Creating Disaster-resistant Nuclear Power Stations

TEPCO is taking steady and sure steps to strengthen nuclear power stations against disaster.

Ever since the July 16, 2007 Niigata-Chuetsu-Oki Earthquake, TEPCO has been taking various measures to strengthen the Kashiwazaki-Kariwa Nuclear Power Station against disaster. We are inspecting and evaluating all facilities, implementing the necessary restoration work, and improving seismic safety. We are applying the same initiatives to the Fukushima Daiichi and the Fukushima Daini Nuclear Power Stations, and have also incorporated the necessary considerations in the application for the construction of a nuclear reactor at the Higashidori Nuclear Power Station.

Confirming the soundness of facilities (Kashiwazaki-Kariwa)

Based on an inspection and evaluation plan we have submitted to the government, we are inspecting and evaluating all facilities and buildings of the power station in great detail, to ascertain the impacts of the earthquake.

Visual inspection and operation tests

We are conducting visual inspections and operation tests of all units to make sure none of the facilities with high safety significance have suffered damage from the earthquake.

Inspection of a low-pressure condensate pump

Visual inspection of the wall of the nuclear reactor building

Functional tests of equipment systems

After verifying the soundness of all equipment, we will evaluate groups of equipment that form a single system.

System functional test (inspection of the Unit 7 turbine bypass valve function)

Functional tests of entire plants

In order to confirm reactor pressure, reactor water level, steam flow rate, and other parameters, we will start up the nuclear reactor and generate power.

Improving the seismic safety of power stations

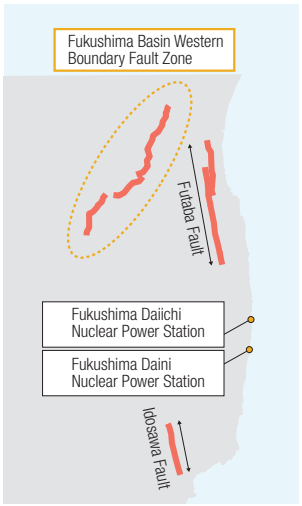
(Fukushima Daiichi, Fukushima Daini, Kashiwazaki-Kariwa)

To improve the seismic safety of our power stations, we are implementing the necessary reinforcement work based on a detailed assessment of seismic motion.

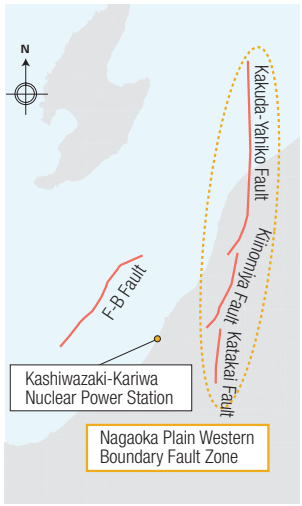
Geological surveys and assessment of active faults

We have conducted geological surveys to examine the subsurface structure and the movement of active faults around the power station sites. Based on the results of these surveys, we have identified and evaluated active faults that may have an impact on our power stations from among many that exist in the vicinity.

Active faults that may have a large impact on TEPCO's power stations



Fukushima Prefecture: Fukushima Daiichi and Fukushima Daini Nuclear Power Stations



Niigata Prefecture: Kashiwazaki-Kariwa Nuclear Power Station

Summary of design-basis seismic motion *

*Design-basis seismic motion
The magnitude of seismic motion that provides a standard for earthquake resistance design of nuclear power stations

We have established design-basis seismic motion intensities based on an evaluation of active faults. Results shown below have been approved by the Nuclear Safety Commission of Japan.

Evaluation of seismic motion in each reactor at the Kashiwazaki-Kariwa Nuclear Power Station (Gal)

Position	Evaluated seismic motion	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6	Unit 7
Bottommost floor of the nuclear reactor building	Measured value of the Niigata-Chuetsu-Oki Earthquake	680	606	384	492	442	322	356
	Seismic motion calculated based on the design-basis seismic motion	845	809	761	704	606	724	738
	Seismic motion for improved seismic resistance	1,000						
Design-basis seismic motion		2,300				1,209		

Comment from a stakeholder : Please give a detailed account of the safety of TEPCO's nuclear power stations. (Questionnaire)

TEPCO's reply : To ensure the safety of our nuclear power stations, we are improving the seismic safety of our facilities and strengthening our disaster response framework.

Seismic reinforcement work

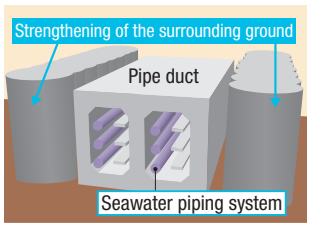
To increase the seismic safety of our facilities, we have established target seismic vibration values by calculating the earthquake motion at the bottommost floor of the nuclear reactor building based on the design-basis seismic motion.

At the Kashiwazaki-Kariwa Nuclear Power Station, we are applying seismic reinforcement work to all reactors so they can withstand a seismic motion of 1,000 Gal.

Major undertakings

- Strengthening and reinforcement of the pipework (including conduits, cable trays, air conditioning ducts)
- Strengthening the ground around the pipe duct by spraying and mixing cementing material with the earth
- Addition of steel reinforcements to the steel-reinforced truss supporting the roof of the nuclear reactor building
- Installation of vibration control devices to absorb vibrations of the exhaust stack used to ventilate the nuclear reactor building

Addition and reinforcement of pipework supports



Conceptual image of emergency seawater duct work (Fukushima Daiichi Nuclear Power Station)

Reinforcement of the truss of a nuclear reactor building roof

Installation of a vibration control device

Construction of seismic-isolated buildings

At the Kashiwazaki-Kariwa Nuclear Power Station, we are constructing a seismically isolated building that houses an emergency response center and important communications and power supply facilities.

Seismic-isolated building (rendering)

Reinforcement of firefighting facilities and framework (Fukushima Daiichi, Fukushima Daini, Kashiwazaki-Kariwa)

Based on the lessons learned from the earthquake, we have taken various initiatives to improve our initial response to fires.

Strengthening initial firefighting activities

- Deployment of chemical fire trucks and pump trucks with water tanks
- Establishment of an initial firefighting unit in the in-house firefighting squad to provide 24-hour service, and implementation of systematic training programs

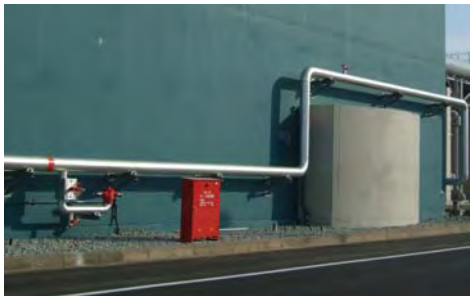
Fire trucks and firefighting personnel (Kashiwazaki-Kariwa Nuclear Power Station)

Upgrading fire-extinguishing equipment

- Installation of earthquake-resistant, fire-safe water tanks

Earthquake-resistant, fire-safe water tank (Fukushima Daiichi Nuclear Power Station)

- Installation of an above-ground fire hydrant pipe network
  Kashiwazaki-Kariwa: Completed
  Fukushima Daiichi: To be completed by the end of Sept. 2009
  Fukushima Daini: To be completed by the end of July 2009



Above-ground fire hydrant pipe network (Kashiwazaki-Kariwa Nuclear Power Station)