

Fukushima Report: No.2

May 30, 2011



* Details of Current Situation of Accident at Fukushima Daiichi Nuclear Power Station and its Impact

1. Circumstances in and around the nuclear power station

* Tough road to secure a stable cooling condition of reactors

On April 17, Tokyo Electric Power Company (TEPCO) announced the Roadmap towards restoration from the accident at Fukushima Daiichi Nuclear Power Station. TEPCO has started preparations to meet the requirements for gradually bringing Units 1, 2 and 3 to a stable cooling condition in accordance with this roadmap

Regarding Unit 1, TEPCO took anti-radiation measures, such as ventilation, following a remote-controlled investigation using robots, and then started to send workers into the reactor building to conduct detailed investigation of radiation level and inspection of facilities. At the same time, the company is sorting out the records of restoration measures that have been taken since the occurrence of the earthquake as well as plant data. The assessment given as a result of these procedures was that the upper portions of the fuel rods, from the top to 150 to 160 centimeters below, were exposed above the surface of the cooling water, with approximately 55% to 70% of the fuels damaged. However, the current assessment based on recent updates is that at Unit 1, fuel pellets melted and fell to the bottom of the pressure vessel at a relatively early stage after the arrival of the tsunami.

Moreover, it has been revealed that the pressure vessel was somewhat damaged, leading to leakage of stagnant water with high levels of radioactivity at the bottom of the vessel into the basement of the reactor building.

TEPCO has started studying the possibility of circulating the contaminated water accumulated in the basement and using it as cooling water.

As for the condition of the reactor core of Unit 1, TEPCO's assessment is that as the reactor core, including the fuels that melted and fell off, has been being cooled continuously (temperature in the pressure vessel is at roughly 100 to 120 degrees Celsius) by means of water injection, the situation is unlikely to result in future release of large amounts of radioactive materials.

At Unit 4, where fuels had been withdrawn from the reactor and placed in the spent fuel pool due to periodic inspection, the reactor building was damaged by an unknown cause on March 15. (The damage to the reactor building of Unit 4 followed the damage inflicted on the buildings of Unit 1 on March 12, the day after the earthquake and tsunami, and of Unit 3 on March 14.) Through a crack in the wall of the building, a monitoring camera and an underwater camera were inserted to observe the appearance of the spent fuel pool and the conditions in the pool. As a result, it was found that the spent fuels were kept in the pool in a mostly normal condition.

Subsequently, it was estimated that the damage to the upper part of the reactor building of Unit 4 had been caused by a hydrogen explosion resulting from the inadvertent inflow of hydrogen that was generated in Unit 3.

Please refer IAEA's Website on the detailed information about the Fukushima Nuclear Accident Update Log for Unit 2 and Unit 3.

(<http://www.iaea.org/newscenter/news/tsunamiupdate01.html>).

*** Stagnant water with high levels of radioactivity**

By late May, the volume of stagnant water with high levels of radioactivity amounted to more than 90,000 tons.

In order to prevent the leakage of the contaminated water into the sea and other areas, TEPCO has secured spaces for water storage and is transporting the water to the storage site. A Mega-Float artificial island with a water storage capacity of 10,000 tons, which was being used as a park off Shizuoka Prefecture, around 460 km southwest of the Fukushima accident site, is scheduled to be transported to the sea off the accident site by the end of May. The Mega-Float will be used as a facility to store contaminated water.

2. Circumstances around the nuclear power station

*** Evacuees**

One month after the earthquake, the government re-designated evacuation zones other than the "no-entry zone," which was the area within 20 km from the Nuclear Power Station, into which entry is prohibited in principle. The area between 20 and 30 km from the Power Station, which was initially designated as a "stay-indoor zone," was re-designated as a "voluntary evacuation zone." Moreover, some parts of this zone were designated as an emergency evacuation preparation zone, where residents may be required to stay indoors or evacuate in the event of an emergency. Meanwhile, hot spot areas outside the 20-kilometer radius where the cumulative dose of radiation is high were designated as a "planned evacuation zone," where residents have been instructed to evacuate within one month.

