

عنوان مقاله:

Investigation of the Natural Circulation FlowMap in NuScale Small Modular Reactor

محل انتشار:

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خلاصه مقاله:

Natural Circulation (NC) is an important mechanism in several industrial systems, and knowledge of its behavior is of interest to nuclear reactor design, operation and safety. The main safety issue in present nuclear reactors is to ensure the sufficient removal of decay heat during accidents. Recently, Small Modular Reactors (SMRs) have increasingly received a lot of positive attention and even several types of these reactors are in different stages of design and construction. Some of these SMRs, such as NuScale, are designed to operate in full NC mode as the main mechanism of the primary coolant drive force for heat removal from the reactor core during normal operation. The present study deals with the Natural Circulation Flow Map (NCFM) investigation in the NuScale reactor as one of the SMRs that operate in full NC mode. At first, NuScale reactor elements are modeled with RELAP5 thermal-hydraulic code. Then, after the verification of the steady-state modeling, the operational point of the NuScale reactor is indicated in NCFM that is based on the database of different PWR simulators (gathered from the experimental test facilities). The evaluation of Natural Circulation Performance (NCP) of this reactor has proved the good design of NCP during normal operation in comparing typical PWRs operations in high power cases.

کلمات کلیدی:

Natural Circulation Performance (NCP), Integral Small Modular Reactors, Full Natural Operating Reactors, RELAP5

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