may affect their personal safety.

External Liaison and Assistance

15.24 In a nuclear emergency outside Daya Bay, the need for referencing information and advice available in the international community and rendering possible assistance to Hong Kong residents who happen to be in the vicinity of the accident site is especially important. The arrangements for external liaison and assistance set out in Chapter 14 are applicable.

Annex 15



Nuclear Power Stations (NPSs) in East Asia

(as at Nov 2011)

CHAPTER 16

RESPONSIBILITIES OF DEPARTMENTS AND BUREAUX

Overall Command and Co-ordination

(1) Security Bureau (Emergency Monitoring & Support Centre)..... Chapter 2

Key Bureaux and Departments

(2)	Agriculture, Fisheries and Conservation Department	16.1
(3)	Department of Health	16.2
(4)	Environment Bureau	16.3
(5)	Electrical and Mechanical Services Department	16.4
(6)	Food and Environmental Hygiene Department	16.5
(7)	Food and Health Bureau	16.6
(8)	Home Affairs Bureau	16.7
(9)	Hong Kong Observatory	16.8
(10)	Hong Kong Police Force	16.9
(11)	Information Services Department	
	(Combined Information Centre)	16.10
(12)	Water Supplies Department	16.11

Operational Departments

(13)	Auxiliary Medical Service	16.12
(14)	Civil Aid Service	16.13
(15)	Civil Aviation Department	16.14
(16)	Civil Service Bureau	16.15
(17)	Customs and Excise Department	16.16
(18)	Department of Justice	16.17
(19)	Drainage Services Department	16.18
(20)	Education Bureau	16.19
(21)	Environmental Protection Department	16.20
(22)	Fire Services Department	16.21
(23)	Government Flying Service	16.22
(24)	Government Laboratory	16.23
(25)	Government Logistics Department	16.24
(26)	Home Affairs Department	16.25
(27)	Hospital Authority	16.26
(28)	Immigration Department	16.27
(29)	Leisure and Cultural Services Department	16.28
(30)	Marine Department	16.29
(31)	Post Office	16.30
(32)	Social Welfare Department	16.31
(33)	Office of the Telecommunications Authority	16.32
(34)	Transport Department	16.33

Agriculture, Fisheries and Conservation Department (AFCD)

16.1 The Director of Agriculture, Fisheries and Conservation is responsible for the following –

Control of food (See also under FEHD - paragraph 16.5)

- (a) the monitoring and control of local agricultural produce (milk, vegetables, livestock, live poultry and fish) (Chapter 9);
- (b) the monitoring and control of fresh primary produce at farms and wholesale markets (Chapter 9);
- (c) assistance in the disposal of contaminated produce under the Waste Disposal Action Plan (Chapter 10);
- (d) assistance with the notification of persons on Ping Chau and visitors of the affected Country, Marine and Geo Parks to leave or take shelter (Chapter 6);

Marine Water Monitoring

(e) collecting marine water samples at designated Fish Culture Zones (Chapter 4); and

Other matters

(f) deploying a Liaison Officer to EMSC, if requested.

Department of Health (DH)

16.2 The Director of Health is responsible for the following -

Assessment of radiological health hazard

- (a) acting as a member of CESG (Chapter 2);
- (b) deploying a Liaison Officer to EMSC (Chapter 2);
- (c) providing professional assessment on the potential human health hazard following any release of radioactivity and advising on countermeasures to eliminate or minimise this hazard (Chapters 4 and 6);
- (d) convening Radiological Protection Advisory Group (RPAG) if necessary which will advise D of Health on the situation and radiological protective actions (Chapter 4);
- (e) following developments on the WHO front and assessing the public health risk in nuclear emergencies. In the event that the

WHO makes temporary recommendations under Article 15 of IHR2005 regarding response to nuclear accident, D of Health will follow closely developments on this front in considering the necessary enactment of subsidiary legislation under Section 9 of the Prevention and Control of Disease Ordinance (Cap. 599) to support the appropriate government actions. (Chapters 7, 14 and 15);

