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Topics Fukushima introduces JAEA's activities related to Fukushima.

Japan Atomic Energy Agency (JAEA) Reporting Conference #2
Our Efforts – In Light of the Nuclear Accident

On November 28, 2012, the Japan Atomic Energy Agency (JAEA) held the 7th JAEA Reporting Conference in Tokyo, with the theme "Our Efforts – In Light of the Nuclear Accident." The previous issue provided a general overview of the conference opening address and the R&D efforts of JAEA. This issue focuses on specific themes being addressed by JAEA – in particular, the current situation and future approach relating to the accident at the Tokyo Electric Power Company (TEPCO)'s Fukushima Daiichi Nuclear Power Station.

JAEA efforts to restore the environment

Junichiro Ishida, Director, Fukushima Environmental Safety Center, Headquarters of Fukushima Partnership Operations

Activities based in Fukushima

"Before the start of today's conference, I greeted you all at the entrance. I was glad to once again meet many of the people I have met in Fukushima over the last year, and I'm thankful that so many of you are still concerned about the current situation in Fukushima. You also asked about things you can do yourselves. I would like to acknowledge once more that our activities are only possible due to the support of all of you, and first of all, I would like to express my thanks for that."

These were the introductory remarks made by Junichiro Ishida, Director of the Fukushima Environmental Safety Center, Headquarters of Fukushima Partnership Operations at the start of the latter session of the JAEA Reporting Conference. JAEA has sent many personnel to Fukushima, but there are limits on what can be achieved by JAEA alone, and it is necessary to cooperate with many involved people.

Next, Director Ishida gave the following explanation of JAEA efforts to restore the environment, and how they will proceed from here.

"Today, I would like to talk about five themes. First, is the Fukushima Environmental Safety Center; second is ascertaining the radiation situation in the environment; third are the results of our decontamination model demonstration project; fourth is collaboration/cooperation with relevant organizations; and fifth is strengthening of R&D efforts.

First, in JAEA's various efforts relating to the accident at the TEPCO's Fukushima Daiichi Nuclear Power Station, we are making progress using the Headquarters of Fukushima Partnership

Operations, which is directed by the president of JAEA, as a control tower. The Headquarters of Fukushima Partnership Operations is comprised of three departments; the Department for Planning and Management of Partnership Operations, the Fukushima Environmental Safety Center, and the Department of Partnership Operations for Plant Restoration. The Fukushima Environmental Safety Center collaborates with relevant organizations, provides support for decontamination work, conducts environmental monitoring and mapping in Fukushima Prefecture, and carries out R&D to restore the environment. The Department of Partnership Operations for Plant Restoration is in charge of R&D for decommissioning, such as handling of fuel and treatment of accumulated water. The Department for Planning and Management of Partnership Operations manages the whole work of the Headquarters of Fukushima Partnership Operations and coordinates with relevant organizations.

The specific efforts being made by the Fukushima Environmental Safety Center are as follows:

(1) Collaboration/cooperation with relevant organizations in the Fukushima region

In the roughly six month period after November 2011, we carried out a decontamination demonstration project under entrustment from the Cabinet Office. We also dispatched experts to aid decontamination activities of the national and local governments, and provided technical assistance for formulating decontamination plans, and technical guidance relating to decontamination. Furthermore, to ease worries about exposure by people living in Fukushima Prefecture, we are conducting internal exposure measurement (WBC) and hosting meetings to answer to questions about radiation.

(2) Ascertaining the radiation situation in the environment – Environmental monitoring and mapping

Since immediately after the accident, we have continuously measured environmental radiation and radioactivity in the soil and other locations, prepared detailed maps through a project commissioned by the Ministry of Education, Culture, Sports, Science and Technology, and carried out wide-area monitoring using aircraft.

(3) R&D for restoring the environment

We have been performing R&D for environment restoration, with the aim of assessing and reducing exposure, according to the R&D schedule, which was decided to coordinate with the national roadmap."

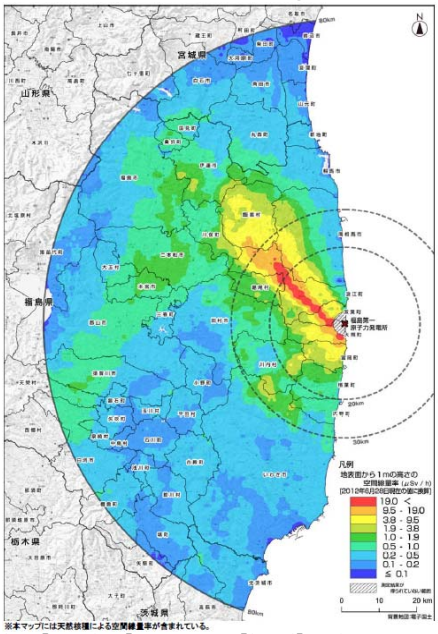
Ascertaining the radiation situation in the environment

Mr. Ishida stressed that environmental monitoring and mapping are critically important to these efforts.

