Phase: **Design**

Decommissioning Process **"Dismantling PCV/RPV/Buildings"**
Investigation Subject **"Structural integrity"**
Issue **"Understanding the structural integrity of PCV and the buildings, etc."**

Needs

1. Confirming current and long-term structural integrity

Desired state and reasons for it

- Before and during dismantling the PCV／RPV／building, it is necessary to ensure their structural soundness and seismic safety from the viewpoint of ensuring the confinement function of radioactive materials.
- It is also desirable to be able to make a comprehensive judgment of the integrity of the buildings by monitoring both sudden changes and the changes that occur over time.
- Therefore, it is desirable to be able to evaluate structural soundness and seismic safety, including deterioration caused by aging that becomes apparent after a long and complex history.

Current state against ideal

- Integrity evaluation for the PCV／RPV／buildings have been conducted to a certain extent, and long-term maintenance management plans considering the progress of deterioration have been formulated and are in operation. In addition, for the integrity of the Unit 1 to 3 reactor buildings, the internal investigation of the building and trend analysis using seismographs is being continuously conducted.
- In particular, based on the confirmation of the exposure of the inner wall reinforcement and inner skirt inside the pedestal during the investigation inside the containment vessel of Unit 1, a safety assessment on the pedestal support function is being conducted. In this assessment, while the maximum effective dose at the site boundary in the event of loss of pedestal support function, subsidence of the RPV, and large opening of the PCV is assumed to be 0.04 mSv／event. Since it includes uncertainty due to the estimation of temperature history during the accident and the limited inspection range of the equipment, measures to mitigate the effects of dust dispersion are planned to be taken.
- The survey method of integrity in the high-dose building is still under investigation.
- For Unit 2, part of fuel assemblies had fallen to the bottom inside of the pedestal, though no significant damage is confirmed to the CRDH support and to the inner wall surfaces of the pedestal. For Unit 3, part of the CRDH support had fallen, though no significant damage is confirmed to the inner wall surfaces of the pedestal.

Issues to be resolved

- It is necessary to evaluate the soundness of the building as appropriate based on the facts that will be revealed by the PCV／RPV／building interior investigations, etc. to be conducted in the future. Also, it is considered necessary to advance the evaluations of the decline in integrity with aging and of the decline in strength due to dismantling.

- It is considered necessary to develop a survey method for integrity and monitoring technology in high-dose buildings.

2. Ensuring the structural integrity

Desired state and reasons for it

- To dismantle the PCV／RPV／buildings safely, it is desirable that measures (management and maintenance activities, etc.) are taken to ensure structural integrity and seismic safety, considering the results of prediction and evaluation of degradation modes and aging.

Current state against ideal

- The process of installing a large cover for Unit 1, etc. was reviewed in consideration of the application of the new seismic design policy presented by the Nuclear Regulatory Commission in FY2022 and the process related to slope countermeasures around seismic critical facilities were added to the "Decommissioning Medium- and Long-term Action Plan" in FY2024.
- In addition, during the investigation inside the containment vessel of Unit 1, the inside wall reinforcement and inner skirt were found to be exposed inside the pedestal. In response to this fact, a safety assessment in the pedestal support function is being conducted. However, this safety assessment includes uncertainties due to the estimated temperature history of the accident and the limited scope of inspection of the equipment.

Issues to be resolved

- Reasonable countermeasures need to be implemented based on the results of NEEDS 1. In implementing countermeasures, it is considered necessary to keep in mind that the impact on dismantling operations must be minimized and the increase in the amount of waste must also be controlled.
- The safety assessment based on the results of the Unit 1 internal investigation indicated that the structural integrity of the reactor building as a whole will be sufficiently maintained even if extreme events are assumed. However, premises and input values for the evaluation had to be based on assumptions, it will be important to reflect the facts that will become clear during the internal investigation and debris removal work to be conducted in the future.

Relevant Issues

- DRB-301 "Removing in-core structures and dismantling buildings"