Reactivity Response Analysis of a Movable Reflector System for the GFR 2400 Core

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Abstract. The paper focuses on the development of neutronic and thermal-hydraulic coupled calculation for the GFR 2400 core. Multiple simulations and studies raise questions about the technical feasibility of the reactor concept. The main contributors to the core damage frequency are loss of coolant accident and unprotected transients that may result in core melting. Therefore, it is necessary to investigate these type of scenarios and proper design countermeasures that are able to minimize core damage frequency. The NESTLE simulation of the GFR 2400 core is demonstrated. The NESTLE code solves nodal multi-group diffusion equation and TRITON sequence process the macroscopic cross-section library appropriate for the NESTLE simulation. The investigated model simulates full power operation of GFR 2400 core that is interrupted by withdrawal of one control assembly to the upper edge of the core. Afterwards, passive system in the form of a reflector trap is actuated by Curie point latch and the change in reactivity and core temperatures are observed.