"Whatever we do, it is crucial to first investigate the intensity of radiation and its distribution. Therefore, we are carrying out fixed-point observation of dose rates using survey meters, and investigating the distribution of radionuclides using soil samples etc. We are also determining the planar dose rate distribution using scintillation fibers (PSF) (see photo next page), the dose rate

distribution in village units using a gamma plotter and other tools, dose rate distribution in eastern Japan using mobile surveys, dose rate distribution in regional units using unmanned helicopters, and the wide-area dose/nuclide concentration distribution using aircraft.

As one example, the detecting part of the scintillation fibers has a length of 20 m, and the fibers can be bent, or used to perform measurement under water. These fibers make it possible to measure the dose rate over a "line" or "surface." They also have the potential for measuring under water at the bottom of rivers and lakes. In addition, we are measuring the wide-area dose/nuclide concentration distribution using aircraft and unmanned helicopters. An example of the measurement results is shown at right."



Changes in the air dose rate distribution, found through aircraft monitoring (June 2012)

Decontamination model demonstration project

Meanwhile, in the period from October 2011 to March 2012, we carried out a decontamination demonstration project under entrustment from the Cabinet Office. The target region had a high dose rate of over 20 mSv/year, and data was gathered using various techniques and methods for carrying out decontamination in the area. The findings were presented so they could be incorporated into methods for large-scale outdoor decontamination, and measures to ensure safety in protecting workers from radiation. Director Ishida gave the following explanation of the results of this demonstration project.

"By conducting the first decontamination model demonstration project in Japan, we obtained various findings and technical data. We established a work procedure – covering steps from decontamination to temporary placement of removed material – and demonstrated that proper radiation management for workers can be achieved, even in outdoor decontamination work. The importance of preliminary studies for establishing a plan to carry out decontamination was highlighted, and best practices for decontamination work were presented. The results were

Scene of decontamination at a private home

then incorporated into the common work specifications for full-scale decontamination by the national government. Furthermore, we confirmed the best direction for future R&D in order to carry out and optimize decontamination."

Collaboration/cooperation with relevant organizations

"In our collaboration/cooperation with relevant organizations, we have provided technical support and cooperation to enable the Ministry of the Environment and local governments to smoothly proceed with decontamination activities, focusing first on Fukushima Prefecture. In the special decontamination area, we have cooperated with the decontamination activities of the Ministry of the Environment, provided technical guidance for decontamination work, and assisted the formulation of decontamination plans and conduct of decontamination work by each municipality in the area subject to high priority survey of the contamination situation. We have provided assistance in a total of 1,844 cases.

Observation and technical guidance for decontamination work

Cooperation with explanatory meetings for residents

In terms of communication activities, we have held approximately 210 meetings to answer questions about radiation, for more than 16,000 parents, guardians and teaching staff at elementary schools, kindergartens and day-care centers.

Also, at the request of Fukushima Prefecture, we have conducted internal exposure testing, using a whole body counter (WBC) and mobile WBC truck, for more than 30,000 residents living in the prefecture."

Strengthening R&D efforts

"To contribute to restoration of the Fukushima environment going forward, the Fukushima Environmental Safety Center will collaborate and cooperate with relevant organizations in the Fukushima region, and ascertain both spatial and temporal changes in environmental radiation. In other efforts to achieve environmental restoration, we will conduct research to evaluate safety of the living environment, such as the sophistication of monitoring and mapping technology, and carry out R&D to restore an anxiety-free living environment, such as elucidating the adsorption-desorption process for cesium.

In summary, JAEA will take the following action so that the residents of Fukushima can live their lives with peace of mind.

・In cooperation with national/local governments and relevant organizations, we will continue our

activities to restore the environment.

・As a group of experts on nuclear power, we will take the initiative in conducting R&D to restore the living environment.

・In collaboration with experts and professional bodies inside and outside Japan, we will carry out activities requiring academic expertise.

Furthermore, we will actively disseminate the results we have obtained here both inside and outside Japan."

