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The Gen-IV Proliferation Resistance and Physical Protection methodology applied to GEN IV system designs: some reflections

The Generation Four International Forum (GIF) formed a proliferation resistance and physical protection (PRPP) Working Group (PRPPWG) to develop a methodology to evaluate the six GIF nuclear energy systems concepts.

The PRPPWG developed the methodology through a series of development and demonstration case studies, using a hypothetical “Example Sodium Fast Reactor”(ESFR). The ESFR assessment allowed to test the full methodology on a complete nuclear energy system and many insights were gained from the process.

The PRPPWG and representatives of the GIF System Steering Committees (SSCs) for each of the six GIF design concepts analyzed the PRPP; aspects of the six designs concepts. The outcome of this activity is documented in a joint PRPPWG and SSCs report made publicly available in 2011, highlighting the analysis performed and its main outcomes.

Currently the PRPPWG and the six GIF SSCs are in the process of repeating the exercise based on current status of the six GIF system design concepts, taking into account the designs evolution since 2011.

In line with Safeguards by Design, while during the first exercise the level of detail of the design options enabled only a high-level evaluation of the systems'proliferation resistance, the early design stage allowed designers to introduce modifications for improving the system's performance. With the designs' current level of detail, the room for proposing modifications diminishes but increases the potential to inform the safeguards RD; community on potential RD; needs to fill potential safeguardability issues.

The paper will first summarize the main concepts behind the PRPP; evaluation methodology. It will then summarize the main outcomes and lessons learned as in the current white papers on the PR aspects of the six GIF design concepts, and will finally describe the ongoing activity to update them.

Which “Key Question” does your Abstract address?

NEW1.1

Topics

NEW1

Which alternative “Key Question” does your Abstract address? (if any)

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