Phase: **Action**

Decommissioning Process **"Fuel Removal from SFP"**
Investigation Subject **"Removal"**
Issue **"SF removal"**

Needs

1. Safely pulling out stuck spent fuel

Fuel Removal from SFP：【Short】

Desired state and reasons for it

- As one of the removal methods for fuel in the SFP that cannot be removed smoothly, it is desirable to be able to solidify the entire fuel assembly so that it can be handled as a single unit.

Current state against ideal

Unit 1

- Assembling works of steel frames, etc., are being conducted in the yard outside the premises in preparation for the installation of the large cover.
- The followings are scheduled in the future:
- Installing a large cover to prevent dust scattering during rubbles removal
- Fabrication of fuel handling equipment necessary for fuel removal
- Installing fuel handling equipment after removal of rubbles and collapsed overhead cranes, treatment of well plugs (shielding concrete installed on top of the primary containment vessel) that have been displaced due to the accident, and dose reduction by decontamination and shielding.
- Starting fuel removal after fuel handling training

Unit 2

- Preparation works such as ground improvement are underway for the installation of the south-side platform.
- In the reactor building, works based on dose reduction measures are being implemented on the top floor of the building to reduce the radiation dose.
- The followings are scheduled in the future:
- Fabrication of fuel handling equipment necessary for fuel removal
- Installing a platform on the south side of the reactor building in order to remove the fuel from the wall opening of the reactor building.
- Installing fuel handling equipment after reducing dose by decontamination and shielding of the operation floor
- Start fuel removal after fuel handling training

Issues to be resolved

- It is necessary to prepare measures to remove spent fuel according to the degree of its damage.
- It is necessary to prepare countermeasures for fuel and stump fuel that cannot be pulling out due to biting or other causes. In particular, if rubble is trapped in a gap between racks and fuel cannot be removed, there could be other options such as cutting it before removal and technologies are required to cope with the options.

- The removal of stump fuel could be addressed by combining existing technologies.
- However, some fuel may not be removed smoothly. In particular, one of the possible methods for fuel removal in the SFP is to solidify the entire fuel assembly so that it can be handled as a single unit. In such a case, however, there is a high possibility that solidification could be an irreversible operation and therefore, an increase of the difficulty of subsequent processing and disposal work must be avoided. In addition, the fuel could adhere to racks and other objects during solidification, making it difficult to remove, so it is necessary to introduce solidification technology that can avoid such adherence.
- The well plugs in Units 1-3 are noted to be "extremely important in terms of safety and decommissioning operations" due to their high level of contamination. Since manned work is also expected during fuel removal from the pool when installing some equipment and when responding to problems, it is necessary to reduce the radiation dose to the operation floor as much as possible and to improve the environment.

Relevant Issues

- SFP-101 "Understanding current status of SFP"
- SFP-201 "Understanding and preventing emission and leakage"
- SFP-202 "Ensuring structural integrity"
- TSR-101 "Characterization"
- TSR-102 "Waste strategy"
- TSR-103 "Material accountancy"
- PDR-101 "Characterization"
- PDR-102 "Waste strategy"
- PDR-103 "Material accountancy"