R&D relating to safety

– Efforts at the Oarai Research and Development Center –

Hiroshi Kawamura, Deputy Director General,
Oarai Research and Development Center

Next was a report by Hiroshi Kawamura, Deputy Director General of the Oarai Research and Development Center on "R&D relating to safety – Efforts at the Oarai Research and Development Center." The following provides a summary of the part relating to the accident at the TEPCO's Fukushima Daiichi Nuclear Power Station.

For about 40 years, the Oarai Research and Development Center has conducted safety research using the JMTR, and contributed to efforts such as the creation of a national database for safety review and aging assessment.

Regarding the accident at the TEPCO's Fukushima Daiichi Nuclear Power Station in March 2011, on the other hand, "strengthening the instrumentation system for reactors and containment vessels, etc." has been highlighted as a lesson to be learned in the report by the Japanese government to the IAEA Ministerial Conference regarding nuclear safety which was compiled in June 2011. Also, in March 2012, the Nuclear and Industrial Safety Agency indicated measures for preventing hydrogen explosions, ensuring reliability of instrumentation in case of an accident, and strengthening ability to monitor plant status, in their technical findings on the accident at the TEPCO's Fukushima Daiichi Nuclear Power Station.

In light of this situation, we will help improve safety measures for light water reactors by developing hydrogen concentration sensors, water level gauges and gamma ray detectors which can withstand even severe accidents. This will be achieved by using the various measurement technologies we have accumulated through R&D on safety using the JMTR.

Making full use of our experience and findings relating to dismantling technology

Takashi Iijima
Director, Department for Planning and Management of Partnership Operations, Headquarters of Fukushima Partnership Operations
Hiromichi Ogawa
Director, Department of Decommissioning and Waste Management, Nuclear Science Research Institute
Yoshikuni Otani
Deputy Director, Nuclear Fuel Cycle Engineering Laboratories

From left: Iijima (Director), Ogawa (Director), Otani (Deputy Director)

The final theme was "Making full use of our experience and findings relating to dismantling technology." First, Takashi Iijima, Director of the Department for Planning and Management of Partnership Operations at the Headquarters of Fukushima Partnership Operations, explained the medium-term roadmap for decommissioning the TEPCO's Fukushima Daiichi Nuclear Power Station. Next, Hiromichi Ogawa, Director of the Department of Decommissioning and Waste Management of the Nuclear Science Research Institute, spoke on the theme of "Making full use of our experience and findings relating to dismantling technology – The Japan Power Demonstration Reactor (JPDR) Decommissioning Project." Director Ogawa pointed out that "Technologies for tasks such as dismantling and decontamination have been developed and verified in the project by successfully carrying out safe dismantling of nuclear facilities using appropriate dismantling technology and radiation control. The safety of trench disposal has been demonstrated, and data and knowledge have been accumulated relating to dismantling work and wastes." He also noted that "through these efforts, a foundation for dismantling nuclear reactor facilities has been established."

Next, Director Iijima spoke on the theme "Making full use of our experience and findings relating to dismantling technology – Decommissioning of the Fugen prototype advanced thermal converter reactor." He said that "Fugen was the first practical-scale water-cooled reactor for which decommissioning was attempted. Basic technology for dismantling nuclear reactor facilities, established in the JPDR Decommissioning Project, was used, and efforts were made to raise the level of technologies for dismantling (e.g., laser cutting) and waste volume reduction. A system for decommissioning planning and evaluation was developed by accumulating data on man-hours,

exposure doses and costs involved in facility dismantling." He stated his desire to apply technologies for facility dismantling and waste treatment to practical decommissioning in the future.

Deputy Director Yoshikuni Otani of the Nuclear Fuel Cycle Engineering Laboratories, Tokai Research and Development Center, also gave a talk with the theme "Making full use of our experience and findings regarding dismantling technology – Experience with dismantling technology at the Tokai Reprocessing Facility." He stated that decommissioning of auxiliary facilities will be accelerated by making use of findings – obtained from experience in areas such as remote dismantling and maintenance of the glass fusing furnace, dissolution tanks and other equipment in a high dose environment at the Tokai Reprocessing Facility – while considering the potential for using these findings in decommissioning of the Fukushima Daiichi Nuclear Power Station.

Closing remarks

Yonezo Tsujikura, Executive Vice President, JAEA

At the end of the Reporting Conference, Yonezo Tsujikura, Executive Vice President, JAEA, took the podium, expressed his thanks to the participants, and said that JAEA is conducting a broad range of advanced R&D on fundamental issues – not only in the field of the nuclear fuel cycle, but also in areas such as nuclear fusion and quantum beams. He concluded the conference with the words, "As Japan's only general R&D institution relating to nuclear power, JAEA will work to disseminate all of its results to the world."