- (f) advising on the need and demand for setting up Monitoring Centres (MCs) to provide assistance to contaminated persons (Chapter 8);
- (g) based on scientific evidence, stockpiling sufficient amount of thyroid blocking agent and advising on related storage and management, and drawing up guidelines on thyroid blocking taking reference from WHO's advice (Chapter 6);
- (h) deploying medical teams to MCs to provide counselling (Chapter 8); and
- (i) providing advice on human health impact with respect to radiation to Departmental Radiological Protection Officers (DRPOs) and on the appropriate protective actions, if any, which staff in the field should take (Chapter 13).

Environment Bureau (ENB)

16.3 The Secretary for the Environment (SEN) has policy responsibility for the provision of electricity supply in Hong Kong and is a member of CESG. The Permanent Secretary for the Environment is a Director of the HKNIC. They are responsible for -

- (a) acting as a member of CESG (Chapter 2);
- (b) assisting S for S and DEMS in liaison with CLP, HKNIC, GNPJVC and DNMC on matters relating to the GNPS/LNPS (Chapters 2, 3 and 11);
- (c) working with the local power companies to ensure that the effect on Hong Kong of any disruption and/or reduction to the power supplied to Hong Kong by the GNPS is mitigated and minimized through the provision of additional power from other sources (Chapter 11); and
- (d) advising from energy policy aspects of matters relating to liability for damages arising from the radiological consequences of any emergency in as much as they affect Hong Kong (Chapter 12).

Electrical and Mechanical Services Department (EMSD)

16.4 The Director of Electrical and Mechanical Services is responsible for the following -

- (a) acting as a member of CESG (Chapter 2);
- (b) deploying a Liaison Officer to EMSC (Chapter 2);
- (c) obtaining from PEACO, GNPJVC and DNMC, through HKOMAC and/or EMSC, updated information on the plant conditions of the GNPS/LNPS, and liaising with the appropriate authorities on any further data/information exchange (Chapter 3);
- (d) liaising with HKNIC and CLP to obtain information about the plant and power supply conditions and other matters in accordance with both the requirements of the Electricity Ordinance and administrative arrangements (Chapters 3 and 11);
- (e) providing technical interpretation of information relating to the engineering aspects of any incident at the GNPS/LNPS, how it may develop and what the implications would be for Hong Kong in terms of both hazard and loss of power supply (Chapters 3 and 11);
- (f) assisting ENB in working with the power companies to devise ways to minimise the power disruption resulting from an incident at the GNPS/LNPS (Chapter 11);
- (g) keeping S for S, via EMSC, HKOMAC and CESG fully informed of the situation with respect to the plant conditions of the GNPS/LNPS, the progress of the incident and the assessment of the potential for any radioactive release (Chapters 3 and 11);
- (h) following accident development as may be brought out by IAEA and other international and national organizations to assess the plant conditions, especially regarding a nuclear accident outside Daya Bay (Chapters 3 and 15);
- (i) manning the EMSD Co-ordination Office when the DBCP is activated (Chapter 3); and
- (j) co-ordinating the supply of monitoring equipment available from the stock at EMSD (Pool) in accordance with the advice from EMSC. (Chapter 13)

Food and Environmental Hygiene Department (FEHD)

16.5 The Director of Food and Environmental Hygiene is responsible for the following –

- (a) assisting other departments in collection and disposal of contaminated or radioactive waste, according to the Waste Disposal Action Plan (Chapter 10);
- (b) hosing down contaminated vehicles at points of entry (Chapters 7 and 9) by using high pressure hoses of water wagon;

Control of food (See also under AFCD - paragraph l6.1)

- (c) monitoring and control of all imported food and live food animals at the points of entry (Chapter 9);
- (d) monitoring and control of all food processed in Hong Kong e.g. meat at slaughterhouses, milk at milk factories; etc. (Chapter 9); and
- (e) monitoring and control of all food at retail outlets (Chapter 9).

