



Accidents of Fukushima Daiichi Nuclear Power Stations

1. Latest Major event and response

Apr. 22st

The Japanese government has announced the official expansion of the evacuation zone around the troubled Fukushima Daiichi nuclear power plant to selected areas beyond the existing 20-kilometer radius.

The Japanese government requested the related municipality governments not to do rice farming in designated area this year.

2. Chronology of Nuclear Power Stations

(1) Fukushima Dai-ichi NPS

	Unit 1	Unit 2	Unit 3	Unit 4	Unit-5 and 6
Major Incidents and Actions	11th 15:42 Report IAW Article 10* (Loss of power)	11th 15:42 Report IAW Article 10* (Loss of power)	11th 15:42 Report IAW Article 10* (Loss of power)	14th 04:08 Water temperature in Spent Fuel Storage Pool increased at 84°C	19th 05:00 Cooling SFP with RHR-pump started at Unit 5 19th 22:14 Cooling SFP with RHR-pump started at Unit 6
The Act on Special Measures Concerning Nuclear Emergency Preparedness	11th 16:36 Event falling under Article 15 occurred (Incapability of water injection by core cooling function)	11th 16:36 Event falling under Article 15* occurred (Incapability of water injection by core cooling function)	12th 20:41 Start venting	15th 09:38 Fire occurred on 3rd floor (extinguished spontaneously)	20th 14:30 Cold shutdown achieved at Unit 5. 20th 19:27 Cold shutdown achieved at Unit 6.
	12th 00:49 Event falling under Article 15* occurred (Abnormal rise of CV pressure)	13th 11:00 Start venting	13th 05:10 Event falling under Article 15* occurred (Loss of reactor cooling functions)	16th 05:45 Fire occurred (extinguished spontaneously)	22nd 19:41 All power source was switched to external AC power at Unit 5 and 6.
	12th 14:30 Start venting	14th 13:25 Event falling under Article 15* occurred (Loss of reactor cooling functions)	13th 08:41 Start venting	Since 20th, operation of spraying water to the spent fuel pool continues.	Apr. 1st 13:40 Start transferring pooled water in the Unit 6 radioactive waste process facility to the Unit 5 condenser.
	12th 15:36 Hydrogen explosion	14th 16:34 Seawater injection to RPV	13th 13:12 Seawater injection to RPV	29th 11:50 lights in the main control room becomes available	
	12th 20:20 Seawater injection to RPV	14th 22:50 Report IAW Article 15* (Abnormal rise of CV pressure)	14th 05:20 Start venting		
	22nd 11:20 RPV temperature increased	15th 00:02 Start venting	14th 07:44 Event falling under Article 15* occurred (Abnormal rise of CV pressure)		
	22nd 02:33 Seawater injection through feed water line started in addition to fire extinguish line	15th 06:10 Sound of explosion, Suppression Pool damage suspected	14th 11:01 Hydrogen explosion		
	24th 11:30 lights in the main control room becomes available	15th 08:25 White smoke reeked	15th 10:22 Radiation dose 400mSv/h		
	25th 15:37 Freshwater injection to the reactor started.	20th 15:05 operation of spraying water to the spent fuel pool started.	16th 08:34, 10:00 White smoke reeked		
	27th 08:30 Continuing to transfer the water in the basement of the turbine building	26th 10:10 Freshwater injection to the reactor started.	Since 17th, operation of spraying water to the spent fuel pool continues.		
	31st 09:20-11:25 Work to remove the water in the trench	26th 16:46 lights in the main control room becomes available	21st 15:55 Slightly gray smoke erupted (18:02 settled)		
	31st 12:00 Start to transfer the water in the CST to the surge tank (- 15:27, Apr. 2)	29th 16:45 Start to transfer the water in the CST to the surge tank	22nd 22:46 lights in the main control room becomes available		
	31st 13:03 Start water injection to SFP	Apr. 2nd 16:25 Start injecting concrete to stop water leakage from the pit near the intake	25th 18:02 Freshwater injection to the reactor started.		
	Apr. 7th 01:31 Injection of Nitrogen gas started after opening all valves through the line.	2nd 17:10 Start transferring water in the condenser to the CST	28th 17:40 Start to transfer the water in the CST to the surge tank		
	Apr. 10th 09:30 Transfer of water from the main condenser to the CST completed.	Apr. 5th 15:07 Regarding leakage from the pit that is closed to discharge outlet of unit-2, hardening agent was injected to hole dug surrounding the pit. (Apr. 6 05:38 It was confirmed that water flow stopped	Apr. 13 13:50 Installation of silt fences in front of the Unit 3 and 4 seawater screen completed		
	Apr 17 16:00 Start investigation of the inside of R/B using a remote-controlled robot.	Apr. 9th 13:10 Transfer of water from the main condenser to the CST completed.	Apr 17 11:30 Start investigation of the inside of R/B using a remote-controlled robot.		
		Apr. 13th 17:04 Transfer of highly radioactively contaminated wafer accumulated in the trench outside the turbine building to the condenser completed			
		Apr. 15th 14:15 Installation of steel plate in front of Unit 2 seawater screen completed			
		Apr 18 13:42 Start investigation of the inside of R/B using a remote-controlled robot.			
		Apr. 19 10:08 Start transferring highly radioactive water accumulated in the turbine building and the concrete tunnel to the waste processing facility			
	Apr. 3rd 12:18 Switch power supply for water injection pumps to the RPV from power supply vehicles to originally equipped power source				
	Apr. 14 12:20 Installation of silt fences in front of the Unit 1 and 2 seawater screen and intake completed				
Major Data *1	Reactor Water level (Apr. 22 12:00) (A) -1650mm, (B) -1650mm	Reactor Water level (Apr. 22 12:00) (A) -1500mm, (B) -2050mm	Reactor Water level (Apr. 22 12:00) (A) -1850mm, (B) -2250mm	Thermography (Apr. 20 07:30) SFP: 29°C	Water temperature of SFP Unit 5 37.7°C (Apr. 22 13:00) Unit 6 35.0°C (Apr. 22 13:00)
	Reactor pressure (Apr. 22 12:00) (A) 0.440MPaG, (B) 1.120MPaG*2	Reactor pressure (Apr. 22 12:00) (A) -0.023MPaG*2, (B) -0.027MPaG*2	Reactor pressure (Apr. 22 11:50) (A) -0.049MPaG*2, (B) -0.089MPaG*2		
	CV pressure (Apr. 22 12:00) 0.160MPaabs	CV pressure (Apr. 22 12:00) 0.085MPaabs	CV pressure (Apr. 22 11:50) 0.1048MPaabs		
	RPV temperature (Apr. 22 12:00) 136.5°C*2 at feed water line nozzle	RPV temperature (Apr. 22 12:00) 129.2°C at feed water line nozzle	RPV temperature (Apr. 21 12:00) 92.4.0°C*2 at feed water line nozzle		
	Thermography (Apr. 20 07:30) CV: 12°C, SFP: 14°C	Thermography (Apr. 20 07:30) Top of R/B: 24°C	Thermography (Apr. 20 07:30) CV: 31°C, SFP: 55°C		

