

R&D Outline for Decommissioning of the Fukushima Daiichi Nuclear Power Station

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Abstract

International Research Institute for Nuclear Decommissioning (IRID) was established in August 2013 in Japan as an organization to develop nuclear power plant decommissioning technologies efficiently. The main purposes are at first technology development for nuclear decommissioning, secondly, promoting cooperation with international and domestic organizations on nuclear decommissioning, and thirdly developing human resources for research and development.

Since then, IRID has been playing a proactive role in the R&D required for the decommissioning of Fukushima Daiichi Nuclear Power Station of TEPCO in Japan as an urgent issue.

In this poster session, I will introduce some examples of IRID's R&D activities for preparation of fuel debris retrieval that is a core operation of decommissioning.

Various kinds of remote controlled equipment and robots have been developed so far for decontamination and investigation inside the reactor building. In 2012 and 2013, we investigated the dose rate and contamination distribution at each floor of the Units 1-3. Therefore, the conditions inside the reactor buildings are still very severe. We have developed three types of remote decontamination equipment: suction/blast type, high pressure water jet type and dry ice blast type.

As the most recent example, IRID developed a shape changing robot that can go through a penetration to investigate outside the pedestal at the lower part of the RPV.

IRID also developed a technology for detection of fuel debris in the reactor. Remote sensing technology utilizing cosmic ray muon is one of the methods to identify location of fuel debris.

In the development of technologies for fuel debris retrieval, in addition to the method in which PCV is submerged, we are evaluating retrieval in the air, partial or full in air, as applicable method. Because the status differs from unit to unit, we should consider the applicability of each method.

IRID is also studying the technologies to establish concept for treatment and disposal of accident generated waste. Radionuclide analysis of rubbles, fallen trees and contaminated water, etc. sampled at Fukushima Daiichi NPS and inventory evaluation of waste materials based on the analysis of these results are now being performed. In order to have a clear prospect of safe treatment and disposal of solid waste, IRID will continue to conduct R&D of technologies required for storage management, waste characterization, waste encapsulation, and waste disposal.

As the result of our R&D activities, IRID has acquired some useful outcome, but at the same time, technical challenges toward decommissioning have also becoming clearer. Based on these achievements and challenges, IRID will keep working on technology development necessary to decide the method for fuel debris retrieval in 2018, and contributing to completion of decommissioning at the earliest time.

Country or International Organization

International Research Institute for Nuclear Decommissioning, Japan

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