

I.- 2. TEPCO's Fukushima Daiichi Nuclear Power Plant Accident (1/2)

Situation soon after the accident occurrence

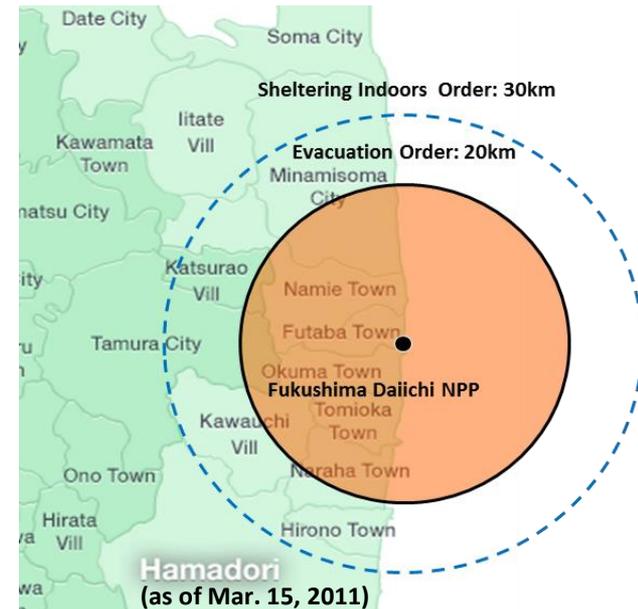
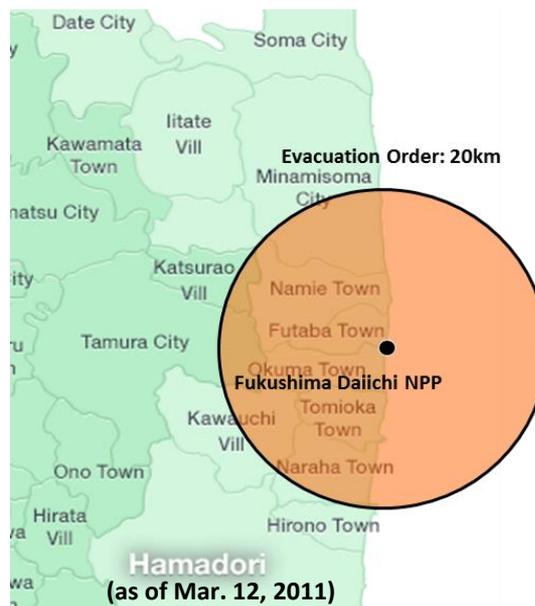
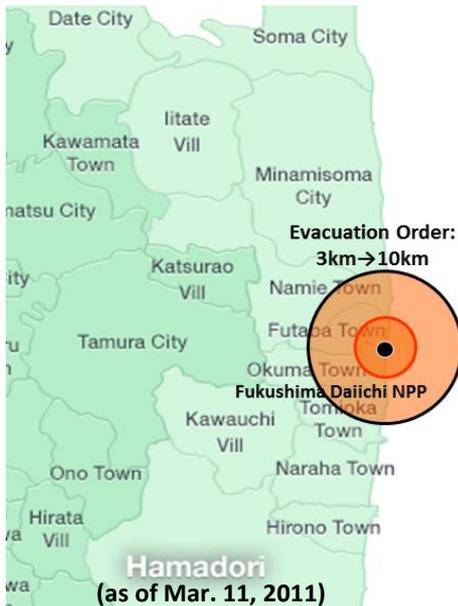
The massive earthquake automatically shut down the Units 1, 2 and 3 which were being operated at TEPCO's Fukushima Daiichi Nuclear Power Plant (Fukushima Daiichi NPP). At that time, Units 4, 5 and 6 were not operated because they were being checked or tested.

Since the earthquake lost all external power sources at the Fukushima Daiichi NPP, the emergency diesel generators automatically started running and maintained the cooling function of the reactors and spent fuel pools. However, the subsequent tsunami discontinued the operation of the emergency generators resulting in all AC power sources lost for Units 1 to 4. TEPCO took measures to recover power source in cooperation with the government, but they faced difficulties.

The isolation condenser of Unit 1 became inoperable. At Units 2 and 3, DC power source ran out and the supply of cooling water stopped. These led to dysfunction of core cooling system at each Unit. As a result, the water level of the reactors lowered and the reactor cores were exposed. The reactors began to be damaged and were finally melted down. After that, there were hydrogen explosions at Unit 1 and 3 around the roof top of the reactor building. The explosions are estimated to have been caused by hydrogen leaked from the containment. The explosions destroyed the operation floor of each building. These explosions released a huge amount of radioactive materials into the atmosphere. Following the explosion at the Unit 3 building, there was another explosion at Unit 4 where all reactor fuel had been moved to its spent fuel pool due to a regular check. The explosion is estimated to have been caused by hydrogen. The upper part of the reactor building was destroyed. During this period of time, a large damage is estimated to have occurred at Unit 2 probably around its suppression chamber room.

The Japanese government issued "Declaration of Fukushima Daiichi Emergency Situation", followed by evacuation order to residents within the 3km radius of Fukushima Daiichi NPP. Next day (March 12), at 5:44, the government expanded the evacuation order area from 3km to 10km after the radiation level in the center control room of Unit 1 rose. Following the hydrogen explosion at Unit 1 at 15:36 on that day, the evacuation order area was further expanded to 20km at 18:25. At 11:01 on March 14, another hydrogen explosion was confirmed at Unit 3. At 6:10 on March 15, an explosion was heard at Unit 4 and then the government ordered sheltering indoors to 140,000 residents within the 20-30km radius area of the power plant at 11:00.

