

Keynote Lecture

Current status of Fukushima Daiichi decommissioning: Issues and Perspectives

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Abstract: Thirteen years after the Fukushima Daiichi Nuclear Power Station accident, significant milestones have been achieved in decommissioning efforts. Attention now turns to the formidable task of fuel debris retrieval, slated to commence this year.

Keywords: Decommissioning, Contaminated water, ALPS treated water, Spent fuel, Fuel Debris

1. INTRODUCTION

It has been over 13 years since the accident at Fukushima Daiichi Nuclear Power Station. During this period, spent fuel removal at Units 3 and 4 was completed, and significant progress has been made in managing the contaminated water. Furthermore, the discharge of the ALPS treated water began last year.

Consequently, our current focus is on the most challenging task at the site: fuel debris retrieval. This year will mark the commencement of this arduous endeavor.

2. CONTAMINATED WATER MANAGEMENT AND ALPS TREATED WATER DISCHARGE

The generation of contaminated water in the reactor buildings has been reduced to less than 100m³/day. However, a challenge arises due to insufficient space for decommissioning activities, including the storage of spent fuel and fuel debris. Consequently, the water treated by ALPS must be discharged into the ocean. After receiving approval from the relevant authorities, TEPCO commenced the discharge of the ALPS treated water in August 2023. The discharge process ensures that the water meets regulatory standards for radioactive material concentration, thus posing no adverse impacts on human health and the environment. Regarding Tritium, it is diluted with a large volume of seawater before discharge to reach levels well below 1,500 Bq/L. This concentration is one fortieth of the Japanese regulatory standard of 60,000 Bq/L and significantly lower than the WHO criteria for drinking water, which is 10,000 Bq/L. Following discharge, the water undergoes further dilution, and no abnormalities have been detected by TEPCO and other organizations' monitoring systems. TEPCO remains committed to disseminating accurate information based on scientific facts.

3. FUEL REMOVAL FROM THE SPENT FUEL POOLS

Fuel removal from the spent fuel pools at Units 4 and 3 was completed in 2014 and 2021, respectively. The current plan is to commence removal operations at Units 1 and 2 in the mid-2020s. It has been decided to install a large cover in advance for Unit 1, considering the risk of dust scattering. The fuel removal at Unit 2 will be conducted from the south side without dismantling the existing upper section of the building.

4. FUEL DEBRIS RETRIEVAL

Progress in various investigations has allowed for an understanding of the distribution of fuel debris in the Primary Containment Vessels of Units 1 to 3. The decision was made to commence the first retrieval process at the most extensively investigated Unit 2. In January 2024, it was determined that the telescopic arm would be deployed into the reactor before the robotic arm's retrieval.

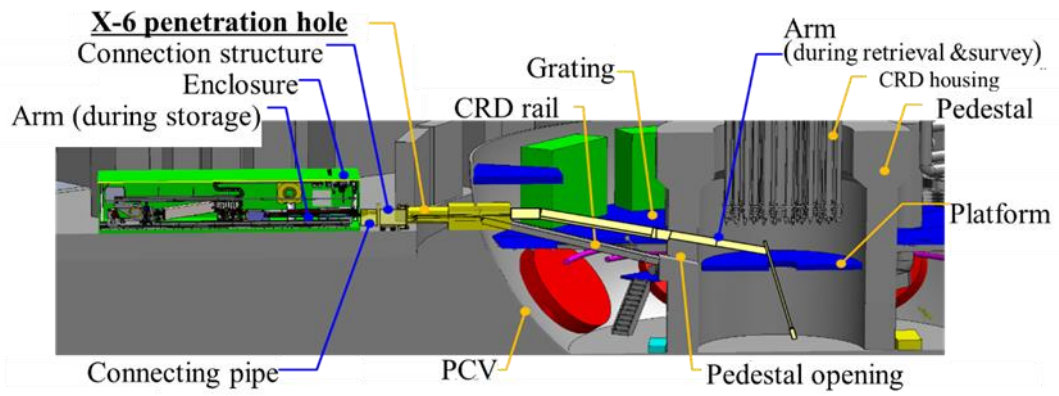


Figure 1. Conceptual diagram of trial fuel debris retrieval