

Status of countermeasures for restoring from the accident at Fukushima Daiich Unit 1 through 4. As of July 14th, 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									
	Emergency power supply	EDGs automatically started up when the external power was lost but stopped later when tsunami hit the plants.									
Current status of the plant and the progress of countermeasures taken	Reactor cooling	Status	Core and fuel integrity		Damaged (core melt*1)	Damaged (core melt*1)	Damaged (core melt*1)	No fuels loaded			
			RPV structural integrity		Limited damage and leakage	Unknown	Unknown	No damage			
			PCV structural integrity		Damage and leakage suspected	Damage and leakage suspected	Damage and leakage suspected	No damage			
			Core cooling		Not functional	Not functional	Not functional	Not required			
			Goal of STEP 1 (April through July)				Stable cooling (circulating injection cooling reusing accumulated water)			—	
			Cooling by minimum injection rate		Injecting freshwater into the reactor via feed water line at 3.5 m3/h[7/13]	Injecting freshwater into the reactor via feed water line at 3.5 m3/h [7/13]	Injecting freshwater into the reactor via feed water line at 9.0 m3/h [7/13]	—	Decreasing the injection rate to prevent the overflow of the accumulated water in the facilities		
		Establishment of circulating injection cooling		Injection line established. Circulation started[6/27-] following the radioactive water process facility starts its operation.			—				
		Nitrogen gas injection into PCV		Injection continued [4/6-]	Injection continued [6/28-]	Work for injection line completed [7/12]	—				
		Flooding of PCV after sealing leaks		Studying	Studying	Studying	—				
		Securing heat exchange function		Work for secondary-loop piping in progress (5/13-)	Construction work to be started after improving the work environment	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. Preparation work such as removing radioactive debris, radiation monitoring is underway in each unit. Large-scale work inside the R/B started at unit-1 and 2 after radioactive substance and humidity in the air inside the R/B dropped.			—		
		Status	Fuel integrity in SFP		Unknown	Most spent fuels not damaged*2	Unknown	Most spent fuels not damaged*2			
			SFP cooling		Injection function recovered	Function recovered	Function recovered	Not functional			
			Goal of STEP 1 (April through July)				Stable cooling				
	Reliability improvement in injection operation		Injecting freshwater via SFP coolant clean up line	Switching from freshwater injection via SFP coolant clean up line to circulation cooling	Switching from freshwater injection via SFP coolant clean up line to circulation cooling	Injecting freshwater via tentative injection line. Work to establish a cooling system via water circulation continues	Injecting corrosion inhibitor, hydrazine (H2NNH2), with freshwater [5/9-]				
	measures	Circulation cooling with Hx		Planned	In operation [5/31-]	In operation [6/30-]	Construction to be prepared				
		Status	Increase and accumulation of radioactively contaminated water		High level radioactive wastewater is accumulating in the R/B, T/B and RW/B of each unit. (about 97,100m3 [7/12])						
			Goal of STEP 1 (April through July)				Securing storage place of high level radioactive wastewater				
			Securing storage place		-Storage capacity of 14800m3 (10,000m3 + 4,800m3)for highly radioactive wastewater are secured by using the Centralized Radiation Waste Treatment Facility as water storage place. -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.				PMB: Process Main Building MWRTB: Miscellaneous Solid Waste Volume Reduction Treatment Building		
	Transfer of radioactive waste water		Highly radioactive wastewater in Unit 2 and unit 3 has been translated the Centralized Radiation Waste Treatment Facility since April 19.								
	Installation of water process facility		-Highly radioactive wastewater treatment system installed on June 27 is now working on a full-scale basis. (Capacity 1200m3/day) Water processed with the treatment system has been injected to the cores for cooling since June 27.								
	Preventing contamination of the sea, etc.		-Silt fences installed. -Seawater circulatory purification system goes into full-scale operation. [6/13] -Blocking the concrete tunnels outside the T/Bs completed [6/10], etc.								
	Preventing overflow of high level radioactive waste water		Highly radioactive wastewater treatment system should be operated in stable and effective manner to prevent wastewater overflowing to the environment.								
	Challenge	Goal of STEP 1 (April through July)				Storing and processing low level radioactive wastewater					
Increasing storage capacity		18,400 tons(2,200 + 6,200 + 10,000) of tanks installed. 10,000 tons of Mega-Float prepared. 2,000 tons of receiving capacity to be secured.									
Status		Radioactive materials in the ground water		Radioactive iodine, I-131, cesium, Cs-134, 137, and Sr-89, 90 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 July)				Preventing contaminated underground water from spreading to the sea						
	Mitigation of groundwater contamination		Pumps for correcting underground water called “subdrain” is to be restored in the middle of June. Subdrain is to be treated in accordance with the contaminated water management plan. Construction of wall for underground water isolation is under consideration.								
