Decommissioning Process **"Common Issues"**
Investigation Subject **"Radiation resistance"**

Needs

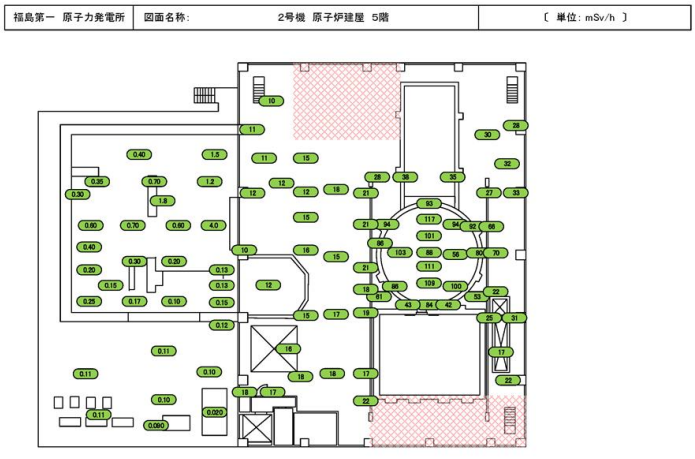
1. Establishing a radiation resistance technology

Desired state and reasons for it

- Since there are areas with extremely high radiation doses in the building and the PCV, the equipment, etc. used in these areas are required to have high radiation resistance.
- The resistance of electronic equipment to radiation is important, among other things, in the development of fuel debris retrieval equipment and devices.

Current state against ideal

- In September 2021, a high radiation level of 1.2 sievert per hour was observed near the surface of the well plug in the reactor containment vessel of Unit 2. Based on the results of the dose survey, decontamination and installation of shields on the top of the well plugs, etc. were carried out, and the dose reduction effect was confirmed again in May 2022. The installation of an opening on the south side of the operation floor is scheduled to be carried out in the future, and there is a risk that the work area will be contaminated again.
- Below are the results of air dose rates measured on the 5th floor of the reactor building of Unit 2, including the highest location (117 mSv／hour) in the reactor building among Units 1 to 6 during the year of FY2020.
- During the test retrieval at Unit 2 conducted in November 2024, it was unfeasible to obtain images from the advanced jig's camera due to radiation-induced charging effects on the camera board caused by high radiation. In irradiation tests conducted under harsher conditions than on-site environment, as well as in irradiation tests conducted under the condition tailored to actual on-site environment, there were cases where the radiation resistance did not meet the manufacturer's specifications.



2号機原子炉建屋5階の空間線量率

東京電力ホールディングス株式会社福島第一廃炉推進カンパニー. "建屋内の空間線量率について". 福島第一原子力発電所周辺の放射性物質の分析結果. 原子炉建屋内等（※年1回更新）. 2021-08-27. https://www.tepco.co.jp/decommission/data/surveymap/pdf/2021/sv-u2-20210827-j.pdf. (参照2021-12-09)

Issues to be resolved

- Equipment, etc. that are required to have high radiation resistance include various sensors, semiconductor parts, cables, and cameras and so on.
- The required level of radiation resistance depends on the dose in the environment in which the equipment, etc. are used and the time of use (cumulative dose). Therefore, it is important that the development should be carried out assuming the specific environment and the specific equipment to be used in the environment.
- It is necessary to survey radiation resistance for robots operated inside the reactor building (e.g., the four-legged robot "Spot" manufactured by Boston Dynamics in the United States) from the perspective of calculating maintenance costs.
- For equipment for which radiation resistance has been surveyed, it is necessary to establish a database to share that information.

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"