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A Common Approach to Safeguards and Security by Design for Small Modular Reactors

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Small Modular Reactors (SMR) with power levels significantly less than the currently standard 1000 to 1600-MWe reactors have been promoted as having a simpler, more standardized, and safer modular design by using factory built and easily transportable components. Because many SMRs designs are still conceptual and consequently not yet fixed, designers have a unique opportunity to incorporate updated design bases threats and emergency preparedness requirements, and more completely integrate safety, physical security, and safeguards/material control and accounting (MC&A). Through the U.S. - Russia Civil Nuclear Energy Working Subgroup activities, collaborative efforts have been focused on developing a common approach to safeguards and security by design (SSBD) for SMRs. To date, this common approach has been concerned with identifying the most relevant set of requirements and guidelines for security, MC&A, and international safeguards that influence SSBD for SMRs. Following identification of the relevant set of requirements and guidelines, evaluation of their applicability for global export of SMRs will be considered.

We report here the identification of commonalities and differences between U.S. and Russian domestic requirements for security and MC&A, and compare these commonalities and differences with IAEA guidance for security and MC&A. Additionally, international (IAEA) safeguards are reviewed for their applicability to SMRs, regardless of their siting location throughout the world. Applicability of the relevant set of requirements for global export of SMRs may be considered with respect to the international export regime, to include the Nuclear Suppliers Group. Results from this study may help guide future U.S. - Russian collaborations related to SSBD for SMRs.

Country or International Organization

United States of America

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