Status of nuclear power plants in Fukushima as of 21:00 March 22 (Estimated by JAIF)

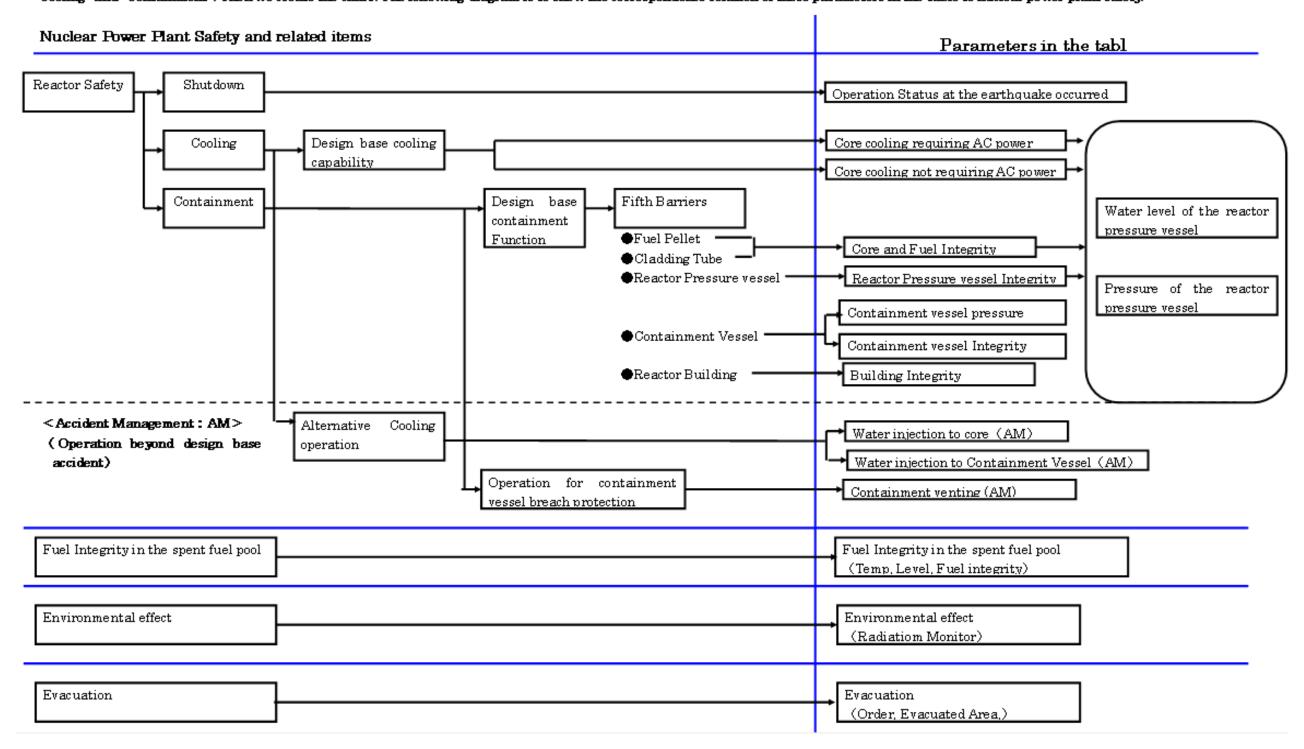
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Power Station	Fukushima Dai−ichi Nuclear Power Station						
Unit	1	2	3	4	5	6	
Electric / Thermal Power output (MW)	460 / 1380	784 / 2381	784 / 2381	784 / 2381	784 / 2381	1100 /3293	
Type of Reactor	BWR-3	BWR-4	BWR-4	BWR-4	BWR-4	BWR-5	
Operation Status at the earthquake occurred	In Service -> Shutdown	In Service -> Shutdown	In Service -> Shutdown	Outage	Outage	Outage	
Core and Fuel Integrity	Damaged	Damaged	Damaged	No fuel rods	Not Damaged	Not Damaged	
Reactor Pressure Vessel Integrity	Unknown	Unknown	Unknown	Not Damaged	Not Damaged	Not Damaged	
Containment Vessel Integrity	Not Damaged	Damage Suspected	Might be "Not damaged"	Not Damaged	Not Damaged	Not Damaged	
Core cooling requiring AC power 1 (Injection)	Not Functional	Not Functional	Not Functional	Not necessary	Functional	Functional	
	Not i dilottorial	Not I diletional	Not i difetional	Not necessary			
Core cooling requiring AC power <u>2</u> (Cooling through Heat Exchangers)	Not Functional	Not Functional	Not Functional	Not necessary	Functioning (in cold shutdown)	Functioning (in cold shutdown)	
Core cooling not requiring AC power	Not Functional	Not Functional	Not Functional	Not necessary	Not necessary	Not necessary	
Building Integrity	Severely Damaged (Hydrogen Explosion)	Slightly Damaged (Hydrogen Explosion)		Severely Damaged (Hydrogen Explosion)			
Water Level of the Rector Pressure Vessel	Fuel exposed partially or fully	Fuel exposed partially or fully	Fuel exposed partially or fully	Safe	Safe	Safe	
Pressure of the Reactor Pressure Vessel	Stable	Unknown	Unknown	Safe	Safe	Safe	
			Decreasing after increase in				
Containment Vessel Pressure	Stable	Stable	Mar., 20th	Safe	Safe	Safe	
Water injection to core (Accident Management)		Continuing(Seawater)	Continuing(Seawater)	Not necessary	Not necessary	Not necessary	
Water injection to Containment Vessel (AM)	(confirming)	to be decided(Seawater)	(confirming)	Not necessary	Not necessary	Not necessary	
Containment venting (AM)	Temporally stopped	Temporally stopped	Temporally stopped	Not necessary	Not necessary	Not necessary	
Fuel Integrity in the spent fuel pool	Water injection to be considered	Seawater Injection conducted in Mar. 20th	Water level low, Seawater spray continue and certain effect was confirmed	Water level low, Seawater spray continue Hydrogen from the pool exploded	Pool cooling capability was recovered	Pool cooling capability was recovered	
	The Main Gate: 277.5 μ Sv/h	at 15:30. Mar. 22 North of	f Service Building: 2015.0 μ Sv/I	n at 16:30. Mar. 21			
Environmental effect	prefectures. The level of the	national regulatory standard were e radioactivity detected is low end er sampled at the front coast of the	ugh not to do harm to the healt e station showed that radioactiv	kushima prefecture and spinach p h of people who take those produc e Iodine, I–131, and Cesium, Cs–13	cts for a limited time. 34, 137, exceeding the regula		
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Parameters in the Table