Food and Health Bureau (FHB)

- 16.6 The Secretary for Food and Health is responsible for the following
- -
- (a) acting as a member of CESG (Chapter 2);
- (b) maintaining policy oversight of public health, food safety and food supply concerning the DBCP; and
- (c) activation of the Food Control Committee if the food supply situation warrants it (Chapter 9).

Home Affairs Bureau (HAB)

- 16.7 The Secretary for Home Affairs is responsible for the following -
 - (a) acting as a member of CESG (Chapter 2); and
 - (b) maintaining policy oversight of district matters concerning the DBCP.

Hong Kong Observatory (HKO)

16.8 The Director of the Hong Kong Observatory is responsible for the following -

- (a) acting as a member of CESG (Chapter 2);
- (b) acting as SB's agent and first point of contact, on a 24-hour basis, for receiving and authenticating messages from the PEACO and IAEA in accordance with bilateral agreements and the international conventions on Early Notification and Assistance (Chapter 3);
- (c) gathering information on accident development as may be brought out by IAEA and other international and national bodies to assess possible impacts on Hong Kong, especially regarding an accident outside Daya Bay (Chapters 3 and 15);
- (d) exchanging radiological and meteorological data with the Guangdong authorities (Chapters 3 and 4);
- (e) acting as a monitoring and assessment centre for detecting any release of radioactive materials from the GNPS/LNPS, notifying SB, EMSD and DH of events (including rumours) indicating possible releases from the GNPS/LNPS so that a combined assessment can be made and S for S can determine the activation level of the DBCP (Chapter 3);
- (f) acting as an adviser to SB by keeping it fully informed of the radiological situation, predictions and assessments, and recommending to it, in consultation with DH and EMSD, any necessary countermeasures to protect the public against direct exposure to the radioactive plume (Chapters 3 and 4); specific advice will be given concerning -
 - (i) evacuation or sheltering of people on Ping Chau and Mirs Bay within the 20 km EPZ l (Chapter 6);
 - (ii) implementation of boundary control measures (Chapter 7); and
 - (iii) establishment of MCs (Chapter 8);
- (g) coordinating the government effort in radiation monitoring in the plume exposure pathway if necessary; in ordinary times this would include maintaining an inventory of HKO's radiological measuring instruments and ensuring the correct calibration for those instruments under HKO's maintenance (Chapter 4);

HKSARGDBCP – Chapter 16

- (h) liaising with other government departments in the monitoring of food produce and drinking water (Chapter 9);
- (i) advising S for S whether and what type of assistance is required from external organisations (e.g. IAEA) (Chapter 14); and
- (j) deploying a Liaison Officer to EMSC (Chapter 2); and
- (k) organizing training programmes for DRPOs (Chapter 13).

Hong Kong Police Force (HKPF)

- 16.9 The Commissioner of Police is responsible for the following -
 - (a) acting as a member of CESG (Chapter 2);

Alerting

- (b) ensuring a capability exists for receiving and responding to any emergency message from Guangdong concerning an incident at the GNPS/LNPS (Chapter 3);
- (c) assisting in the task of alerting emergency organisations (Chapter 3);

Preparation

- (d) determining, based on information provided by EMSC and HKOMAC, which police resources may be required to deal with the evolving situation;
- (e) ensuring that police resources can be called upon and deployed rapidly should the need arise;

Operational duties

- (f) preparing to evacuate or shelter persons on Ping Chau and in the 20 km EPZ 1 in Mirs Bay and implementing the action when ordered by EMSC (Chapter 6);
- (g) controlling crowds and traffic which may develop following rumours of an incident or accident at the GNPS/LNPS;
- (h) the continued maintenance of law and order;

Supporting duties

- (i) providing manpower and logistical support for -
 - (i) distribution of thyroid blocking agents; and

- (ii) deployment of other emergency personnel;
- (j) opening the Casualty Enquiry Unit in the event of either the evacuation of Ping Chau or the opening of MCs (Chapters 1 and 8); and
- (k) providing a senior Police officer as a Liaison Officer and an experienced the third generation Computer Assisted Command and Control System (CACCS3) terminal operator to EMSC.

