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U.S. –U.K. Bi-Lateral Collaboration on a Material Flow Safeguards Analysis for a Nominal Molten Salt Reactor Design

Advanced and small modular reactor technologies have an immense potential to change power generation strategies worldwide. However, by utilizing advanced fuels and design elements, these same technologies present novel challenges for securing and safeguarding nuclear materials, requiring innovative solutions. Molten salt reactors (MSR) represent one of the most challenging reactor design classes, using fuel dissolved in the coolant to form a homogenous mixture that continuously circulates through the reactor system. Future deployment and export of MSRs must be accompanied by effective and efficient safeguards approaches and must meet the high precedent set by the IAEA to ensure that global proliferation risks are mitigated.

In anticipation of this challenge, the United States Department of Energy's National Nuclear Security Administration and United Kingdom's Department for Energy Security and Net Zero recognize the need for cooperation and technical exchange to address challenges relevant to IAEA safeguards. This conference paper will present collaborative efforts to define key MSR design features and discuss their impact within a nuclear material safeguards context. While this work is not meant to provide a comprehensive solution to all anticipated safeguards challenges with MSRs, it should elicit dialogue and provide a framework for future work.

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Confirm that the work is original and has not been published anywhere else

YES

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