Commentary

Toward Enhancing Preparedness and Response Arrangement and Capabilities for a Nuclear Emergency (2)

–National and Local Government Activities and Proposal to the Future–

The Japan Atomic Power Company, **Takashi Nitta**

The government of Japan has been carrying out a systemic overhaul of its nuclear emergency management by taking heed of the experience and lessons learned from the accident that occurred at the Fukushima Daiichi Nuclear Power Plant, which is operated by the Tokyo Electric Power Company (TEPCO). A new framework was constructed to implement adequate measures against nuclear emergencies. The specific steps include the following: the establishment of the Nuclear Regulation Authority; a revision of the Basic Disaster Management Plan in line with the Basic Act on Disaster Management; a revision of the Act on Special Measures Concerning Nuclear Emergency Preparedness (Nuclear Emergency Act) as a special act pursuant to the Basic Act on Disaster Management; and the establishment of the Guidelines for Measures against Nuclear Emergencies in accordance with the Nuclear Emergency Act. In keeping with these steps, municipalities located within roughly 30 km of the nuclear power plant are developing their own regional disaster prevention plans (against nuclear emergencies) and evacuation plans.

This commentary summarizes presentations made at a session organized by the Nuclear Safety Division when the Annual Meeting of the Atomic Energy Society of Japan (AESJ) was held in spring 2014.

I. Efforts Made by the National Government

In the first presentation, entitled "Further measures to be taken for managing nuclear emergencies," [1] Mr. Yasushi Morishita (Director, Emergency Preparedness/Response and Nuclear Security Division, Secretariat of the Nuclear Regulation Authority) addressed the issue of measures taken by the national government. A summary is provided below.

The respective investigation commissions appointed by the Cabinet and the Diet have identified various issues concerning the response by the national government to the accident that occurred at the Fukushima Daiichi Nuclear Power Plant. Examples of these issues include the crisis management framework and the government's response to the emergency on-site (to

DOI : 10.15669/fukushimainsights.Vol.3.112

Originally published in Journal of the Atomic Energy Society of Japan (ISSN 1882–2606), Vol. 56, No. 10, p. 669–674 (2014) in Japanese. (Japanese version accepted: May 30, 2014)

bring the accident under control) and off-site (to provide radiation protection for residents near the site and assistance to those affected). Bearing these issues in mind, the national government has been carrying out a systemic overhaul of its nuclear emergency management, which also covered the framework for taking necessary measures and crisis management organizations. A new framework was constructed to allow adequate measures to be taken when responding to a nuclear emergency. The specific steps include the following: the establishment of the Nuclear Regulation Authority (NRA) [2]; a revision of the nuclear emergency management part of the Basic Disaster Management Plan in line with the Basic Act on Disaster Management [3]; a revision of the Act on Special Measures Concerning Nuclear Emergency Preparedness (Nuclear Emergency Act) as a special act pursuant to the Basic Act on Disaster Management [4]; and the establishment of the Guidelines for Measures against Nuclear Emergencies in accordance with the Nuclear Emergency Act [5]. In keeping with ongoing revisions to these guidelines, nuclear emergency management is being further pursued and fostered by, for instance, supporting relevant efforts made by the host communities of nuclear power plants.

1. Issues Identified in Relation to the Response to the Accident at TEPCO's Fukushima Daiichi Nuclear Power Plant

The respective investigation commissions appointed by the Cabinet and the Diet have identified various issues concerning the response by the national government to the accident that occurred at the Fukushima Daiichi Nuclear Power Plant [6, 7], which is operated by the Tokyo Electric Power Company (TEPCO).

(1) Crisis management framework for emergencies

The entangled communication and decision-making that took place at the central level (Prime Minister's Office and the Nuclear and Industrial Safety Agency (NISA)) hindered local command and coordination. Furthermore, the relevant agencies did not share enough information. These problems were compounded by the dysfunctional Emergency Response Support System (ERSS), the System for Prediction of Environmental Emergency Dose Information (SPEEDI), and the off-site centers.

(2) On-site response (to bring an accident under control on-site)

Effective use of communication channels was hampered partly by the dysfunctional off-site centers. An adequate scheme was not in place to deal with the accident and not enough professionals with adequate expertise were available to provide the necessary advice and guide the responsible personnel and relevant agencies through their response to the emergency. The commissions also pointed out that not enough drills had been conducted in anticipation of severe accidents.

