

LCQ3: Threats posed to Hong Kong by nuclear incidents occurring at nuclear power stations caused by natural disaster

Following is a question by the Hon Gary Fan and a reply by the Secretary for Security, Mr John Lee, in the Legislative Council today (January 9):

Question:

In view of the extensive damage caused by super typhoon Mangkhut during its onslaught in Hong Kong in September last year, and the fact that the nuclear power stations in Daya Bay, Taishan, Yangjiang and Lufeng of the Guangdong Province are, at the farthest, only 220 kilometres away from Hong Kong, quite a number of members of the public are concerned about the threats posed to Hong Kong by nuclear incidents occurring at such nuclear power stations caused by natural disasters. In this connection, will the Government inform this Council:

(1) whether it knows the maximum sustained winds and the maximum gusts recorded at each of the nuclear power stations as well as the heights of the maximum storm surge and the maximum sea level recorded in the nearby waters during the onslaught of Mangkhut; the designed maximum wind pressure that each of the nuclear power stations can withstand;

(2) whether the Government's work on guarding against Mangkhut included seeking information from the Guangdong provincial authorities about the pre-typhoon preparatory measures and emergency response plans put in place for the nuclear power stations in the Province, and whether it received, after the onslaught of Mangkhut, any reports from the Guangdong provincial authorities on how such nuclear power stations had been affected by the typhoon (including if any safety incident had occurred); if so, of the details; if not, the reasons for that; and

(3) whether it will provide in the Contingency Plan for Natural Disaster that where a major natural disaster (such as typhoon, earthquake or tsunami) which may cause damage to such nuclear power stations has occurred, the Government must expeditiously seek information from the Guangdong provincial authorities on how the nuclear power stations have been affected, and make public the information so obtained; if so, of the details; if not, the reasons for that?

Reply:

President,

The construction and operation of nuclear power stations on the Mainland are governed by national regulations for civilian nuclear facilities, which

are formulated with reference to relevant international standards. When considering the siting for a nuclear installation, all previous tropical cyclones which took place within 300 to 400 kilometres of a site will be analysed for the purpose of deducing the most damaging paths that may be taken by the most severe storms and typhoons, and correspondingly adopt in the plant's design a sufficient flood protection margin. Impacts of extreme incidents such as earthquakes, tsunamis and air crashes will also be given due consideration. For example, compared to normal construction projects, substantially larger amounts of steel bars are used in the construction of nuclear power stations to achieve very high level of structural strength which enables the plants to withstand super typhoons, air crashes and other scenarios to ensure that the safety of the nuclear power stations will not be jeopardised. Besides, the designs of the breakwaters of nuclear power stations have taken into account the designed base flood level, maximum typhoon surge and wave overtopping discharge corresponding to the wind speed. In addition, operators of each nuclear power plant on the Mainland are required under relevant laws and regulations to formulate their own contingency plans for natural disasters, prescribing response actions in a planned and structured manner to ensure the safety of the nuclear power plants.

The Daya Bay Nuclear Power Station (DBNPS), comprising the Guangdong Nuclear Power Station (GNPS) and the Ling Ao Nuclear Power Station (LNPS), is relatively closer to the Hong Kong Special Administrative Region (HKSAR) (at about 50 kilometres northeast of the city's urban area). Regular co-operation and communication channels are in place between the HKSAR Government and the Guangdong authorities for periodic review of issues such as nuclear incident monitoring and notification arrangements. This is to ensure that, in case of a nuclear incident, relevant information can be obtained promptly for implementation of corresponding measures. In this regard, as early as the mid-1990s, the HKSAR Government and Guangdong authorities established an official contingency notification channel with specific time requirements, including notification within two days for non-emergency events and immediate notification for serious off-site emergencies in the DBNPS. Over the years, the notification mechanism for incidents at DBNPS has been working effectively. Furthermore, the Government has put in place a comprehensive Daya Bay Contingency Plan (DBCP), which sets out appropriate contingency measures to be adopted immediately by government departments for the protection of public health and safety in the event of a release of radioactive materials at any nuclear power station. It also stipulates that 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 arising from a radiological release, or even rumours of such a release, and to advise members of the public what to do and what not to do.