Information Services Department (ISD)

16.10.1 The Director of Information Services will convene the Information Policy Committee to advise the CESG on the overall information and public relations strategy both locally and overseas (Chapter 5).

16.10.2 The Director of Information Services is responsible for the following -

- (a) acting as a member of CESG (Chapter 2);
- (b) deploying a Liaison Officer to EMSC (Chapter 2);
- (c) keeping the public informed promptly of the situation, through the news media (Chapter 5);
- (d) countering rumours and misleading information (Chapter 5);
- (e) providing the public advice on actions they can take (Chapter 5);
- (f) providing assessments of media reaction to EMSC and CESG (Chapter 5); and
- (g) conveying promptly to HKOMAC and SB/EMSC the substance of rumours about incidents at the GNPS/LNPS (Chapter 3).
- 16.10.3 To perform the above tasks, DIS will, as detailed in Chapter 5 -
 - (a) set up the CIC;
 - (b) open the Press Briefing Centre and arrange for press briefing; and
 - (c) ensure that all major press releases are cleared by S for S, and ensure that other press releases are in line with the strategy laid down by CESG.

Water Supplies Department (WSD)

16.11 The Director of Water Supplies is responsible for the following -

- (a) ensuring, as far as practicable, that water supplies remain safe and fit for consumption (Chapter 9);
- (b) monitoring water imported from Guangdong, in impounding reservoirs, entering and leaving treatment works and in water catchment areas and consumer taps (Chapter 9);
- (c) considering the application of countermeasures such as -
 - (i) arranging for water to be drawn preferentially from noncontaminated or least contaminated sources;
 - (ii) adjustment of treatment processes to reduce radioactivity; and
 - (iii) water rationing (Chapter 9);
- (d) ensuring that adequate water is supplied to MCs (Chapter 8); and
- (e) monitoring of sludge at water treatment works and arrange disposal of the sludge according to the Waste Disposal Action Plan (Chapters 9 and 10).

Auxiliary Medical Service (AMS)

16.12 The Chief Staff Officer, Auxiliary Medical Service is responsible for the following -

- (a) setting up in situ MCs for monitoring incoming persons and conveyances where necessary (Chapters 7 and 8);
- (b) control and manning of MCs (Chapter 8);
- (c) assisting in the disposal of contaminated items arising from the MCs in accordance with the Waste Disposal Action Plan (Chapters 8 and 10); and
- (d) assisting DH, HA and FSD by providing medical supporting services such as distribution of thyroid blocking agents.

Civil Aid Service (CAS)

16.13 The Chief Staff Officer, Civil Aid Service is responsible for the following -

 (a) assisting HKO in the collection of samples from HKO monitoring stations and designated fire stations and transporting these samples to the King's Park Radiation Laboratory or other laboratories for analysis (Chapter 4);

- (b) liaising with GLD for providing transport and deploying CAS personnel to escort Ping Chau residents who are not being contaminated from evacuation discharge points to LCSD's holiday camps for temporary re-housing;
- (c) assisting AMS by providing marshalling and crowd control outside MCs, and assisting in setting up MCs where necessary (Chapter 8);
- (d) manning the supply of additional water and exit hoses established by FSD for the MCs (Chapter 8);
- (e) liaising with GLD for providing transport and deploying CAS personnel to escort contaminated person (with no injury) from
 - (i) evacuation discharge points and points of entry to MCs (Chapters 6 and 7);
 - (ii) the points of entry and MCs to Emergency Radiation Treatment Centres (ERTCs) at designated hospitals (Chapters 7 and 8);
- (f) deploying Liaison Officer to EMSC and providing dispatch services for EMSC during the emergency, if required (Chapter 2); and
- (g) providing such other assistance as may be required.