(3) Off-site response (radiation protection for residents near the site and assistance to those affected)

Numerous updates to the evacuation zones forced many residents to evacuate multiple times and resulted in extended affected areas. The inadequate level of preparedness in relation to protecting residents and providing support to those affected became clear when hospitals and care homes for the elderly could not secure a means of evacuation or find safe havens. Another issue to be identified was the protracted ex-post measures that were conducted to address concerns among residents over environmental contamination and the radiological impact.

2. Systemic Overhaul of Nuclear Emergency Management Based on Critical Comments

Bearing in mind the critical comments presented in the previous section, the national government has sought to perform a systemic overhaul of nuclear emergency management in the following manner.

(1) Institutional framework for nuclear emergency management

The national government has revised the nuclear emergency management part of the Basic Disaster Management Plan, which has been developed in line with the Basic Act on Disaster Management. In this manner, they have sought to reinforce the national crisis management framework, prepare to protect residents and support those affected, and build up the necessary infrastructure. In accordance with the Nuclear Emergency Act, the NRA has established the Guidelines for Measures against Nuclear Emergencies to define specialized and technical matters related to nuclear emergency management. Action plans to be adopted by the respective stakeholders during a nuclear emergency have been developed in line with the revision of the nuclear emergency management part of the Basic Disaster Management Plan as well as the establishment and revision of the Guidelines for Measures against Nuclear Emergencies. The national government has revised their Nuclear Emergency Management Manual and the Disaster Management Operation Plan. Similarly, municipalities have revised their regional disaster prevention plans and power utilities have revised their disaster management operation plans.

(2) Overhaul of crisis management organizations

The Nuclear Emergency Preparedness Commission, which is chaired by the prime minister, has been permanently established to implement measures according to the Guidelines for Measures against Nuclear Emergencies. In this manner, a framework was laid out for the entire government to implement necessary measures on a regular basis in anticipation of nuclear emergencies. During an emergency, a Nuclear Emergency Response Headquarters is to be established under the leadership of the prime minister to take charge of the overall coordination of stopgap and ex-post measures taken in response to a nuclear emergency. Under normal circumstances, the NRA develops and revises safety regulations and the Nuclear Emergency Response Guidelines. During an emergency, however, the NRA guides and supervises the activities conducted by the operators to bring an accident at a nuclear facility under control.

(3) Modifications to nuclear emergency management in the Basic Disaster Management Plan

− Reinforcement of the government's capacity to respond to nuclear emergencies

The government has decided to undertake the following measures: enhance the capacity of the Prime Minister's Office in relation to making decisions and sharing information; clarify the roles necessary to conduct the on-site and off-site response to an emergency; conduct practical drills to simulate complex disasters and severe accidents; and ensure mutual collaboration among the multiple headquarters established to respond to a complex disaster.

− On-site response (to bring an accident under control on-site)

Power utilities are to reinforce their capacity to manage nuclear emergencies, including in terms of emergency response stations, logistic support bases, and nuclear emergency rescue teams (permanent teams to centrally control and operate the necessary equipment for stopgap measures under a high-dose environment). Attempts are to be made to improve coordination and develop a more robust capacity, including for operational units, by conducting drills and other regular measures under ordinary circumstances.

− Off-site response (radiation protection for residents near the site and assistance to those

affected)

Attempts are to be made to enhance protection for residents by planning an evacuation procedure in advance for each area, clarifying the procedure for announcing the results of estimates produced by SPEEDI, and putting in place a monitoring system for the event of an emergency. Closer support is to be provided for those affected by a nuclear emergency by established teams tasked with supporting their livelihoods by finding host communities for evacuees and helping them temporarily return to their home communities.

− Better infrastructure and equipment for managing disasters

Better infrastructure and equipment are to be put in place, including the following: networks that allow video-conferencing and other modes of communication among the Prime Minister's Office, the NRA Secretariat, nuclear power utilities, and municipalities; satellite connections and multiple communication routes to build a reliable network that allows uninterrupted communication during complex disasters; reliable emergency power supplies; and more robust equipment and infrastructure at off-site centers.

− Ex-post measures

The government is to take responsibility for health counseling, decontamination, and other ex-post measures, even after a state of emergency has been lifted.