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.				Survey map on the site : http://www.tepco.co.jp/en/nu/fukushima-np/f1/index3-e.html			
		R/B integrity		Severely damaged	Partly opened	Severely damaged	Severely damaged				
	Goal of STEP 1 (April through July)				Preventing scattering of radioactive materials in the facilities and the site						
	Dispersion of inhibitor		Dispersion to the outside of buildings completed [full operation: 4/26-6/28] Dispersion to the R/Bs and T/Bs completed [5/27-6/18]								
	Removal of debris		Removal of debris using remote-controlled heavy machine in progress [4/10-]								
	Installing R/B cover		Preparation work in progress [5/13-] Installation work of the cover started [6/28-]	—	Designing	Planning					
Tsunami, reinforcement, etc.	measures	Goal of STEP 1 (April through July)				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] -Installing a temporary tide barriers [-6/30]							
		Planning and implementation of reinforcement work of each unit		-Work for installing supporting structure under the bottom of the Unit 4 SFP in progress. Steel pillars installed [6/7-6/20]. Work to be completed by filling concrete and grout by the end of July. -The structural assessment for each unit is in progress. Enough seismic capacity was confirmed for Unit 1, 4 [5/28] and Unit 3 [7/13].							
		Various radiation shielding		Pipe work completed, pumping vehicle set [5/17]							
Plant parameters	Reactor	Reactor water level (mm) [7/13 11:00]		A: Below the lower end of gauge, B: -1650**, Mostly steady	A: -1900, B: -2150 Mostly steady**	A: -1950, B: -2250 Mostly steady**	—	■ "A", "B" shows the group of the redundant instruments ■ Reactor water level monitors to be calibrated. Unit 1 Ch.A done.[5/11] Unit 2 Ch.A conducted.[6/22-24] ■ Primary parameters' trend is available at JANTI's HP: http://www.gengikyo.jp/english/shokai/special_4.html			
		Reactor pressure (MPa) [7/13 11:00]		A: 0.037, B: -, Mostly steady Measured with temporary pressure indicator [6/4-]	A: 0.026, B: - Mostly steady	A: -0.166, B: -0.104 Mostly steady**	—				
		RPV temperature at feedwater nozzle (°C) [7/13 11:00]		116.8 Mostly steady	111.7 Mostly steady	149.6 Mostly steady	—				
		RPV temperature at the bottom of the vessel (°C) [7/13 11:00]		102.8 Mostly steady	122.5 Mostly steady	117.1 Mostly steady	—				
	PCV	Pressure of drywell (MPa) [7/13 11:00]		0.1437 Mostly steady	0.015 Mostly steady**	0.0999 Mostly steady	—	**Continuously monitoring the status			
		Pressure of suppression pool (MPa) [7/13 11:00]		0.125 Mostly steady	Below the lower end of gauge Instrument failure	0.1836 Mostly steady	—				
	Pool	Water temperature of SFP		Instrument failure	35.0°C [7/13 11:00]	31.7°C [7/13 11:00]	82°C [7/8 16:00]				
	High level accumulated water	Stored volume[7/12]		16,900m3	27,100m3	30,300m3	22,800m3				
		Water level in T/B[7/12]		OP.+4,941mm	OP.+3,568mm	OP.+3,653mm	OP.+3,664mm	OP.: Onahama Bay mean sea level Near-term target: OP. +3,000mm*4			
		Total stored volume[7/12]		97,100m3 (Approx. 117,500m3 including the wastewater transferred to the Centralized Radiation Waste Treatment Facility)							
Total volume of processed water[7/12]		Approx. 19,740m3 decontaminated (Approx. 9,200m3 desalinated)									
Environmental effect in the vicinity of the station		-Air dose rate: 5-115 μ Sv/h at the NPS border (Monitoring Post), 338 μ Sv/h at the south side of the office building, Not available due to the instrument failure at the main gate, 13 μ Sv/h at the wet gate [7/14 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 collected from underground water and also seawater at or near the site. Environmental monitoring has been enhanced [4/16-]. Sr-89, 90 exceeding the regulatory limit have been detected from the seawater sampled on 5/16 near the seawater intake.				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		TEPCO has been examining some 8,300 workers who have/had worked at the plant since March (3,771 workers) or since April (4,567 workers) for exposure to radiation. It announced on July 13th the external exposure dose and the internal exposure dose (definite value for TEPCO's employees and provisional value for others) for the 3,538 workers (since March) and the 3,254 workers (since April). (100-150mSv: 88 workers, 150-200mSv: 14 workers, 200-250mSv: 3 workers, 250mSv-: 6 workers) Definite exposure doses of 6 workers who received more than 250mSv are distributed from 309 to 678mSv. *The allowable emergency limit for radiation doses: 250 millisieverts									

*1 TEPCO's analysis [announced on 5/15 s		
*2 TEPCO judged that most spent fuels were not damaged in the Unit 2 and 4 SFPs based on the detailed analysis of the radioactive materials in the pool water. [5/31]		
*3 Rough estimate by TEPCO [announced on 5/31]		
*4 TEPCO set the target so as to reduce the risk of the discharge of the overflowed water into the sea and the leak to the underground water.		
[Source]	[Significance judged by JAIF]	[Progress of countermeasures]
Government Nuclear Emergency Response Headquarters: News Release,	:Low	: Completed
Press conference	:High	: Under construction
NISA: News Release, Press conference	:Severe (Need immediate action)	: To be done (including studying and manufacturing)
TEPCO: Press Release, Press Conference		
[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		
RW/B: Radioactive Waste Disposal Building		
RHR: Residual Heat Removal system		
CST: Condensate water Storage Tank		
Hx: Heat exchanger		
NPS: Nuclear power station		