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Passive Safety System and Safety Demonstration of innovative Small Modular Reactor (i-SMR)

In order to respond to the global climate crisis and supply sustainable clean energy, the Republic of Korea has developing a new SMR named innovative SMR(i-SMR). The safety goals of the i-SMR are that a core damage frequency (CDF) is less than 10-E9 and a large early release frequency (LERF) is less than 10-E10. To achieve these safety goals, a passive system design is applied and a non-safety active system design is applied to back it up. The safety systems of i-SMR enable the emergency planning zone (EPZ) to be within the site boundary, which will be designed to practically eliminate the need for public evacuation during an accident.
This paper discusses the design characteristics of the passive system adopted by the innovative SMR. The safety system of the innovative SMR consists of a passive emergency core cooling system to respond to LOCA accidents, a passive auxiliary feedwater system to respond to non-LOCA accidents, and a passive containment cooling system to cool down the steel containment vessel. Also, this paper deals with examples of safety analysis results for the performance of those systems during the accidents. Lastly, a demonstration plan of the safety system through separated effect tests and integral effect tests is described.

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Confirm that the work is original and has not been published anywhere else

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