

NDF Strategic Plan for Decommissioning of the Fukushima Daiichi Nuclear Power Station

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NDF was set up in August 2014, as an organization specializing in formulation of strategies and provision of technical support with the objectives of safe and steady decommissioning of damaged reactors. Since then efforts have been made to study the specific strategies to address major challenges of decommissioning from the mid-and-long-term viewpoint, and NDF formulated the first version of the “Strategic Plan” in April 2015, and is going to revise and formulate its 2016 version by summer of 2016. The goals of this “Strategic Plan” are to provide a firm technical basis for the government’s mid-and-long-term Roadmap.

Basic concept of the Strategic Plan

The basic concept of the Strategic Plan is to continuously and promptly reduce the risks associated with the radioactive materials in the Fukushima Daiichi NPS, and risk reduction strategy is formulated for the risks which are represented by the significant effect (hazard potential) and the likelihood of loss of containment function due to radioactive materials (risk sources) such as fuels, contaminated water and waste.

The major risk sources are categorized into three levels depending on the order of priority. This Strategic Plan focuses on the areas of study, the fuel debris retrieval which requires thorough preparations and has a number of challenging issues, and the waste management that requires to be addressed on a long-term basis.

The technical studies on the fuel debris retrieval and the waste management are set out based on the following Five Guiding Principles to risk reduction;

- 1) Safe- Reduction of risks posed by radioactive materials
- 2) Proven- Highly reliable and flexible technologies,
- 3) Efficient- Effective utilization of resources (human, physical, financial, space, etc.),
- 4) Timely- Awareness of time axis, and
- 5) Field-oriented- Thorough application of Three Actuals (the actual place, the actual parts and the actual situation).

Strategic plan for fuel debris retrieval

(Approaches to the study on the fuel debris retrieval)

Although the fuel debris is in a certain stable condition at present, it needs to be retrieved as soon as reasonably achievable by careful preparations and proven technologies, and store it in a stable condition in the site to reduce further risks.

This should proceed with the following steps:

- 1) maintaining and management of the fuel debris in stable condition until it is retrieved;
- 2) safe retrieval of the fuel debris; and
- 3) storage of the retrieved fuel debris in a stable condition after being collected and transported.

Especially among these steps, (2) safe fuel debris retrieval requires to be evaluated based on the following major issues of “identification of the location, amount, properties of fuel debris and FP distributions,” ensuring the safety during the

fuel debris retrieval work” and “the fuel debris retrieval method.” The studies on “ensuring the safety during the fuel debris retrieval work,” and “the fuel debris retrieval method” correspond to the technical requirements for the fuel debris retrieval method and consist of the following nine items:

- 1) securing the structural integrity of the PCV and the R/B,
- 2) criticality control,
- 3) maintaining the cooling function,
- 4) establishment of the containment function,
- 5) reduction of exposure to the workers during operation,
- 6) development of fuel debris retrieval equipment and device,
- 7) establishment of access routes to the fuel debris,
- 8) establishment of the system equipment and working areas, and
- 9) ensuring the work safety.

(Options of the retrieval method and plan for selecting the scenario in accordance with the options)

This strategic plan describes possible options for the fuel debris retrieval method based on the water level of the PCV which can be filled with water and the direction of accessing the fuel debris for each of the Submersion method and the Partial submersion method. After the selection of the methods to be focused on,

the current status and the future actions for the nine technical requirements for the Submersion and Partial submersion methods are discussed. In addition, this plan proposes several scenarios with combinations of different methods and the plan for selecting the scenario in accordance with the conditions of each unit.

The scenario of application to the actual plant is to be selected in stages in accordance with the technical development which will be a key to the success in the fuel debris retrieval method, improvement of estimation accuracy of plant conditions such as the locations and distributions of the fuel debris in each unit. The investigation required to determine the application scenario for each unit and review of the R&D plans are carried out as necessary.

Reference

[1] Nuclear Damage Compensation and Decommissioning Facilitation Corporation, Technical Strategic Plan 2015 for Decommissioning of the Fukushima Daiichi Nuclear Power Station of Tokyo Electric Power Company - Towards Amendment of the Mid-and-Long-Term Roadmap in 2015- (2015)

Country or International Organization

Japan

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