(4) Establishment and revision of the Guidelines for Measures against Nuclear Emergencies

− Classification of emergencies

Emergencies were classified into the following three categories according to the conditions of the nuclear facilities: alerts, site-area emergencies, and general emergencies. Protection of residents, the performance of emergency monitoring and other such necessary measures were prescribed according to this classification.

− Introduction of emergency action levels

As criteria for classifying the abovementioned emergencies, emergency action levels (EALs) were assigned according to the condition of the equipment at nuclear facilities in the respective levels of defense in depth as well as their functions in relation to containing radioactive materials. Evacuation and sheltering in place are to be conducted according to EALs.

− Introduction of operational intervention levels

Operational intervention levels (OILs) were assigned based on air dose rates to prescribe the evacuation planning, temporary relocation, restrictions on food and water intake, and other such necessary measures accordingly.

− Priority zones for additional disaster management measures

In light of mistakes made during evacuations, the guidelines were revised to pre-assign precautionary action zones (PAZs) and urgent protection action planning zones (UPZs) in preparation for evacuations and to implement the necessary protective measures, such as evacuation, sheltering in place, and temporary relocation, in accordance with EALs and OILs.

− Overhaul of the emergency monitoring system

According to the revised version of these guidelines, the national government, local governments, nuclear utilities, and other stakeholders must work together to establish an emergency monitoring center. The national government must take the lead in emergency monitoring and ensure that the relevant organizations can function smoothly even during an emergency. Under ordinary circumstances, the relevant organizations are expected to deepen their intercommunication by holding liaison meetings and joint drills.

− Preparations for the prophylactic administration of iodine thyroid blocking agents

Necessary measures have been prepared for the prior distribution and prophylactic administration of iodine thyroid blocking agents in the event of a nuclear emergency.

(5) Revision of regional disaster prevention plans

Regional disaster prevention plans are basic documents that municipalities use in responding to a nuclear emergency. They compile the key data required to manage a disaster, such as information on shelters, medical institutions dealing with radiation exposure, evacuation roads, monitoring stations, population distribution, equipment and materials, and the deployment of iodine thyroid blocking agents.

(6) Revision of disaster management operation plans drawn up by power utilities

Disaster management operation plans drawn up by power utilities define matters such as how they should organize themselves to manage a nuclear emergency, what equipment and materials they should use, and how they should conduct drills and implement stopgap measures. The content of these plans has been significantly expanded as described below. In addition, the scope of necessary consultation for the development or modification of disaster management operation plans was expanded to include the governors of prefectures that have regional disaster prevention plans (for nuclear emergency management) covering all or part of an area within 30 km of a nuclear power plant.

- Installation and operation of equipment for transmitting information from a nuclear site, emergency response stations at the nuclear site, offsite centers, and the Nuclear Power Facility Immediate Response Center
- Installation and operation of emergency communication equipment and video-conferencing systems at the respective bases
- Formation and deployment of nuclear emergency rescue teams (units for operating and managing remote-controlled devices and other equipment)
- Installation of emergency power supplies for the respective bases, centers, and systems and maintenance of their functions during a natural disaster
- Matters related to evaluation of drills conducted by nuclear power utilities
- Establishment of an information and communications network for connecting the Prime Minister's Office, the NRA Secretariat, and other relevant stakeholders and provision of a reliable connection via video-conferencing systems at emergency response stations

3. Initial Response by the Government

The government must take the following actions in its initial response as required according to the particular event and its escalation.

(1) An initial response by the government is required for the following three types of events.

[1] Alerts

- An earthquake with an intensity of 6-lower or greater on the Japanese seismic intensity scale in a prefecture that hosts a nuclear power plant
- A major tsunami alert issued in a prefecture that hosts a nuclear power plant
- A severe failure or other issue at a nuclear reactor facility (e.g., leakage of cooling water from a reactor or leakage of steam from a ruptured pipe)

[2] Events prescribed in Article 10 of the Nuclear Emergency Act (site area emergencies)

- Leakage of reactor coolant
- Plant blackout for more than five minutes
- Complete loss of the function for cooling a reactor during its shutdown

[3] Events prescribed in Article 15 of the Nuclear Emergency Act (general emergencies)

- Complete loss of emergency AC power supplies for more than five minutes
- Complete loss of the function for shutting down a reactor when an emergency shutdown

is necessary
- An air dose rate of 5 μSv/h for more than 10 minutes at the site border

(2) If a power utility reports any of the events prescribed in Article 10 of the Nuclear Emergency Act to the NRA, the following steps are taken to establish a Nuclear Emergency Response Headquarters:

[1] The Minister of the Environment, the NRA Chairman, and the Secretary-General of the NRA Secretariat report the situation to the prime minister.