Civil Aviation Department (CAD)

16.14 The Director-General of Civil Aviation is responsible for the following -

- (a) ensuring that aircraft in flight are kept at least 25 km away from the GNPS/LNPS;
- (b) approving, after consultation with SB, the overflight of Hong Kong by PRC aircraft monitoring the plume (Chapter 14); and
- (c) maintaining the operation of the airport and ensuring priority is given to emergency flights of equipment or personnel to assist in radiological decontamination in Hong Kong or in Guangdong (Chapters 6 and 14).

Civil Service Bureau (CSB)

16.15.1 The Secretary for the Civil Service is responsible for issuing general guidelines to bureaux/departments for reference and compliances for the

HKSARGDBCP – Chapter 16

radiological protection of those operational staff whose duties specified under the DBCP. In times of a nuclear incident affecting Hong Kong, CSB would also relay to bureaux/departments any health guidance from DH and any specific guidelines for employers/employees on the nuclear incident from LD so that bureaux/departments can adjust their safety measures as necessary.

16.15.2 The Principal Official Languages Officer in the Official Languages Division (OLD) is responsible for sending qualified persons to EMSC to provide translation and/or interpretation services where necessary.

Customs and Excise Department (C&ED)

16.16 The Commissioner of Customs and Excise is responsible for the following -

- (a) monitoring goods imported to detect any radiological contamination (Chapter 7);
- (b) monitoring of lorries and lorry drivers arriving at the land Boundary Control Points for radiological contamination (Chapter 7);
- (c) providing services for facilitating the passage of cross-boundary assistance agencies (Chapter 14);
- (d) assisting, if necessary, in evacuation of persons on Ping Chau and those in Hong Kong territorial waters in Mirs Bay within 20 km of the GNPS/LNPS (Chapter 6); and
- (e) disposal of contaminated items arising from the control operations at points of entry in accordance with the Waste Disposal Action Plan (Chapter 10).

Department of Justice (DoJ)

16.17 The Secretary for Justice will ensure, through the appropriate Law Officers, that -

- (a) legal advice is given on the necessity for making the Emergency (Radiological Contamination) Regulation, which has been predrafted (Chapter 12); and
- (b) other legal advice is given as required; if necessary, a liaison officer will be deployed to EMSC.

Drainage Services Department (DSD)

16.18 The Director of Drainage Services is responsible for the following-

- (a) ensuring that the exit water from MCs is adequately drained away during the operating hours of such centres (Chapter 8); and
- (b) proper collection and disposal of contaminated sludge, screenings and grits removed from sewage pumping stations and sewage treatment works (Chapter 10).

Education Bureau (EDB)

- 16.19.1 The Secretary for Education (SED) is responsible for -
 - (a) liaising with the Director of Information Services (DIS) in order that
 - (i) DIS can keep the SED informed of all government statements and advice; and
 - (ii) SED can convey to DIS any relevant information or announcements that he considers necessary;
 - (b) passing on appropriate advice to students, parents, schools and educational institutions (including examination authorities); and
 - (c) keeping schools and educational institutions open so that students may remain there as necessary.

16.19.2 The procedures to be adopted by EDB will be broadly similar to those adopted for natural disasters.

Environmental Protection Department (EPD)

16.20 The Director of Environmental Protection is responsible for the following -

Disposal of contaminated waste

- (a) providing advice and technical support on the disposal of contaminated waste; the Waste Disposal Action Plan, written by EPD, includes details of where and how to dispose of such waste (Chapter 10);
- (b) seeking advice from DH on human health relating to the disposal of radioactive waste (Chapter 10); and

Marine Water Monitoring

(c) collecting marine water samples at designated water sampling points and LCSD's gazetted beaches (Chapter 4).

