Decommissioning Process **"Fuel Debris Retrieval"**
  Investigation Subject **"Understanding status inside PCV"**
    Issue **"Collection of knowledge on conditions inside PCV"**

Needs

1. Consolidating obtained knowledge and comprehensively understanding the conditions in the reactor

Fuel Debris Retrieval：【Mid】

Desired state and reasons for it

- In order to formulate a fuel debris retrieval plan, it is desirable to reorganize information on the in-core condition obtained from actual equipment investigations, experiments, knowledge, accident progression analyses, or other sources and to improve the estimation of the condition of each unit.
- Since it is not possible to confirm the entire inside of the PCV and the RPV, it is desirable to estimate the condition of parts that cannot be visually confirmed, by using analysis and evaluation technologies. These require not only the acquisition and detailed analysis of a portion of the debris, but also evaluation that pays attention to consistency with objective data. In order to maintain technical capability and human resources, it is important to conduct research such as experiments and analyses, and to constantly improve the accuracy of predictions through the exchange of opinions among experts on the content of analysis data and analysis evaluations.
- The fuel debris retrieval method, the process management, and the integrity evaluation of structure are important issues because they may lead to improve work efficiency and safety. For this reason, it is important to understand the condition in the reactor that overlook these decommissioning processes (decommissioning management). Mainly during the fuel debris retrieval period and the PCV／RPV／building dismantling period, the in-core status should be updated on an ad-hoc basis based on the results of internal investigations and accident progression analyses and it needs to function as a hub (information collection point) for outputting to the decommissioning process.

Current state against ideal

- TEPCO has been continuously conducting estimation of conditions inside RPVs and PCVs. The results were organized in 2021 in "Estimation of Conditions in the Reactor Pressure Vessel and Containment Vessel after the Accident at the Fukushima Daiichi Nuclear Power Plant". On the other hand, it cannot be said that sufficient information has been collected to support the estimation.

Issues to be resolved

- The future issue is how to reorganize information on fuel debris and FPs and on the status of structures inside the PCV and the RPV, which are listed in FDR101 to FDR104, for the purpose of contributing to the fuel debris retrieval method and system design.
- In Government-led R&D Program on Decommissioning and Contaminated Water Management, the results of fuel debris characterization were compiled into a "Properties List". In the same

project, an "In-core Status Estimation Map" was prepared under the project "Upgrading Level of Grasping State inside Reactor". In the future, it is necessary to analyze and evaluate fuel debris obtained by fuel debris retrieval, etc., and to integrate the results.

- Since information will be continuously collected and its volume will keep growing, it is necessary to consider an efficient and effective data management method.

Relevant Issues

- ➢ FDR-101 "Understanding status of fuel debris"
- ➢ FDR-102 "Understanding status of structures inside PCV and RPV"
- ➢ FDR-103 "Understanding status of FP"
- ➢ FDR-104 "Understanding doses inside PCV and RPV"
- ➢ FDR-201 "Sorting fuel debris and radioactive waste"
- ➢ FDR-205 "Establishing confinement function"
- ➢ FDR-213 "Fuel debris retrieval policy"
- ➢ FDR-214 "Establishing debris collection strategy"
- ➢ FDR-217 "Establishing access route to fuel debris"
- ➢ FDR-218 "Developing fuel debris retrieval equipment and devices"