Safety Requirements Applicable to the SMART Design

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Abstract

The 330 MW thermal power of integral reactor, named SMART (System integrated Modular Advanced ReacTor), is under development at KAERI for seawater desalination application and electricity generation. The final product of nuclear desalination plant (NDP) is electricity and fresh water. Thus, in addition to the protection of the public around the plant facility from the possible release of radioactive materials, the fresh water should be prevented from radioactivity contamination. In this study, to ensure the safety of SMART reactor in the early stage of design development, the safety requirements applicable to the SMART design were investigated, based on the current regulatory requirements for the existing NPPs and the advanced light water reactor (LWR) designs. The interface requirements related to the desalination facility were also investigated, based on the recent IAEA research activities pertaining to the NDP. As a result, it was found that the current regulatory requirements and guidance for the existing NPPs and advanced LWR designs are applicable to the SMART design and its safety evaluation. However, the safety requirements related to the SMART-specific design and the desalination plant are needed to develop in the future to assure the safety of the SMART reactor.