By late May, a total of around 62,000 people were evacuated from the no-entry zone, which covers an area of approximately 600 square km. The designation of the "planned evacuation zone" indicates that the annual estimated radiation exposure dose in the area is assumed to be higher than 20 millisieverts. Adding to the seriousness of the situation is the fact that most parts of these evacuation zones were also struck by the giant tsunami of March 11, which destroyed or damaged a large number of houses there. In addition, because of the government's evacuation orders issued in accordance with the level of radioactivity, it was difficult to search for bodies of earthquake and tsunami victims in some areas.

*** Radiation monitoring**

Radiation monitoring regarding soil and other samples collected in the areas surrounding the nuclear power station are conducted mainly by the Ministry of Education, Culture, Sports, Science and Technology (MEXT). The monitoring results are available at MEXT's website

<http://www.mext.go.jp/english/incident/1303962.htm>).

Until now, the release of radioactive materials from the damaged nuclear power plants has presumably been caused mostly by hydrogen explosions that occurred on March 12 and 14. Nonetheless, a small amount of radioactive material is all but certain to have been released in the form of contaminated steam from the reactor buildings.

The current situation can be summed up thus: while the ambient dose of radiation is declining, the full picture of soil and other contamination due to the residual radioactivity derived from fallout is gradually coming to light as the radiation monitoring proceeds. Unfortunately, each time the monitoring results are announced in accordance with the progress in monitoring, concerns grow among residents.

3. Prime Minister's request for shutdown of Chubu Electric Power's Hamaoka Nuclear Power Station and resulting shutdown

At a press conference on May 6, Prime Minister Kan announced that he had requested Chubu Electric Power to shut down Hamaoka Nuclear Power Station.

As a factor behind his request, the Prime Minister cited the estimate by MEXT's Headquarters for Earthquake Research Promotion that there is an 87% chance of an earthquake with a magnitude of approximately 8 occurring in the Tokai region, where the Hamaoka power station is located, in the next 30 years. "I contemplated what would happen if a major incident were to occur at Hamaoka Nuclear Power Station, and the enormous impact this would have on Japanese society as a whole," he stated. "In consideration of these special circumstances surrounding Hamaoka Nuclear Power Station, there is a need to implement sound mid- to long-term measures, such as building of seawalls, that will allow us to sufficiently withstand the envisaged Tokai earthquake," he added. Thus, he indicated that the Hamaoka power station should be kept out of service until such measures have been taken.

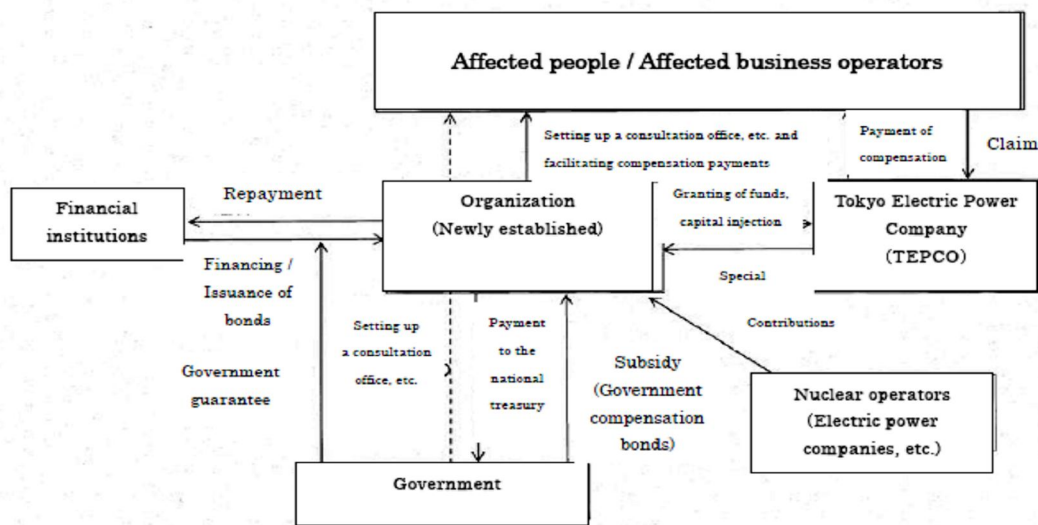
Hamaoka Nuclear Power Station is located in a coastal area facing the Sea of Enshu in the north west Pacific Ocean, approximately 200 km southwest of Tokyo. Two of its five reactors, Units 1 and 2, are scheduled to be decommissioned and had already been out of service when the request for shutdown was made. Unit 3 (with a generation capacity of 1,100 MW), which was undergoing periodic inspection, was scheduled to resume operation in the near future. Meanwhile, Units 4 (1,147 MW) and 5 (1,380 MW) were operating. On May 9, Chubu Electric Power decided to meet the request for the shutdown of Units 4 and 5 and to put on hold the restart of Unit 3 for the moment. As a result, Chubu Electric Power will lose a generation capacity of 3,600 MW, equivalent to around 10% of the generation capacity in the Chubu region.