As for other nuclear power stations in Guangdong, the one closest to Hong Kong is about 130 kilometres from our urban area, and the rest are even further away. The general assessment made on the basis of international standards is that the threat to Hong Kong posed by nuclear power stations outside Daya Bay is small, hence the risk to which we are exposed is very

low. Nevertheless, in view of the nuclear development in Guangdong in recent years, the HKSAR Government and the Nuclear Emergency Committee Office of the Guangdong Province (GDNECO) have drawn up notification mechanisms for new nuclear power stations in the Province, so to ensure that the HKSAR Government receives sufficient information to respond. The DBCP formulated by the HKSAR Government is applicable to all nuclear power stations beyond Daya Bay that are in operation.

My reply to the specific questions raised by the Hon Gary Fan is as follows:

(1) Based on the information available, super typhoon Mangkhut weakened into a severe typhoon in the morning of September 16, 2018, and made landfall in the coastal areas of Taishan in Guangdong at around 5pm that day. According to the information from the Mainland, when Mangkhut arrived in Guangdong, the DBNPS was the most impacted among the nuclear power stations in the Province, with the maximum wind speed reaching 41.75 metres/second, or about 150 kilometres/hour. Based on the information published by the Mainland marine authorities, before and after the landfall of Mangkhut, maximum heights of the storm surge recorded by monitoring points in Mainland waters near the various nuclear power stations ranged from 1 to 3 metres. This maximum height of the storm surge caused by Mangkhut was much lower than the plants' design basis – as an example, the DBNPS is situated at about 6.5 to 7 metres above sea level, and the height of its breakwater is some 13.8 to 14 metres – hence the storm surge caused by Mangkhut posed any impact on the safety of the stations. Despite serious damage caused to many places by its strong wind and storm surge, Mangkhut did not affect the safety of the nuclear power stations in Guangdong.

(2) Before and after the onslaught of Mangkhut in Guangdong, the HKSAR Government maintained close liaison with relevant Guangdong authorities and nuclear power enterprises in respect of the typhoon protection contingency arrangements of nuclear power stations in the Province, so to understand their safety condition. According to our understanding, to tackle the attack of Mangkhut, the GDNECO advanced its typhoon protection contingency preparations a few days ahead of Mangkhut's arrival, including the inspection and implementation of nuclear contingency plans and stocking up of emergency supplies; test-run and protection of the nuclear emergency command system; requesting power stations to strengthen their backup power supply and circuit protection; further enhancement of information exchange and operational liaison among fellow nuclear emergency response units (on meteorology, power supply and communication) and nuclear power stations. All nuclear power stations also carried out inspections on various typhoon protection preparations and measures, as well as communication, logistics support and protection of emergency supplies in anticipation of the super typhoon. GDNECO also notified the HKSAR Government of its activation of contingency procedures for nuclear emergencies. The Mainland authorities and the China General Nuclear Power Group (which manages the nuclear power stations in Guangdong) disseminated to the public information about the typhoon protection preparations, contingency measures and safety condition of the four nuclear power stations in the Province before and after the landfall of

the typhoon through various media (including television and radio broadcast, newspapers, webpages, WeChat, Weibo, etc.). During the typhoon, the Department of Ecology and Environment of Guangdong Province strengthened the protection of emergency radiation monitoring to ensure effective capture of information on the ambient gamma dose-rate and meteorology data throughout the period of the storm. The Guangdong Power Grid Company closely monitored the safety of the nuclear power grid to ensure that the electricity transmission paths of the nuclear power stations stayed intact during the typhoon. All the power stations also conducted 24-hour monitoring of the movement of Mangkhut and the effectiveness of their typhoon protection measures. After the passage of the typhoon, the 11 nuclear-generating units in the Province remained in safe condition.

(3) The HKSAR Government attaches importance to the safety of nuclear power stations across the border. The operations of various nuclear power stations mentioned in the question (including their contingency arrangements) are strictly governed by relevant legislations of the Mainland. The DBCP and the notification mechanism set out in paragraphs two and three above are applicable to safety incidents at the DBNPS and other nuclear power stations, including those caused by natural disasters. In the case of the attack by Mangkhut on this occasion, the HKSAR Government had, in accordance with the established notification mechanism, contacted the Guangdong authorities to obtain information on the relevant contingency arrangements. Therefore, there is no need to make a separate provision in the Contingency Plan for Natural Disasters. We will continue to maintain in communication with the relevant Mainland authorities under the existing notification mechanism in respect of contingency issues of the nuclear power stations, so to ensure that, where the situation requires, the Government could implement appropriate measures and disseminate necessary information to the public.

Thank you, president.