Phase: **Design**

Decommissioning Process **"Fuel Debris Retrieval"**
Investigation Subject **"Strategy and risk"**
Issue **"Fuel debris retrieval policy"**

Needs

1. Confirming the details of fuel debris retrieval work and the feasibility of the system

Fuel Debris Retrieval：【Short】

Desired state and reasons for it

- In order to implement fuel debris retrieval in a sustainable manner, it is desirable to confirm the contents of the work at each stage of fuel debris retrieval and the feasibility of the system through consulting and technical reviews.

Current state against ideal

- TEPCO is currently conducting a conceptual study on further expansion of the scale of fuel debris retrieval, with Unit 3 being the first to go, and fuel debris retrieval scenarios as well as methods.
- In this context, construction methods have been studied until the end of FY2021, in FY2022, the measures to deal with these issues and risks were evaluated, including on-site applicability and technological feasibility. In addition, in FY2023, the issues to be confirmed for each method and the feasibility of the method, including its business continuity is evaluated. Issues to be resolved.

Issues to be resolved

- The construction method should be evaluated based on the five perspectives (safety, reliability, rationality, rapidity, and site-oriented) to confirm whether the targeted safety level is satisfied, and whether the method is site-applicable, technically feasible, and having business continuity.
- In addition, judgment indicators should be set from the initial stage of construction method study, and the judgment criteria used for evaluation should be clarified.
- Regarding the judgment criteria, perspective for objective judgment (e.g., exposure assessment, structural assessment, etc.) should be clarified in advance.
- The method should be to enable the retrieval even if the entire site situation cannot be identified, and the method should be less susceptible to external events such as earthquakes (robust construction method).

2. Investigating alternative methods for fuel debris retrieval

Fuel Debris Retrieval：【Mid】

Desired state and reasons for it

- In order to prepare a backup for the fuel debris retrieval method, it is desirable to consider in advance a method different from the existing one.
- It is desirable to select the most appropriate method according to the condition or the safest method under the condition.

Current state against ideal

- Based on the importance of determining the fuel debris removal method, a "Subcommittee for Evaluation of Fuel Debris Removal Methods" (hereinafter referred to as the Subcommittee) has been established under the Technical Committee on Decommissioning, etc., a committee of the NDF, to study and evaluate the method.
- Examples of the methods include the airborne method, optional airborne method (filling and solidification methods)) and the flooding method.
- The proposed airborne method (RPV water injection) is a method to remove fuel debris while pouring water inside the RPV as the fuel debris is exposed in the air or immersed at a low water level.
- The airborne method optional (RPV filling and solidification) involves physically stabilizing the bottom of the pedestal, RPV, and reactor well with filling material, and then excavating and removing the fuel debris together with the filling material.
- The flooding method (ship hull method) is a method of enclosing the entire reactor building with a new structure called a ship hull structure as a confinement barrier, flooding the reactor building, and removing the fuel debris.
- The Subcommittee reported its findings in March 2024 after 12 rounds of deliberations. TEPCO is proceeding with specific design investigations in accordance with the contents of the Subcommittee report. It also plans to complete the specific design investigations in one to two years and to move on to the basic design phase using their results.

Issues to be resolved

- In order to proceed the decommissioning of nuclear power plants safely and stably, which have many uncertain factors, it is important to develop a system and establish a method that allows planning to be carried out based on the information and assumptions currently available, while at the same time incorporating new information and various findings obtained as work progresses in a timely manner and flexibly revising the plan according to the condition as it becomes clear.

Relevant Issues

- FDR-101 "Understanding status of fuel debris"
- FDR-102 "Understanding status of structures inside PCV and RPV"
- FDR-104 "Understanding doses inside PCV and RPV"
- FDR-105 "Collection of knowledge on conditions inside PCV"
- FDR-211 "Ensuring structural integrity of PCV and buildings"
- BST-006 "Risk assessment"