[2] If an event prescribed in Article 15 of the Nuclear Emergency Act escalates, the NRA Chairman, the Minister of the Environment, and the Secretary-General of the NRA Secretariat collectively submit proposals to the prime minister for the declaration of a state of emergency and an evacuation order.

[3] The prime minister declares a nuclear emergency, after which cabinet approval is obtained for the establishment of a Nuclear Emergency Response Headquarters headed by the prime minister (who is referred to as the Chief of the Government Nuclear Emergency Response Headquarters).

(3) Once a nuclear emergency has been declared and a Nuclear Emergency Response Headquarters has been established, the following steps are taken.

[1] The Nuclear Emergency Response Headquarters is convened to establish a policy for implementing stopgap measures, including the designation of evacuation zones and distribution of iodine thyroid blocking agents.

[2] The Chief of the Government Nuclear Emergency Response Headquarters orders the relevant ministries, agencies, and municipalities to evacuate or shelter residents, prophylactically administer iodine thyroid blocking agents, restrict food intake, and protect residents from radiation (offsite measures).

[3] The Chief of the Government Nuclear Emergency Response Headquarters orders the relevant ministries, agencies, and organizations to implement stopgap measures (onsite measures) to bring the accident at the plant under control according to the needs of the power utility.

After the presentation, the following questions were raised and answered.

Q: In relation to the presented zoning rules for nuclear facilities, how are PAZs and UPZs designated for the Fukushima Daiichi and Daini Nuclear Power Stations?

A: Because of the presence of Units 5 and 6, the zoning rule applied to the Fukushima Daiichi Nuclear Power Station is the same as that for other facilities. Similarly, that for the Fukushima Daini Nuclear Power Station is the same as that for other facilities; Its PAZ has a range of 5 km and its UPZ has a range of 30 km. The zoning rule for the Fukushima Daiichi Nuclear Power Station is currently being re-examined.

Q: Compared to the reviews conducted by the NRC in the United States, Japan seems to adopt a different approach with respect to the reviewing of disaster prevention plans. How is the ongoing review aimed at resuming the operation of nuclear power plants in Japan going?

A: In the United States, evacuation plans are reviewed by the NRC before the construction of a nuclear reactor is approved. Under Japanese law, though, municipalities must develop their own plans for preventing disasters and evacuating residents. The national government helps municipalities located near the nuclear power plants to develop their own plans and keeps track of their progress. France takes the same approach as Japan.

Q: According to the presentation, the Fukushima Nuclear Accident prompted a systemic

overhaul of nuclear emergency management. However, it is not very clear what has changed since the accident. It seems that the system is being streamlined, but will it be able to handle a disruption to any of the interconnections?

A: The system has fundamentally not changed since the accident. However, the division of roles and responsibilities has been clarified. For instance, utilities became primarily responsible for the responses taken on-site. The Prime Minister's Office supports efforts on the ground and the NRA provides technical advice to the prime minister. Drills are considered crucial and they will be conducted to make further improvements.

II. Efforts Made by Municipalities

In the next presentation, entitled "Evacuation measures taken in Shimane Prefecture and challenges ahead," [8] Mr. Noriaki Shimada, Director of the Office for Evacuation, Nuclear Safety Division, Disaster Management Department, Shimane Prefecture, explained how municipalities are undertaking their respective efforts. A summary is provided below.

In Shimane Prefecture, the Fukushima Daiichi Nuclear Accident prompted local efforts to reinforce the organizations that handle nuclear-related operations and to prevent nuclear emergencies. In the process of developing an extensive evacuation plan, the prefecture has addressed various practical needs. These needs include the following: deployment of necessary vehicles; medical assistance for those who require it; recruitment of necessary caregivers; securement of necessary supplies, equipment, and materials for evacuation and shelters; provision of secondary shelters for a prolonged evacuation; preparation of a screening system that can attend to large numbers of evacuees; and a specific method for determining the extent of the evacuation zones based on the results of emergency monitoring. The prefecture is also addressing challenges that emerged during the Fukushima Daiichi Nuclear Accident, such as the issue of how iodine thyroid blocking agents should be distributed.

