Fukushima Report: No.5

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The Great East Japan Earthquake and the ensuing huge tsunami, which struck the Pacific coast of northeast Japan on March 11, have killed or left missing approximately 20,000 people. Nine months after the disaster, the damage done has not yet been fully recovered. The harsh winter weather of this region will be felt all the more acutely this season.

According to the Japanese government, more than 130 countries provided Japan with material and spiritual support in the aftermath of the disaster.

Regarding the accident at Fukushima Daiichi Nuclear Power Station, Japan has also received a broad range of support, including the provision of materials, equipments and technologies and the dispatch of experts, from United States, France, United Kingdom and International Atomic Energy Agency, among other countries and international organizations.

At the end of this tumultuous year, we would like to reaffirm our heartfelt gratitude for the support received from the people around the world.

In the meanwhile, it is quite regrettable that the nuclear accident has had an impact on the energy policies of countries around the world. Tokyo Electric Power Company (TEPCO) and the Japanese government have pledged to be open in disclosing information concerning the accident. I hope that our information disclosure will help nuclear experts around the world to learn lessons from the accident and enhance the safety of nuclear power in the future.

<The burden of post-accident recovery work is shifting from the damaged power station to the surrounding area and wider society>

The nuclear accident caused by the huge tsunami and the physical conditions of the site have steadily been moving closer to being brought under control, although not yet fully stabilized.

As a result of stable circulation of cooling water, the temperature in the bottom parts of the damaged nuclear reactors has been kept below 100 degrees Celsius. The level of radiation leaking into the atmosphere together with steam has become minuscule. The release of radioactive materials into the atmosphere and into underground water and ocean due to external factors such as aftershocks and typhoons has also been put under control.

On December 16, the Japanese government announced that “cold shutdown” of the damaged reactors, the objective of the second step of the roadmap toward restoration of the reactors, which was announced by TEPCO in April, has been achieved. The radiation dose at the site boundary of the nuclear power station has been reduced to less than 1 millisievert per year.

Over the nine months since the accident, onsite investigations of the damaged reactors by human inspectors and robots have been conducted, and as a result, accumulated data and materials necessary for estimating and assessing the state within the reactors and the process of the accident are becoming available. As calculations using new parameters have proceeded, important phenomena that should provide lessons useful for enhancing future safety are beginning to be identified.

This is the background that TEPCO announced the analysis of the No. 1 reactor conditions on November 30. According to the announcement, in the pressure vessel, decay heat in fuel rods melted themselves and the surrounding metal structure, including fuel claddings, also melted, and the melted fuels dripped through the bottom of the pressure vessel into the containment vessel and eroded the concrete floor to a depth of 65 centimeters. The meltdown of the No. 1 reactor was a new finding.

Frankly speaking, nine months after the accident, the post-accident problem is shifting from the damaged nuclear power station to outside of the station. Of course, that does not mean that challenges facing the damaged power station have completely been resolved.

<Remaining challenges>

The greatest challenge is completing decontamination of the surrounding area to pave the way for the return-to-home of the 113,000 people (as of June 2, 2011) who have been evacuated to keep them away from radiation. The government and TEPCO are devoting full-fledged efforts to decontamination. Regarding the radioactive fallout, extensive monitoring of soil conditions has been conducted and detailed checks of rice and other foods for radiation have been implemented. As a result, radiation exceeding the prescribed upper limit was observed in some regions. Some foods have been found to be contaminated with radiation, fueling food safety concerns among the people, even though the level of radiation is below the prescribed upper limit.

Other remaining challenges are as follows:

1. Electricity supply and demand and procurement of fuels:

Governors' consent to the restart of shutdown nuclear reactors and the evaluation of the stress tests as variable factors for the electricity supply-demand balance through next year

The nuclear accident has had a serious impact on TEPCO and other electric power companies that own nuclear power stations, aggravating their business conditions. Specifically, they face such challenges as how to secure sufficient electric power supply and how to cope with an increase in fuel costs due to a prompt increase in the procurement of alternative fuels to make up for the loss of nuclear power generation.

(1) Persistent concerns over the electricity power supply and demand balance

In Japan, nuclear reactors are required to undergo periodic inspection at an interval of 13 months. The restart of a reactor shutdown for inspection is subject to the consent of the governor of the prefecture in which the reactor is located. In addition, based on a recent government decision, nuclear reactors in operational condition are required to undergo stress tests. The results of the stress tests are reported to and evaluated by the government (eight reactors are in the stage of stress test evaluation). Electric power companies may go to next stage to explain the safety of the inspected reactors and request their restart only after the evaluation and upon approval by the government.

Even if reactors are technically ready to operate, there are serious concerns over the electricity supply-demand balance for this winter through next year as reactors remain shutdown after inspection.

The table below indicates the status of nuclear reactor operation. All of the seven reactors that will be in operation at the end of the year will be shut down for periodic inspection by the end of May next year.