Extended evacuation order areas



I.- 2. TEPCO's Fukushima Daiichi Nuclear Power Plant Accident (2/2)

Timeline from the accident occurrence

2011/03/11	14:46	"2011 off the Pacific Coast of Tohoku Earthquake" occurred. Magnitude: 9.0; Seismic intensity observed: 6 lower (Fukushima City); Maximum intensity observed: 7 (North Miyagi Prefecture).
		The following reactors were automatically shut down: Units No. 1 to 3 at Fukushima Daiichi NPP and Units No. 1 to 4 at Fukushima Daini NPP. Units 4 to 6 at Fukushima Daiichi NPP were in a regular check.
		The disaster response headquarters were established by Fukushima Prefecture and the disaster security headquarters by Fukushima Prefectural Police. (49 municipalities in Fukushima Prefecture also established their own disaster response headquarters.)
	14:49	The Japan Meteorological Agency issued a major tsunami warning to the Pacific coastal regions of the following prefectures: Aomori; Iwate; Miyagi; and Fukushima.
	14:50	The Japanese Government established the Response Office at the Prime Minister's Office. => The government established the Disaster Management Headquarters at 15:14.
	15:37	Fukushima Daiichi NPP lost its power source due to the tsunami. => 15:42 TEPCO notified the government of the event based on Act on Special Measures concerning Nuclear Emergency Preparedness
	19:03	The government issued "Declaration of Fukushima Daiichi NPP Emergency Situation".
	20:50	The Fukushima Prefecture Nuclear Disaster Headquarters "requested evacuation" to residents within a radius of 2 km from Unit 1 of Fukushima Daiichi NPP.
	21:23	The government ordered evacuation to 5,862 residents within 3 km radius of Fukushima Daiichi NPP, and ordered sheltering indoors to residents of the radius of 3 - 10 km from the NPP.
2011/03/12	5:44	The government ordered evacuation to 51,207 residents within 10km radius of Fukushima Daiichi NPP.
	7:45	The government issued "Declaration of Fukushima Daini NPP Emergency Situation".
	7:45	The government ordered evacuation to 8,049 residents within 3km radius of Fukushima Daini NPP and sheltering indoors to residents within 3-10km radius of the power plant.
	15:36	Hydrogen explosion at Unit 1 of Fukushima Daiichi NPP.
	17:39	The government ordered evacuation to 32,426 residents within 10km radius of Fukushima Daini NPP.
	18:25	The government ordered evacuation to about 80,000 residents within 20km radius of Fukushima Daiichi NPP.
	19:04	Seawater injection into the reactor of Fukushima Daiichi NPP started.

2011/03/14	11:01	Hydrogen explosion in the Unit 3 building of Fukushima Daiichi NPP.
	18:22	All fuel rods at Unit 2 of Fukushima Daiichi NPP were exposed due to shortage of cooling water.
2011/03/15	around 6:00	An impulsive sound presumably from damage around the pressure suppression room in Unit 2 of Fukushima Daiichi NPP was confirmed. A significant impulsive sound was heard from Unit 4 of the NPP. The roof top area on the fifth floor of the reactor building was damaged.
	11:00	Residents within 20-30km radius of Fukushima Daiichi NPP were ordered to stay indoors.
2011/03/16	5:45	Fire occurrence around the north-west part of the third floor of Unit 4 reactor building of Fukushima Daiichi NPP was confirmed.
	8:34	A large grey smoke rising from Unit 3 was observed.
2011/03/17		Water spraying into the Unit 3 spent fuel pool was conducted by police and Self-Defense Forces.
2011/03/18		Water spraying into the Unit 3 spent fuel pool was carried out by Self-Defense Forces and the U.S. Army using high-pressure water cannon vehicles. Nuclear and Industrial Safety Agency issued Level 5 (Accident with off-site risk) INES provisional rating for Units 1 to 3.
2011/03/19		Emergency Fire Rescue Team of Fire and Disaster Management Agency sprayed water to the Unit 3 spent fuel pool.
2011/03/20		Unit 5 at Fukushima Daiichi NPP was in cold shutdown. Unit 6 at Fukushima Daiichi NPP was in cold shutdown.
2011/03/23		Estimates for radioactive effects using SPEEDI was announced.
2011/03/25		The government requested mayors of municipalities in the areas where sheltering order was issued (20-30 km radius of Fukushima Daiichi NPP) for active encouragement of voluntary evacuation to their citizens and for beginning preparations on the assumption evacuation order issuance.
2011/04/01		The government named the disaster as "Great East Japan Earthquake".
2011/04/04		Low-level radioactive contaminated water was discharged into the ocean.
2011/04/12		The INES provisional rating was raised to Level 7 (Major accident) for Units 1-3.
2011/04/17		TEPCO released "Roadmap towards Restoration from the Accident at Fukushima Daiichi Nuclear Power Station".

Translation of the following references and websites:

Reports (The National Diet of Japan Fukushima Nuclear Accident Independent Investigation Commission); Reports (Investigation Committee on the Accident at the Fukushima Nuclear Power Stations of Tokyo Electric Power Company established by the cabinet decision); Prime Minister's Office website; Cabinet Office's website; Ministry of Economy, Trade and Industry's website; Japan Meteorological Agency's website; and excerpts from "Great East Japan Earthquake and Tsunami - Record Document of Fukushima -" published by JRCS Fukushima Chapter.

Copyright Red Cross Nuclear Disaster Resource Center

Reports (The National Diet of Japan Fukushima Nuclear Accident Independent Investigation Commission)

<http://warp.da.ndl.go.jp/info:ndljp/pid/3856371/naic.go.jp/en/>

Reports (Investigation Committee on the Accident at the Fukushima Nuclear Power Stations of Tokyo Electric Power Company established by the cabinet decision)

<http://www.cas.go.jp/jp/seisaku/icanps/eng/>

