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Developing Regulatory Frameworks for A/SMRs: Security by Design and Other Regulatory Considerations

The diversity of advanced reactor and small modular reactor (A/SMR) designs, combined with various modes of deployment and specific circumstances with respect to a country's threat assessment and design basis threat (DBT) or representative threat statement (RTS), raise new regulatory challenges and the need to adapt existing legislative and regulatory frameworks for nuclear security to account for the particularities of future A/SMR deployments. Establishing robust Security by Design (SeBD) regulatory requirements is essential for regulators and future operators to effectively address some of the potential security challenges posed by the future deployment and operation of A/SMRs. This paper discusses some of the regulatory challenges pertaining to the security of A/SMRs and embarks on a legal analysis of laws and regulations that illustrate how some of these challenges may be addressed. Based on open-source information, this paper analyzes legislative and regulatory provisions that could be leveraged to support SeBD and other security considerations for A/SMRs and identifies related references in IAEA nuclear security series publications. Based on the results of this analysis, the paper discusses several regulatory provisions that embarking and expanding countries may consider adding or enhancing in their frameworks as they further develop or adapt existing regulatory documents to ensure the secure deployment of future A/SMRs. Among other topics, the analysis will focus on SeBD requirements and their consideration in the licensing process. (Released under PNNL-SA-195386)

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