1. How Shimane Prefecture has Organized and Carried Out Their Efforts Since the Fukushima Daiichi Nuclear Accident

The Shimane Nuclear Power Plant is the only plant in Japan to be located in a prefectural capital (Matsue). There are six municipalities within 30 km of the plant: Matsue, Izumo, Yasugi, Unnan, Yonago, and Sakaiminato. As of December 2012, the first four cities in the prefecture have a total population of roughly 398,000.

(1) Organizations established by the prefectural government

Prior to the Fukushima Daiichi Nuclear Accident, nuclear-related assignments in Shimane Prefecture used to be handled by the Nuclear Safety Measures Office, which was part of the Firefighting and Disaster Management Division under the General Affairs Department of the prefectural government. Since the accident, its organizational capacity has been reinforced. In August 2011, the Nuclear Safety Measures Division was established. In the following April, the Nuclear Emergency Management Group, the Nuclear Safety Measures Group, the Evacuation Measures Office, and the Nuclear Environment Center were established within this division. The division was rearranged into the Disaster Management Department in April 2013, with the Deputy Director-General assigned to take charge of nuclear safety.

(2) Efforts made to date

In addition to the reinforcement of the organizational capacity, the following efforts have been made.

− May 2011

The Nuclear Emergency Management Liaison Committee was jointly established by the prefectural governments of Tottori and Shimane along with the six cities located within 30 km of the nuclear power plant. The committee decided to sort out the various challenges and coordinate the necessary actions while bearing in mind the experience of the nuclear emergency that occurred in Fukushima.

− September 2011

Urgent priorities were compiled in an interim report. A summary of these priorities is provided below.

[1] Establish a communication system, multiplex the communication devices, and build up the capacity for taking the initial response

[2] Build up a system for evacuating residents in general

[3] Build up a system for evacuating persons who require special assistance during a disaster

[4] Install additional measurement devices and expand the capacity for conducting emergency monitoring

− October 2011

At a meeting, governors from the Chugoku region were requested to cooperate in hosting evacuees across extensive areas.

− November 2012

An extensive evacuation was planned in Shimane Prefecture according to the following basic policy.

[1] Build up capacity so that information can be reliably shared with residents and those involved in disaster management. Clarify in advance the locations and routes to shelters.

[2] Try to complete evacuations before a massive release of radioactive materials by assuming phased evacuation orders.

[3] Ensure that those who need special assistance during a disaster (including those at home, those in welfare facilities, and patients in hospital) can be evacuated safely and swiftly.

2. Overview of the plan for an extensive evacuation from Shimane Prefecture and challenges associated with the evacuation, etc.

The destinations for an evacuation from the four cities of Shimane Prefecture were distributed radially within Shimane Prefecture, Hiroshima Prefecture, and Okayama Prefecture. The evacuation routes to reach them were carefully arranged to ensure that they would not cross each other. Backup shelters were also arranged inside Tottori Prefecture. An evacuation of residents is normally carried out by having them walk from their homes to a provisional assembly point, move to a transit point by bus (or go directly to the transit point from their home by car), and then travel to the appropriate shelters on foot, by bus, or by other means. Meanwhile, those who need special assistance are evacuated from their homes or welfare facilities to temporary welfare shelters for an extensive evacuation. Hospitalized patients are evacuated directly to other hospitals. Here, the temporary welfare shelters for an extensive evacuation serve as the primary shelters for those in need of special assistance during an emergency. Compared to shelters in the same areas for residents in general, these shelters offer a better living environment as they have air conditioning, accessible restrooms, and

other amenities to facilitate nursing care. Those who need special assistance during a disaster require adequate preparations to be made at an early stage to ensure their swift evacuation and reduce the risks that they face. Until preparations for an evacuation have been made, they need to be sheltered in place.

(1) Tasks associated with evacuation of residents

An evacuation of general residents requires the following: [1] arrangements for the necessary means of transport and drivers and [2] arrangements for the necessary supplies at shelters. Consultations are also underway with bus companies.

