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Challenges and Opportunities in Developing a Safety Case for Small Modular Reactors: The Ghanaian Perspective

This review paper examines the safety objectives and application of defence-in-depth to Small Modular Reactors (SMRs) in Ghana, focusing on inherent and passive safety features, design simplification, integration, and modularity. It explores safety challenges and opportunities specific to SMRs, including severe accident mitigation, internal and external hazard considerations, and fuel and core safety. The paper also discusses materials and chemistry safety implications, risk-informed approaches for SMRs, and novel deployment models. It emphasizes the need for a robust safety case to address these challenges, highlighting the importance of leadership and management of safety in the context of Ghana's nuclear power program. The novelty of this paper lies In its comprehensive examination of the safety objectives and application of defence-in-depth to SMRs in Ghana, focusing on specific challenges and opportunities unique to the country's nuclear power program. It provides practical insights into addressing these challenges, enhancing the safety and success of SMR deployment in Ghana.The conclusions drawn from this review paper provide insights into the practical implementation of safety measures for SMRs in Ghana, contributing to the overall safety and success of the country's nuclear power development.
Keywords: Small Modular Reactors (SMRs), Safety Case, Ghana, Nuclear Power, Challenges and Opportunities

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