

International Conference on Management of Spent Fuel from Nuclear Power Reactors: An Integrated Approach to the Back End of the Fuel Cycle



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Al-clad metallic uranium legacy fuel after 50 years in underground dry storage . Spent fuel aging management

Spent, legacy fuel elements from the early 50s and 60s originating from the first Norwegian RR, JEEP I, are stored in an underground dry storage since the mid 60s. It is known that some of the Al-clad naturally enriched metallic uranium fuel elements had defects by the time they were discharged from the JEEP I RR and put into the cooling pond. In the mid 60s an underground dry storage site for JEEP I fuel was opened and the spent metallic fuel elements were transferred to the dry storage site: There, each element was stored individually in an open Al-container in a storage pit. Then, in 1982 the fuel elements were repacked into closed and tight stainless steel packages and stored dry, each element in one tight package and each package inside one underground storage pit. For many years the dry storage pits were sealed and opened for IAEA inspections, only. Now, and due to the age of the storage and the knowledge of the defects in the fuel, the spent fuel aging management program has to include inspection of the storage pits with regard to corrosion of the pit lining, the state of stainless steel package, the state of the inside of the package with respect to hydrogen, humidity, corrosion and signs of fuel degradation.

The paper illuminates not only the NDT examinations performed and the findings, but also the challenges, met after 50 years of storage. Next to the NDT examination the long time dry storage induced development of the defects in the fuel elements was studied in detail by neutronradiography and the fuel and defect microstructure by metallography and SEM.

Country/ int. organization

Institutt for energiteknikk (IFE), Kjeller, Norway

Primary authors: Dr OBERLÄNDER, Barbara Charlotte (Institutt for Energiteknikk, OECD Halden Reactor Project); Ms ANDERSSON, Vendi (Institutt for energiteknikk, Kjeller, Norway)

Co-author: Mr KLEEMANN, Hans-Jörg (Institutt for energiteknikk (IFE) Kjeller, Norway)

Presenters: Dr OBERLÄNDER, Barbara Charlotte (Institutt for Energiteknikk, OECD Halden Reactor Project); Ms ANDERSSON, Vendi (Institutt for energiteknikk, Kjeller, Norway)