Australian Government
Australian Radiation Protection and Nuclear Safety Agency

Fact Sheet

Japan Advisory – The Fukushima Dai-ichi Nuclear Power Plant Accident

Following the Great East-Japan (or Tohoku) earthquake and tsunami on 11 March 2011, a series of engineering design and equipment failures caused severe damage to four of the reactors at the Fukushima Dai-ichi Nuclear Power Plant (NPP). It was the largest nuclear accident since the Chernobyl accident of 1986.

The Great East Japan earthquake and tsunami

On 11 March 2011, the Great East-Japan earthquake struck approximately 72 km east of the Oshika Peninsula, Japan. At magnitude 9.0, this was the largest earthquake recorded in Japan since records began. The earthquake triggered a tsunami with an estimated height of 14 m at the Fukushima Dai-ichi site that reached the east coast of Japan in less than an hour.

What damage occurred at the Fukushima Dai-ichi nuclear power plant?

At the time of the earthquake reactor Units 1 to 3 were in operation, Unit 4 had been de-fuelled and Units 5 and 6 were in cold shutdown for planned maintenance.

Units 1, 2 and 3 shut down automatically during the earthquake. External electrical power to the site was interrupted by the earthquake and the back-up diesel generators started up to provide continuity of electrical supply to emergency equipment, including the cooling systems. These systems are essential for removing heat from the reactors, as the reactor fuel is still generating heat from the decay of fission products even though the fission itself has stopped.

The tsunami resulting from the earthquake overwhelmed the site's 6 m high sea defenses, disabling the shared reactor heat exchangers and diesel generators and breaking the connection to the power grid. With external assistance hindered by flooding, debris and earthquake damage, these serious events led to overheating of the reactors. In the hours and days that followed several hydrogen explosions occurred and the reactor cores of Units 1, 2 and 3 experienced significant to full meltdown.

Release of radioactive material into the atmosphere led to evacuation of the public out to a 20 to 30 km radius.

For those remaining in affected areas, instructions to shelter in dwellings were given. These protective measures, whilst insufficiently guided by assessment data at the time, proved effective in limiting the radiation exposure to the public. During the emergency, workers were temporarily evacuated at various times when radiation levels made their work environment unacceptably hazardous.

National Recovery Plan

The national recovery plan published on 25 June 2011 by the Japanese Government represented an important post-disaster point, with a transition from an emergency response phase to a primarily recovery phase. During December 2011, cold shutdown of all reactors was achieved limiting the potential for any significant release of radioactive material into the environment in the future. The recovery phase has now entered the mid to long term phase that will see complete fuel removal and disposal achieved in an estimated 40 years.

The Tepco website (http://www.tepco.co.jp/en/decommision/index-e.html) contains information and updates regarding projects on decommissioning and remediation at the Fukushima Dai-ichi site.

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