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# Molten Salt Fast Reactor in Generation IV: Proliferation challenges

Within the Generation-IV International Forum (GIF), research is performed on the molten salt reactor (MSR) concepts. Two fast spectrum MSR are being studied, which are large power units with homogeneous core: the two fluid 3000MWt MSFR in France, Euratom and Switzerland as well as the single fluid 2400 MWt MOSART in RF. R&D studies are on-going in order to verify that fast spectrum MSR systems satisfy the goals of Generation -IV reactors in terms of sustainability, safety, waste management and non-proliferation.

The IAEA defines proliferation resistance as a nuclear power system's capability at preventing the theft or undeclared production of nuclear material as well as the use of the technology considered in view of procuring a nuclear weapon. GIF has proposed a methodology that should allow the analysis of proliferation resistance issues in systems under development. An initial application of this methodology to the MSFR and MOSART is presented here, including an analysis of both the reactor plant and the fuel processing units, these being located in-situ in these concepts. For this initial study, we have focused our attention on a portion of the methodology retained by GIF. This consists in defining a threat, then analyzing the system's response by identifying: the system elements, the targets involved, the pathways for achieving the proliferant objectives. Counter measures are then proposed as obstacles on the pathways identified. Because the MSFR and MOSART are in the design phase, we have adopted a gradual approach of the issues, focusing on the seemingly most dangerous situations.

This first study case concentrates on the threat represented by a State that wishes to acquire nuclear weapons and plans to obtain nuclear material from a power plant site based on MSFR and MOSART reactor plants and subsequently process the nuclear material in a concealed installation. More specifically, this study bears on the threat that fissile material be diverted in such a situation. The purpose of the paper is to work out design recommendations for the elements of the system.

## Which "Key Question" does your Abstract address?

NEW3.1

## Topics

NEW3

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