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FUEL SAFETY EVALUATION METHODOLOGY FOR ATFS UNDER LOSS-OF-COOLANT ACCIDENTS

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In response to the Fukushima Daiichi accident, the development of advanced technology and accident tolerance fuels (ATFs) aims to enhance accident tolerance. The International Atomic Energy Agency (IAEA) launched a Coordinated Research Project (CRP) on Testing and Simulations for ATFs (ATF-TS) in 2020, which consists in four key Work Tasks (WTs) [1]. The work task 3 aims at development and application of a best estimate plus uncertainty fuel safety evaluation methodology (FSEM) for ATFs during Loss-of-Coolant Accidents (LOCAs) [2]. The methodology leverages validated fuel rod codes through Halden integral LOCA tests to simulate the behaviour of ATFs under LOCA conditions in typical nuclear power plants (NPPs), using thermal hydraulic boundary conditions generated by a system thermal hydraulic code [3]. The outcomes of the WT3 were documented in volume 3 of the IAEA TECDOC [4]. This paper presents the selected cases, participants, fuel rod codes, ATF concepts, the simulated cases, specified assumptions and methods, results and discussions, as well as the perspectives.

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