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Evaluation of Anticipated Transient without Scram for SM-SFR using SAS4A/SASSYS-1

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Small Modular Sodium-cooled Fast Reactor (SM-SFR) was developed in UNIST as a breeder reactor with the target of ultra-long cycle operation. The depletion analysis and quasi-static reactivity balance analysis were performed to see its inherent safety in the neutronics point of view. In this study, the inherent safety evaluation is performed in the thermal-hydraulic point of view by using transient analysis for LMR code SAS4A/SASSYS-1 which was developed in Argonne National Laboratory. Three major events of Anticipated Transient without Scram (ATWS) were tested for this research; Unprotected Loss of Flow (ULOF), Unprotected Loss of Heat Sink (ULOHS), Unprotected Transient Over Power (UTOP). Every perturbation for each transient event occurs at 10 second and each simulation time is 100 minute. The power to flow change, the reactivity profiles, and the temperature changes were investigated to trace each transient trend. It has been confirmed that SM-SFR has inherent safety from the fact that any of the events doesn't have a clad failure or a coolant boiling.

Country/Int. Organization

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