

Status of countermeasures for restoring from the accident at Fukushima Daiich Unit 1 through 4. As of June 7th, 2011. (Estimated by JAIF)

		Unit 1	Unit 2	Unit 3	Unit 4	Notes	
Basic information	Type of plant	BWR-3	BWR-4	BWR-4	BWR-4		
	Electric / Thermal power output	460/1380	784/2381	784/2381	784/2381		
Plant status when hit by the earthquake	Operation status	In service -> Shutdown	In service -> Shutdown	In service -> Shutdown	Outage		
	No. of nuclear fuels loaded in the reactor	400	548	548	0		
	No. of spent fuels stored in the SFP	292	587	514	1331		
	External power supply	Stopped due to the earthquake					
Reactor cooling	Status	Core and fuel integrity	Damaged (core melt*1)	Damaged (core melt*1)	Damaged (core melt*1)	No fuels loaded	
		PCV structural integrity	Limited damage and leakage	Unknown	Unknown	No damage	
		RPV structural integrity	Damage and leakage suspected	Damage and leakage suspected	Damage and leakage suspected	No damage	
	measures	Core cooling	Not functional	Not functional	Not functional	Not required	
		Goal of STEP 1 (April through June)	Stable cooling (circulating injection cooling reusing accumulated water)				
		Cooling by minimum injection rate	Injecting freshwater into the reactor via feed water line at 5m3/h	Injecting freshwater into the reactor via feed water line at 5m3/h	Injecting freshwater into the reactor via feed water line at 11.5m3/h	—	Total injection flow: 21.5m3/h [6/5]
		Establishment of circulating injection cooling	Work for injection line in progress	Work for injection line in progress [4/9-]	Work for injection line in progress [4/16-]	—	
		Nitrogen gas injection into PCV	Injection continued [4/6-]	Work for injection line in progress [4/16-]	Work for injection line in progress [4/16-]	—	
		Flooding of PCV after sealing leaks	Studying	Studying	Studying	—	
		Securing heat exchange function	Work for secondary-loop piping in progress (5/13-)	Manufacturing Hx in progress Construction work to be started after improving the work environment	Manufacturing Hx in progress Construction work to be started after improving the work environment	—	
Challenge	Improving work environment				High radiation circumstance is hampering the work to restore reactor cooling. Removing the radioactively contaminated debris, radiation monitoring and other preparation work is under way in each unit. Also, cooling of the SFP is expected to reduce the high humidity in the Unit 2 R/B, which hampers the work in the building.		
SFP cooling	Status	Fuel integrity in SFP	Unknown	Unknown	Unknown	No severe damage suspected*2	
		SFP cooling	Not functional	Not functional	Not functional	Not functional	
	measures	Goal of STEP 1 (April through June)	Stable cooling				
		Reliability improvement in injection operation	Injecting freshwater into the SFP via SFP coolant clean up line	Switching from freshwater injection via SFP coolant clean up line to circulation cooling	Injecting freshwater into the SFP via SFP coolant clean up line	Spraying freshwater into the SFP using pump truck Starting work for injection via SFP coolant cooling line	Injecting/Spraying corrosion inhibitor, hydrazine (H2NNH2), with freshwater [5/9-]
	Circulation cooling with Hx	Planned	In operation	Planned	Planned		
Accumulated water	Status	Increase and accumulation of radioactively contaminated water	High level of radioactive waste water is accumulating in the R/B, T/B and W/B of each unit. (about 92,000m3 [5/31])				
		Goal of STEP 1 (April through June)	Securing storage place of high level radioactive wastewater				
	measures	Securing storage place	-Waterproof check of Centralized Radiation Waste Treatment Facility, Process Main Building (storage capacity: approx. 10,000m3) and Miscellaneous Solid Waste Volume Reduction Treatment Building (storage capacity: approx. 4,800m3) completed -Underground tank for high level radioactive wastewater (storage capacity: approx. 10,000m3) to be installed in the mid August -Storage tanks to receive processed, low to middle level radioactive wastewater with the capacity of approx. 13,000m3 installed (-5/31). Additional capacity to be installed at 20,000m3/month from the end of June.				
