Activities Concerning Radiation Control for the Treatment of Accumulated Water at the Fukushima Daiichi Nuclear Power Plant

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Hitachi-GE Nuclear Energy, Ltd. (HGNE) has been involved in various construction works at the Fukushima Daiichi Nuclear Power Plant (1F) since the Tohoku Pacific Ocean Earthquake that occurred on 11 March 2011. The construction of facilities for treatment of the accumulated radionuclide-contaminated water conducted this year was the largest project yet since the start of the emergency works. Various actions are presented here concerning the radiation control taken in this construction work.

1. Exposure reduction measures for key persons

In this construction work where a large exposure dose is expected, it was assumed in the analysis of the expected exposure dose for job type that the supervisors and group leaders would have a high exposure dose. Among these supervisors and group leaders, many of them who will need to engage in works at 1F after the treatment of contaminated water as key persons will already have had a large cumulative exposure dose; hence it was assumed they had reached the exposure dose control limit for the radiation exposure during the work. Since this would have an impact on the overall work there was a need to reduce the exposure dose of these workers.

In order to reduce exposure dose of key persons, measures were taken in two aspects: individual dose control and environmental aspects.

1.1 Individual dose control

Measures described below were taken to reduce the exposure dose of key persons.

- Set a target value of the control for each of the workers taking into consideration their cumulative exposure dose and expected engagement in future works.
- Allocation of workers considering the dose rate of the work place and importance level of the work, in order to achieve the control target value.

1.2 Exposure dose reduction with respect to the environment

Measures described below were taken in the view point of reducing environmental dose rate

- Reduction by modifying design of the constructed facilities (e.g. change of piping routes)
- Reduction by improving methods (e.g. employing a remote monitoring method)
- Reduction by utilizing shielding (e.g. installing shielding)
- Other measures (e.g. visualization)

These measures allowed significant reduction in the dose rate of work places, leading to the reduction of the exposure dose of key supervisors and group leaders.

2. Measures to prevent problems related to radiation control

Workers without any previous work experience at 1F or other nuclear facilities are expected to be

engaged in this work. There was a concern that problems related to the radiation control may occur with such novice workers. Therefore, in addition to lectures, the hands-on “experience education of radiation control related dangers” was developed as a type of “physical experience education” and provided to the workers at the site. The education experiences included “Experience of body contamination”, “Experience of APD alarming sound”, “Experience of exposure dose reduction” and “Experience of checking for full-face mask leaks”. The workers’ understanding of radiation control was improved through these experiences, thus preventing radiation control problems from occurring.

3. Conclusion

Works toward the 1F decommissioning have steadily been implemented, however, a lot of the works planned from now on will be done in high dose rate areas. Thus the radiation control activities including the reduction of exposure dose will become even more important. HGNE will continuously make efforts for ensuring the radiation safety of workers through the development of radiation control methods corresponding to the changing works.