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The GIF Proliferation Resistance and Physical Protection (PR&PP) Evaluation Methodology: Status, Applications and Outlook

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Methodologies have been developed within the Generation IV International Forum (GIF) to support the assessment and improvement of system performance in the areas of sustainability, safety and reliability, economics, proliferation resistance and physical protection (PR&PP). The last of these four areas was assigned to the GIF Working Group on Proliferation Resistance and Physical Protection (PRPPWG).

The PRPPWG developed the methodology through a series of development and demonstration case studies, by use of a hypothetical "Example Sodium Fast Reactor"(ESFR). This is a generic design of Generation IV reactor based on the US Advanced Fast Reactor (AFR) developed by Argonne National Laboratory.

The PR&PP ESFR assessment was the first opportunity to exercise the full methodology on a complete system, and many insights were gained from the process. In particular, the approach of breaking the assessment into subtasks, each focusing on a separate area of PR&PP (for PR: diversion, misuse, breakout; for PP: theft and sabotage) handled by a dedicated subgroup with diverse international membership, was useful in generating new insights and concept development.

In addition, over the past few years various national and international groups have applied the methodology to inform nuclear energy system designs, as well as to support the development of approaches to advanced safeguards. A number of international workshops have also been held which have introduced the methodology to design groups and other stakeholders.

In this paper we summarize the PR&PP methodology, its application to the ESFR case study, and other accomplishments of the PRPPWG. Current challenges with the efficient implementation of the methodology are outlined, along with the path forward for increasing its accessibility to a broader stakeholder audience - including supporting the next generation of skilled professionals in the field of nuclear non-proliferation and security.

Country/Int. Organization

Generation IV International Forum (GIF) Proliferation Resistance and Physical Protection Working Group (PRPPWG)

Author: Dr CHEBESKOV, Alexander (IPPE)

Co-authors: Dr KWON, Eun-ha (Korea Atomic Energy Research Institute, Korea); Dr COJAZZI, Giacomo G.M. (Europan Commission, Joint Research Centre, Institute for Transuranium Elements); Dr CAZALET, JEAN (CEA (French Atomic Energy Commission)); Dr WHITLOCK, Jeremy (Atomic Energy of Canada Limited); Dr HORI, Keiichiro (Japan Atomic Energy Research Institute); Dr PETERSON, Per (University of California Berkeley, USA); Dr BARI, Robert (Brookhaven National Laboratory)

Presenter: Dr CHEBESKOV, Alexander (IPPE)

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