JAIF picks up these parameters to evaluate safety condition of the nuclear plants during this accident from the view point of the principles of nuclear power plant safety, which are "Shutdown", "Cooling" and "Containment". Then we create the chart. The following diagram is to show the correspondence relation of these parameters in the table to nuclear power plant safety.



Accidents of Fukushima Dai-ichi and Fukushima-Dai-ni Nuclear Power Stations

(March 22nd, 2011 13:00)



1. Latest Major Incidents and Actions

<March 20th>

14:30: Unit 5 cold shutdown 19:27: Unit 6 cold shutdown

<March 21st>

15:55 Slightly gray smoke erupted from Unit 3 (18:02 seemingly stopped)

18:22 White smoke erupted from Unit 2

2. Chronology of Nuclear Power Stations

(1) Fukushima Dai-ichi NPS

(1) Fukushima Dai-ichi NPS	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5, 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 ℃	Water temperature in SF Storage Pool is increasing	
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)	13th 05:10 Event falling under Article 15* occurred (Loss of reactor cooling functions)	15th 09:38 Fire occurred on 3rd floor (extinguished spontaneously)	18th Vent hole was opened on the rooftop for avoiding hydrogen explosion	
	12th 00:49 Event falling under Article 15* occurred (Abnormal rise of CV pressure)	14th 13:25 Event falling under Article 15* occurred (Loss of reactor cooling functions)	13th 08:41 Start venting	16th 05:45 Fire occurred (extinguished spontaneously)	19th 05:00 RHR-pump in the Unit-5 restarted. 19th 22:14 RHR-pump in the Unit-6 restarted	
	12th 14:30 Start venting	14th 16:34 Seawater injection to RPV	13th 13:12 Seawater injection to RPV	Since 20th, operation of spraying water to the spent fuel pool continues.	20th 14:30 Reactor cold shutdown at Unit-5 20th 19:27 Reactor cold shutdown at Unit-6	
	12th 15:36 Hydrogen explosion	14th 22:50 Report IAW Article 15* (Abnormal rise of CV pressure)	14th 07:44 Event falling under Article 15* occurred (Abnormal rise of CV			
	12th 20:20 Seawater injection to RPV	15th 00:00 Start venting	14th 11:01 Hydrogen explosion			
		15th 06:10 Sound of explosion, Suppression Pool damaged	15th 10:22 Radiation dose 400mSv/h			
		15th 08:25 White smoke reeked	16th 06:40, 08:47 Radiation Dose 400mSv			
		20t 15:05, operation of seawater injection to the spent fuel pool was conducted	16th 08:34, 10:00 White smoke reeked			
			Since 17th, operation of spraying water to the spent fuel pool continues.			
	Work to recover external AC power is in progress. External AC power has reached to Unit 2. Unit 1 is to receive the power from Unit 2. Integrity check of electric equipment is going on in both units.		Work to recover external AC power is in progress. External AC power has reached to Unit 4. Unit 3 is to receive the power from Unit 4.		Work to recover external AC power is in progress. External AC power has reached to the both units and partly replaced with the power from EDG in Unit 5.	
			Integrity check of electric equipment is going on in both units.		Integrity check of electric equipment is going on in Unit	
Major Data	Water level (<u>22nd 11:20</u>) (A) <u>-1800mm (B) -1750mm</u>	Water level (<u>22nd 11:20</u>) <u>-1350mm</u>	Water level (<u>22nd 10:35</u>) (A) - <u>1575</u> mm, (B) <u>-2350</u> mm	Water temperature of SFP Immeasurable (since 14th 04:08)	Water temperature of SFPool Unit 5 35.8°C (22nd 01:00)	
	Reactor pressure (<u>22nd 11:20</u>) (A) <u>0.227MPaG</u> , (B) <u>0.205MPaG</u>	Reactor pressure (<u>22nd 11:20</u>) _(A) <u>-0.018MPaG</u> , (B) <u>-0.018MPaG</u>	Reactor pressure (<u>22nd 10:35</u>) (A) - <u>0.101</u> MPaG, (B) <u>-0.036</u> MPaG		37.4°C (22nd 08:00) 37.5°C (22nd 11:00)	
	CV pressure (<u>22nd 11:20</u>) 0.175MPaabs_	CV pressure (22nd 11:20) 0.110MPaabs	CV pressure 0.100MPaabs (22nd 00:15) 0.100MPaabs (22nd 05:30) 0.100MPaabs (22nd 10:35)		Unit 6 30.0°C (22nd 01:00) 23.5°C (22nd 08:00) 25.0°C (22nd 11:00)	
		Water temperature of SFP (22nd 11:20) 53°C		*SFP: Spent Fuel Storage Pool		

(2) Fukushima Dai-ni 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-ni 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

*SFP: Spent Fuel Storage Pool EDF: Emergency Diesel Generator

Status of the Nuclear Power Plants after the Earthquake