Number of Nuclear Units	Total output	Nuclear Units in operation	Total output
54	48847MW	6	5624MW

Given the expected severe situation, Japanese industry is pinning hopes on efforts by electric power companies and support by the government. Prime Minister Noda made the following statement regarding this challenge in his inaugural policy speech in September 2011:

"Without the stable provision of electricity, which is the very "blood" of our economy and society, the foundation for Japan's affluent lifestyle will lose stability and we will become unable to bolster domestic industrial activities… In the mid- to long-term, we must aim to move in the direction of reducing our dependence on nuclear power generation as much as possible. At the same time, however, we will restart operations at nuclear power stations following regular inspections, for which safety has been thoroughly verified and confirmed, under the premise that a relationship of trust is developed with the local government."

(2) Steep rise in the thermal power fuel costs caused by an increase in emergency procurement:

A rise in the fuel procurement costs due to the use of alternative fuels to make up for the loss of nuclear power generation

Electric power companies whose nuclear power stations remain shutdown are securing power supply by increasing the utilization of thermal power stations. As a normal course of action, they are seeking to procure oil, natural gas and coal as an emergency measure that had not been planned before the March 11 disaster. The ensuing fuel cost increase has so far been borne entirely by electric power companies. However, as a fundamental solution, some of the burden will need to be shifted to consumers through a rise in electricity rates. To put it bluntly, some electric power companies face such a dire situation that they have to raise electricity rates as soon as possible as an emergency measure.

In October 2011, the National Policy Unit estimated that if all nuclear reactors are to remain shut down, additional fuel procurement costs for electric power companies would total 3 trillion yen per year and that this figure will translate into an electricity rate hike of as much as 20%.

２. Huge amounts of accident damages and compensation

(1) Inadequacy of the Act on Compensation Damages related to Nuclear Accidents

Japan established a framework for compensation for nuclear accident damage in 1961. However, regrettably, the ceiling was not set on the amount of damages compensation to be paid in the event of a nuclear accident. In addition, while the law has an escape clause that allows exemption from compensation liability in the event of an extreme natural disaster or accident, or social unrest, it is nearly impossible to apply that clause in practice. In this respect, TEPCO Chairman Katsumata stated: "In principle, the escape clause should be applied in this case. However, if we seek its application, we will be engaging in a dispute with the government and it will take a long time before this case is settled. Before it is settled, TEPCO may not be able to continue its operation, a situation which in turn will distress the victims of the accident by resulting in the suspension of compensation payment. In light of that, we did not take steps to seek the application of the escape clause."

Under this law, insurance will cover up to 120 billion yen in damages compensation payment in the event of a nuclear accident. The compensation paid so far has already reached 120 billion yen.

Since the occurrence of the Fukushima nuclear accident, the government has maintained the position that the primary responsibility for the accident rests with TEPCO and that the company should bear the entire liability for compensation payment based on the argument that TEPCO did not make sufficient preparations for tsunamis despite warnings about the risk of tsunamis. However, any violation of laws and regulations regarding TEPCO's safety measures has not been recognized so far. Regrettably, most mass media organizations have sided with the government's position and carried articles and editorials suggesting that the responsibility for the accident rests almost entirely with TEPCO.

(2) Establishment of the Nuclear Damage Liability Facilitation Fund

Following the Fukushima nuclear accident, the government established a legal framework for the payment of damages compensation, under which a new organization called the Nuclear Damage Liability Facilitation Fund (NDLFF) provides financial support for TEPCO's payment of damages compensation. The NDLFF was established in September 2011 with capital of 14 billion yen, including 7 billion yen put up by the government and another 7 billion yen contributed by electric power companies engaging in nuclear power generation. The cost of compensation payment is covered by funds contributed by electric power companies including TEPCO, which bears about a third of the total amount of those funds, and by loans provided out of funds raised through the issuance of special government bonds. Since the NDLFF provides government funds in loan to cover TEPCO's financing needs, it is required that the NDLFF and TEPCO jointly draw up a "special business plan" featuring the improvement of the power company's management and thorough cost reduction.

In my personal opinion, the fact that a private power company like TEPCO is being forced to bear the sole responsibility for a nuclear accident in Japan, an earthquake-prone country, poses a very serious question for the future of this country's infrastructure industries.

３. Hopes for 2012

I understand that the idea of "turning a misfortune into a blessing" is universal throughout the world.

The Fukushima nuclear accident has not only caused great damage and distress to residents living in the surrounding area but has also imposed a very high cost burden on companies engaging in nuclear power generation.

In the meantime, experts around the world are closely examining the accident to learn lessons and improve safety. International collaborative activities have started at the IAEA and other international organizations. In other words, efforts to turn a misfortune into a blessing are starting.

In the 21st Century now on, energy needs would grow further even as the fight against climate change enhances. I hope that the year 2012 will mark the beginning of full-fledged efforts to turn the Fukushima misfortune into a blessing. I also hope that nuclear power generation with improved safety would make further contributions to securing energy sources and improving the environment.

* The responsibility for this report solely lies with Mr. Teruaki Masumoto,
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