		Transfer of radioactive waste water	-Unit 2: Concrete tunnel => Process Main Building [4/19-5/26, approx. 9,600m3] Wastewater transfer was suspended and resumed after revising the storage limit level of the building [6/4-] -Unit 3: T/B => Miscellaneous... Building [5/17-5/25, approx. 3,700m3, Transfer suspended due to possible leakage], T/B => Unit 3 main steam condenser [6/5-]				
		Installation of water process facility	-Working on installation of water processing facilities Water processing to be started on June 15th (capacity: 1,200m3/day) -Desalination of processed radioactive water (capacity: 480m3/day to be installed in the late June and then increased step by step) to reuse the water for injecting into the reactor				
		Preventing contamination of the sea, etc.	-Silt fences installed. -Working on installation of seawater circulatory purification system [5/30-] -Blocking the concrete tunnels outside the T/Bs				
	Challenge	Preventing overflow of high level radioactive waste water				While the risk of the leaking of the high level radioactive wastewater accumulating in the Unit 2 and 3 T/Bs and concrete tunnels is increasing, transfer of the water was suspended due to the limit of the capacity and the possible leakage of the receiving facilities. It has been decided to use Unit 2 and 3 main steam condensers as a receiving tank while revising the storage limit of the process main facility (total increased capacity: approx. 4,300m3)	
	measures	Goal of STEP 1 (April through June)	Storing and processing low level radioactive wastewater				
		Increasing storage capacity	2,200tons of tanks installed. Approx. 16,000tons of tanks to be installed by the beginning of June. 12,000 tons of receiving capacity to be secured by the end of June.				
	Underground water	Status	Radioactive materials in the ground water	Radioactive iodine, I-131, and cesium, Cs-134, 137, were detected from the subdrain, underground water collected and controlled in the facility, and the well water in the Fukushima Daiichi site. [4/7-]			
Goal of STEP 1 (April through June)			Preventing contaminated underground water from spreading to the sea				
measures		Mitigation of groundwater contamination	Restoring subdrain pumps [the middle of June]. Planning subdrain management according to the enhanced storing and processing plan.				
Radioactive materials in the atmosphere / soil	Status	Scattering of radioactive materials to the outside of the facilities	Radioactive materials and radioactively contaminated debris scattered due to the hydrogen explosion at Unit 1 and 3 R/Bs and other events.				
		R/B integrity	Severely damaged	Partly opened	Severely damaged	Severely damaged	
	measures	Goal of STEP 1 (April through June)	Preventing scattering of radioactive materials in the facilities and the site				
		Dispersion of inhibitor	Dispersion to the outside of buildings in progress [full operation from 4/26-] Dispersion to the R/Bs and T/Bs [5/27-]				
	Removal of debris	Removal of debris using remote-controlled heavy machine in progress [4/10-]					
	Installing R/B cover	Under construction [5/13-]	—	Designing	Planning		
Tsunami, etc.	measures	Goal of STEP 1 (April through June)	Enhancement of countermeasures against aftershocks, etc.				
		Countermeasures against tsunami	-Transferring emergency power sources to the upland [4/15] -Addition of redundant water injection line [-4/15] -Setting fire trucks etc. to the upland [-4/18] -Planning to install a temporary tide barriers [by the end of June]				
		Planning and implementation of reinforcement work of each unit	-Field work started for installation of supporting structure under the bottom of the Unit 4 SFP [5/9-] Soundness of structure analysis and evaluation for each unit in progress Seismic safety confirmed for Unit 1 and 4 [5/28].				
		Various radiation shielding	Pipe work completed, pumping vehicle set [5/17]				