(2) Fukushima Dai-ichi NPPs

All units are cold shutdown (Unit-1, 2, 4 have been recovered from a event falling under Article 15*)

3. State of Emergency Declaration

11th 19:03 State of nuclear emergency was declared (Fukushima Dai-ichi NPS)

12th 07:45 State of nuclear emergency was declared (Fukushima Dai-ichi NPS)

4. Evacuation Order

11th 21:23 PM direction: for the residents within 3km radius from Fukushima I to evacuate. within 10km radius from Fukushima I to stay in-house

12th 05:44 PM direction: for the residents within 10km radius from Fukushima I to evacuate

12th 17:39 PM direction: for the residents within 10km radius from Fukushima II to evacuate

12th 18:25 PM direction: for the residents within 20km radius from Fukushima I to evacuate

15th 11:06 PM direction: for the residents within 20-30km radius from Fukushima I to stay in-house

25th Governmental advise: for the residents within 20-30 km radius from Fukushima I to voluntarily evacuate

Abbreviations:

SFP: Spent Fuel Storage Pool

EDG: Emergency Diesel Generator

RPV: Reactor Pressure Vessel

R/B: Reactor Building

RHR: Residual Heat Removal system

CST: Condensate water Storage Tank

*1 Trend data of primary parameters are available at Japan Nuclear Technology Institute's Home Page; "http://www.gengikyo.jp/english/shokai/special_4.html".

*2 Data trend is continuously monitored.

Status of the Nuclear Power Plants after the Earthquake

The accident that brings environmental impact is going on at several units in Fukushima Daiichi nuclear power Station after the earthquake occurred on March 11th. Other nuclear power plants in Japan are in normal operation or safely shutdown.