Fire Services Department (FSD)

16.21 The Director of Fire Services is responsible for the following -

Radiation Monitoring

(a) assisting HKO in the monitoring and sampling of the level of atmospheric radioactivity at designated fire stations (Chapter 4);

At points of entry

(b) conveying injured persons, who may also be radioactively contaminated and requiring medical attention, to ERTCs in hospitals by ambulance (Chapter 7);

<u>MCs</u>

- (c) on instruction from EMSC, and with assistance of AMS and LCSD, arranging for the setting up of MCs (Chapter 8);
- (d) conveying injured persons, who may also be radioactively contaminated and requiring medical attention, to ERTCs in hospitals by ambulance (Chapter 8);

Other services

- (e) undertaking rescue operation, if necessary, in the evacuations for Ping Chau (Chapter 6);
- (f) undertaking decontamination measures where calamities are involved;
- (g) providing cross boundary assistance if considered necessary by the S for S (Chapter 14); and
- (h) providing a Liaison Officer to EMSC (Chapter 2).

Government Flying Service (GFS)

- 16.22 The Controller, GFS is responsible for the following -
 - (a) assisting in the evacuation operations for Ping Chau and any specific areas in the territory as requested by PHQCCC (Chapter 6);

- (b) notification of the public in remote areas and vessels in Mirs Bay of the emergency at the GNPS/LNPS using mobile public address systems if deemed necessary by EMSC, on advice from HKOMAC (when equipment is available) (Chapter 6);
- (c) providing a fast means of checking abnormal instrument readings at Radiation Monitoring Network stations; transporting monitoring teams deployed by HKOMAC and WSD; carrying samples urgently needed by HKOMAC (Chapter 4);
- (d) aerial operations to locate and track any radioactive plume and locate contaminated ground surface in conjunction with HKO (Chapter 4); and
- (e) providing assistance for aerial observations by the Police of traffic conditions.

Government Laboratory (GL)

- 16.23 The Government Chemist is responsible for the following -
 - (a) providing analytical services to HKOMAC, FEHD and AFCD to determine the levels of radioactive contamination in food samples (Chapters 4 and 9);
 - (b) providing analytical services to WSD to determine Sr-90 contamination in water samples upon request; and
 - (c) if necessary, the provision of 24-hour analytical facilities.

Government Logistics Department (GLD)

16.24 The Director of Government Logistics is responsible for the following -

- (a) maintaining an inventory of government vehicles which could be used in an emergency;
- (b) providing, on request from EMSC, vehicles to assist in -
 - (i) moving Ping Chau and Mirs Bay evacuees (Chapter 6);
 - (ii) moving contaminated persons from the points of entry to MCs;
 - (iii) moving contaminated persons from MCs to ERTCs at designated hospitals (Chapter 8);and

- (iv) liaising with GLD contractors and other transport service providers to secure the supply of hired vehicles for transporting uncontaminated persons if there are insufficient government vehicles.
- (c) maintaining a directory of radiological monitoring equipment and consumables (with the assistance of HKO and other key departments in the DBCP);
- (d) maintaining a pool of emergency items as back-up supply to operational departments required under the DBCP; and
- (e) arranging urgent procurement of non-standard stores in an emergency.

Home Affairs Department (HAD)

- 16.25 The Director of Home Affairs is responsible for the following -
 - (a) serving as an interface between central government and District Offices by -
 - (i) acting as the Disaster Relief Coordinator working through the headquarters emergency control centre and the District Officers;
 - (ii) ensuring all District Office staff are kept fully informed of the situation by relaying situation reports requested by the EMSC; and
 - (iii) conveying to EMSC reports from the District Offices on public reaction to the emergency (Chapter 5);
 - (b) reporting rumours to ISD who will, in liaison with EMSC, prepare appropriate authoritative media releases to deal with the situation (Chapter 5);
 - (c) working in liaison with LCSD for the temporary accommodation of Ping Chau residents at the LCSD's holiday camp(s);
 - (d) working with SWD and CAS to ensure that shelter and care is provided for all those in need; and
 - (e) HAD should provide a liaison officer when requested by EMSC. This liaison officer should also be used to fulfill the DHA's role as the Disaster Relief Coordinator.