The evacuation of those who need special assistance requires the following: [1] arrangements for secondary shelters equipped with facilities that offer welfare support; [2] arrangements for hospitals capable of attending to patients who cannot be easily accommodated at their primary destinations; [3] arrangements for medical and nursing professionals who can provide the necessary support while patients are being transported and after they have arrived at their shelters; and [4] arrangements for the necessary means of transport, equipment, and materials according to the conditions of those needing assistance.

(2) Tasks associated with contamination screening

Issues associated with contamination screening include the following: [1] how screening sites should be selected and [2] how screenings should be conducted for large numbers of evacuees and their vehicles.

(3) Tasks associated with evacuation orders

[1] Evacuation before a release of radioactive materials

According to the existing plan, specified persons must be evacuated in the event of a site area emergency at a nuclear power plant. In a general emergency, residents in the PAZ must be evacuated, while residents inside the UPZ must be sheltered in place. Depending on the condition of the power plant, residents inside the UPZ may have to be evacuated in stages. An important task here is to clarify how evacuation orders should be issued and to what extent.

[2] Evacuation after a release of radioactive materials

According to the existing plan and the results of emergency monitoring, an evacuation must be carried out by identifying target areas within a few hours for an OIL of 1 (500 μSv/h) or a temporary relocation must be organized within a week after identifying target areas within one day for an OIL of 2 (20 μSv/h). Given this, it is necessary to specify a method for determining the extent of the area to be evacuated.

(4) Tasks associated with the emergency monitoring system

In addition to 35 posts for regular monitoring, 18 additional posts have been set up for the initial response to an emergency. Depending on how an accident unfolds, 35 more monitoring posts can be added. The issue here is how densely measurements of the radiation dose must be conducted to determine the extent of the area to be evacuated.

(5) Tasks associated with the medical system for urgently attending to radiation exposure

Before the Fukushima Accident, two hospitals were assigned to offer initial care to those exposed to radiation and one hospital was assigned to offer secondary care. Later, the numbers were increased to 14 and 2, respectively. Hospitals are trying to [1] train medical personnel so that they can attend to persons exposed to radiation and [2] develop internal manuals. Unfortunately, not enough personnel have been trained due to limited training opportunities.

(6) Tasks associated with the distribution of iodine thyroid blocking agents

According to the plan, iodine thyroid blocking agents should be distributed to each

household in the PAZ. Arrangements have been made to enable them to be administered outside the PAZ in coordination with an evacuation. Their prior distribution is also possible if local governments need to do so in certain areas.

The tasks that need to be addressed going forward are as follows: [1] determination of the scope and intended targets for prior distribution; [2] arrangements for engaging doctors and pharmacists in the distribution; [3] determination of the distribution method to be used at medical institutions; and [4] proper management after the distribution. The prefectural government of Shimane has established a committee for the distribution and administration of iodine thyroid blocking agents to discuss a specific distribution policy.

After the presentation, the following question was raised and answered.

Q: Do evacuation plans and measures take into account the distribution of released radioactivity that was announced in October 2012 by what was then NISA?

A: No. In the planning phase, the distribution is to be arranged for everyone within a 30-km range based on the assumption of maximum exposure.

III. Conclusions

In 2012, the Nuclear Safety Division offered many recommendations during eight rounds of seminars on the Fukushima Daiichi Nuclear Accident [9]. They identified the need to clarify the responsibilities involved in implementing emergency protective measures and conducting emergency management according to the principles of international standards and in chronological order. They also stressed the importance of a tiered chain of command and division of roles, as well as information sharing with the public based on the collected information and judgments made by experts for the appropriate issuing of instructions and alerts for the public.

The AESJ Investigation Committee on the Accident at the Fukushima Daiichi Nuclear Power Plant has also offered recommendations on reinforcing nuclear emergency management in Section (3) “Building up emergency preparedness and response capabilities” of Chapter 8 “Root causes of the accident and recommendations” in its final report [10].

These recommendations are outlined in the appendix.

Nuclear emergency management is pursued in relation to Level 5 defense in depth as a last bastion to protect the public from health damage caused by exposure to radiation. To enhance its effectiveness, the national government would need to provide further support for the efforts being made by the municipalities, such as the development of their evacuation plans. The Division intends to monitor how the relevant organizations incorporate the recommendations offered at the seminars in their efforts to manage nuclear emergencies.