4. Adoption of a new framework of support for compensation for damage caused by Fukushima nuclear accident

*** Government newly adopted framework of support for compensation**

On May 13, the government held a meeting of the Nuclear Power Station Accident Economic Impacts Response Team with the participation of relevant cabinet ministers and adopted the framework of support for compensation. This team is a special body that is headed by the Prime Minister and involves all cabinet ministers and relevant vice ministers, the deputy chief cabinet secretary and advisers to the Prime Minister. The concept of this framework is as described in the diagram below.

The framework is scheduled to be put into force after a relevant bill is written following examination by the Cabinet Legislation Bureau and is deliberated and enacted in the Diet.



***No ceiling or expiry date set for compensation to be paid by TEPCO**

In 1961, Japan enacted the Act on Contract for Indemnification of Nuclear Damage Compensation (Nuclear Damage Compensation Act), which has undergone several revisions since then. In 1999, Japan experienced an accident in Tokai Village in which neutrons were created by an event called a criticality during the uranium conversion process. Following that accident, compensation was paid based on the Nuclear Damage Compensation Act for the first time. The total amount of compensation came to approximately ¥15 billion, higher than the amount covered by liability insurance (¥1 billion). However, as the full amount was paid with financial support provided by the parent company of the business operator of the affected facility, the government did not extend any financial support. (This accident was attributed to negligence on the part of workers)

However, as the total amount of compensation to be paid in relation to the Fukushima nuclear accident is expected to be enormous, governmental financial support will be provided under the new framework of support for compensation.

The objectives of the Nuclear Damage Compensation Act are the protection of accident victims and the sound development of the nuclear industry, and the act contains the following provisions.

- Although this act imposes no-fault liability on nuclear business operators in order to protect accident victims, the liability may be exempted in the event of a "natural disaster of unusually enormous scale."
- This act requires nuclear business operators to take out insurance to cover possible compensation payments. The government should provide financial support if the compensation liability amount exceeds the insured amount and if the support is necessary in order to achieve the objectives of the act.
- The provision of governmental financial support requires a Diet resolution.

Although the new framework of support for compensation recognizes "the government's social responsibility on nuclear energy policy, which has been promoted through cooperation between the government and nuclear operators," it requires the nuclear business operator, TEPCO, to take on compensation liability without setting either a ceiling or an expiry date for the compensation.

In addition, it is not necessarily clear what specific financial support the government will provide.

Until now, Japanese industry has assumed that governmental support will be provided whenever it is necessary in order to achieve the objectives of the Nuclear Damage Compensation Act. Under this act, it has been expected that in the event of such extensive nuclear accident damage as has been caused by the Fukushima accident, governmental financial support will be a natural course of action to be taken.