Reactor	Reactor	Reactor water level (mm) [6/6 11:00]	A: Below the lower end of gauge, B: -1550. Reading mostly steady	A: -1500, B: -2100 Reading mostly steady	A: -1850, B: -2150 Reading mostly steady	—	
		Reactor pressure (MPa) [6/6 11:00]	A: 0.026, B: -, Measured with temporary pressure indicator [6/4-]	A: -0.011, B: -0.011 Reading mostly steady**	A: -0.136, B: -0.108 Reading mostly steady**	—	
		RPV temperature at feedwater nozzle (°C) [6/6 11:00]	115.6 Reading mostly steady**	109.3 Reading mostly steady	142.3 Increasing**	—	
	PCV	RPV temperature at the bottom of the vessel (°C) [6/6 11:01]	99.3 Reading mostly steady	106.0 Instrument failure	178.6 Increasing	—	
		Pressure of drywell (MPa) [6/6 11:00]	0.1313 Reading mostly steady	0.025 Decreasing	0.0989 Reading mostly steady	—	
		Pressure of suppression pool (MPa) [6/6 11:00]	0.110 Reading mostly steady	Below the lower end of gauge Instrument failure	0.1803 Reading mostly steady	—	
Pool	Water temperature of SFP	Reading mostly steady [5/30]	32°C [6/6 11:00]	62°C (5/8)	84°C (5/7)		
Accumulated water	R/B basement	Volume*3	3,900m3[5/31]	6,000m3[5/31]	6,400m3[5/31]	6,500m3[5/31]	
		Radioactivity*3	4.0E+5Bq/cm3	1.9E+7Bq/cm3	3.8E+5Bq/cm3	2.0E+5Bq/cm3	
	T/B basement	Volume*3	8,400m3[5/31]	11,400m3[5/31]	13,600m3[5/31]	11,800m3[5/31]	
		Radioactivity*3 (Dose at water surface)	4.0E+5Bq/cm3 (60mSv/h[4/28])	1.9E+7Bq/cm3 (1,000mSv/h以上[3/28])	3.8E+5Bq/cm3 (120~750mSv/h[3/24,4/22])	2.0E+5Bq/cm3 (4.5mSv/h[4/21])	
	W/B basement	Volume*3	1,100m3[5/31]	2,400m3[5/31]	2,300m3[5/31]	3,700m3[5/31]	
		Radioactivity*3	4.0E+5Bq/cm3	1.9E+7Bq/cm3	3.8E+5Bq/cm3	2.0E+5Bq/cm3	
	Concrete tunnel outside of T/B	Volume*3	2,800m3[5/31]	4,800m3[5/31]	5,800m3[5/31]	900m3[5/31]	
		Radioactivity*3 (Dose at water surface)	6.9Bq/cm3 (0.4mSv/h[3/27])	1.1E+7Bq/cm3 (>1,000mSv/h [3/27])	2.4E+5Bq/cm3	2.0E+5Bq/cm3	
		Total volume	91,800m3 (Approx. 105,000m3 including the wastewater transferred to the Centralized Radiation Waste Treatment Facility)				
	Environmental effect in the vicinity of the station		-Air dose rate: 5~121 μSv/h at the NPS border (Monitoring Post), 366 μSv/h at the south side of the office building, 14 μSv/h at the wet gate [6/7 09:00] -Some radioactive materials (I, Cs, Pu, Am Cm and Sr) has been detected in the soil sampled at the site. Radioactive materials have been detected in samples corrected from underground water and also seawater at or near the site. Environmental monitoring has been enhanced [4/16-].				Air dose rate: http://www.tepco.co.jp/en/nu/fukushima-np/f1/index-e.html Air, seawater, underground water soil, etc.: http://www.tepco.co.jp/en/nu/fukushima-np/f1/index2-e.html
Radiation exposure of the workers		30 workers has been exposed to radiation more than 100mSv as of 5/30. It was found that two plant operators had taken in high level of radioactive iodine into the body. Evaluation made by a research institute shows that their exposure dose is somewhere between 200mSv and 580mSv. [announced by TEPCO on 6/3] *Emergency exposure dose limit has been set to 250mSv					

\*1 TEPCO's analysis [announced on 5/15,23]

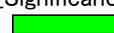


\*2 TEPCO estimated that there was no severe damage to the fuel in the Unit 4 SFP based on the concentration of radioactive materials in the pool and the pictures of the pool. [4/13,28,29]

\*3 Rough estimate by TEPCO [announced on 5/31]

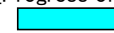

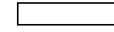
[Source]

Government Nuclear Emergency Response Headquarters: News Release,  
Press conference  
NISA: News Release, Press conference  
TEPCO: Press Release, Press Conference

[Significance judged by JAIF]

 :Low  
 :High  
 :Severe (Need immediate action)

[Progress of countermeasures]

 :Completed  
 :Under construction  
 :To be done (including studying and

[Abbreviations]

SFP: Spent Fuel Storage Pool  
EDG: Emergency Diesel Generator  
RPV: Reactor Pressure Vessel  
PCV: Primary Containment Vessel  
R/B: Reactor Building  
T/B: Turbine Building  
W/B: Waste Building  
RHR: Residual Heat Removal system  
CST: Condensate water Storage Tank  
Hx: Heat exchanger  
NPS: Nuclear power station