–Appendix–

Building up emergency preparedness and response capabilities
(Excerpt from the final report by the AESJ Investigation Committee)

The emergency response to the Fukushima Daiichi Nuclear Accident was complicated by a misguided initial response, poor coordination among the relevant agencies, an unclear decision-making scheme, and other such problems. Discussions on the response were overly focused on how the tools should be used effectively and how the outcomes were announced.

Among the five levels of defense in depth according to the IAEA, disaster management plans stand as the last bastion for Level 5. Accordingly, the AESJ Investigation Committee analyzed various challenges associated with emergency management and operations, while focusing on how residents should be protected from radiation and how the response targets should be achieved. During this process, the challenges were clarified in relation to urgent protective actions as well as the responsibilities and roles of the power utilities and the national and local governments.

Emergency preparedness and response capabilities must be built up to protect against nuclear emergencies being compounded with earthquakes and other non-nuclear disasters by expecting the worst scenarios. The power utilities must consider all conceivable emergencies at their facilities according to assessments of the target events and seek to minimize radiation risks reliably in reasonably predictable events. Capabilities must be built up regularly so that the predetermined procedure can be taken in any crisis management phase and flexible responses can be taken to handle anything not envisaged by the procedure.

To this end, the committee recommends the improvements described below. The responsibilities and roles of the relevant agencies should be re-examined both on the ground and at the local, national, and international levels. Drills should be conducted so that inter-agency coordination can be continuously modified to ensure effectiveness in responding to emergencies.

- A scheme should be established to allow power utilities and local governments to coordinate their urgent protective actions in the initial phase of crisis management under conditions of great uncertainty when less information is available. They should be able to do so before any radioactive materials are released into the environment by carrying out a predetermined procedure according to the facility conditions in comparison with the preassigned criteria.
- Stakeholders, including the power utilities and the national and local governments, should discuss, decide, and document how their on-site and off-site roles and responsibilities will be divided during an emergency. In principle, the response should be led by the power utility on-site and the local government off-site. The national government should provide the necessary support.
- A detailed policy covering various procedures and urgent actions for crisis management should be clarified in advance by considering the options available through exercises and so forth.
- The method to be used in handling data from SPEEDI and other analyses of the dispersion of radioactive materials should be clarified while recognizing their limited application in, for instance, the initial evacuation.
- The protective actions conducted by local governments and the protection of residents led by the police, fire departments, Self-Defense Forces, and the national government should be integrated under a common platform with reference to examples from other countries, bearing in mind that such activities are almost comparable to the measures employed in managing ordinary disasters.
- The principle of radiation protection and adequate knowledge of the impact of radiation exposure must be instilled among all personnel responsible for measures against radioactivity as a unique challenge posed by nuclear emergencies. Their capacity to handle the necessary tasks should also be built up.

References

1) Presentation material: Further Measures to Be Taken for Managing Nuclear Emergencies [in Japanese], Yasushi Morishita, March 28, 2014.
2) Act for Establishment of the Nuclear Regulation Authority [in Japanese], promulgated on June 27, 2012.
3) Central Disaster Management Council: Basic Disaster Management Plan [in Japanese], modified on September 6, 2012.
4) Act on Special Measures Concerning Nuclear Emergency Preparedness, modified on June 27, 2012.
5) Nuclear Regulation Authority: Nuclear Emergency Response Guidelines [in Japanese], fully revised on September 5, 2013.
6) Investigation Committee on the Accident at the Fukushima Nuclear Power Stations of Tokyo Electric Power Company: Final Report, July 23, 2012.
7) The National Diet of Japan Fukushima Nuclear Accident Independent Investigation Commission: Official Report, July 5, 2012.
8) Presentation material: Evacuation Measures Taken in Shimane Prefecture and Challenges Ahead [in Japanese], Noriaki Shimada, March 28, 2014.
9) Report from Seminars on the Accident at the Fukushima Daiichi Nuclear Power Station [in Japanese], Nuclear Safety Division, Atomic Energy Society of Japan, March 2013.
10) Atomic Energy Society of Japan: Final Report by the AESJ Investigation Committee on the Accident at the Fukushima Daiichi Nuclear Power Station [in Japanese], March 2014.