Hospital Authority (HA)

16.26 The Chief Executive of Hospital Authority is responsible for the following -

ERTCs (Chapter 8)

- (a) providing facilities in the Accident and Emergency Department and designated wards of specific hospitals to treat patients and casualties who have been contaminated in the emergency;
- (b) providing facilities for monitoring internal contamination and treatment to government operational staff and members of the public when considered necessary; and
- (c) formulating plans to safeguard the health of patients and staff in hospitals during the emergency.

Immigration Department (ImmD)

- 16.27 The Director of Immigration is responsible for the following -
 - (a) supporting AMS in setting up and running MCs at the points of entry where necessary (Chapter 7);
 - (b) providing assistance to Hong Kong residents outside Hong Kong in accordance with the contingency plan for Emergency Response Operations Outside the HKSAR (Chapter 15); and
 - (c) providing services for facilitation of cross-boundary assistance agencies (Chapter 14).

Leisure and Cultural Services Department (LCSD)

- 16.28 The Director of Leisure and Cultural Services is responsible for -
 - (a) making available and opening designated premises as MCs (Chapter 8);
 - (b) assisting in collection and removal of contaminated and radioactive waste at MCs under the guidance of EPD (Chapter 10);
 - (c) working in liaison with HAD, SWD and CAS for the temporary accommodation of Ping Chau residents who are not being contaminated at LCSD's holiday camp(s); and
 - (d) assisting EPD to collect marine water samples at designated gazetted beaches (Chapter 4).

Marine Department (MD)

- 16.29 The Director of Marine is responsible for the following -
 - (a) ensuring that vessels entering, leaving, or in Hong Kong waters are aware of the emergency (Chapter 3);
 - (b) assisting, if necessary, in evacuation of persons on Ping Chau and those in Hong Kong territorial waters in Mirs Bay within 20 km of the GNPS/LNPS (Chapter 6); and
 - (c) directing suspected radiologically contaminated vessels to the anchorage point at the southwest of Lamma Island for monitoring (Chapter 6).

Post Office (HKPO)

- 16.30 The Postmaster General is responsible for the following -
 - (a) taking over postal article found contaminated (Chapter 7); and
 - (b) decontaminating or disposal of contaminated items arising from the control operations at points of entry in accordance with the Waste Disposal Action Plan (Chapter 10).

Social Welfare Department (SWD)

16.31 The Director of Social Welfare is responsible for providing essential relief items including food and blankets to the evacuees from Ping Chau and persons relocated from remote areas while they are staying in temporary accommodation.

Office of the Telecommunications Authority (OFTA)

16.32 The Director-General of Telecommunications is responsible for the following -

- (a) promptly relaying the possible Telecommunication Network Congestion Warning to the telecommunication network operators upon receipt of notification of a disaster or major emergency, monitoring the status of the networks, and ensuring quick recovery by operators in case of service disruption;
- (b) ensuring that designated radio channels for use during any emergency are free from interference caused by radio transmissions; and

HKSARGDBCP – Chapter 16

(c) coordinating with the mobile network operators on the request of SB on the dissemination of time-critical Government announcements by Short Message Service in accordance with the established procedures as given in the General Circular 6/2008 – Public Announcement by Short Message Service.

Transport Department (TD)

- 16.33 The Commissioner for Transport is responsible for the following-
 - (a) keeping all public transport operators informed of the situation, and advising them whether a need exists for special transport arrangements to be provided;
 - (b) assisting, if necessary, in the evacuation of the public from Ping Chau in Mirs Bay and their dispersal in the urban areas (Chapter 6);
 - (c) co-ordinating the deployment of public transport resources in an emergency; and
 - (d) disseminating information about emergency traffic and public transport arrangements.