

Nuclear Safeguards

Examining the verification system supporting the nonproliferation regime

Stimson's Nuclear Safeguards program examines the resiliency of the verification system that underpins the nuclear non-proliferation regime. We work with industry, governments and multilateral organizations to understand the impact of evolving obligations on states and industry across the nuclear fuel cycle, from its front-end (mining, milling, conversion) to the back-end (waste storage and disposal). The team considers how next generation nuclear facilities and technology may impact the current system and focuses on how solutions can improve the effectiveness of implementation and strengthen effectiveness.

DETECTING MISUSE, BUILDING RESILIENCE

Measures controlling the spread of nuclear weapons are aimed at the early detection of the misuse of technology and materials. These measures, known as nuclear safeguards, have had an enduring impact on international peace and security. They have evolved alongside advances in technology and shifts in the geopolitical environment to become a complex, multi-layered system and comprehensive set of agreements and obligations. The future resiliency of the system requires a deep dive into facilities of the future such as advanced reactor designs, geological repositories or multinational facilities and how these emerging facilities, coupled with emerging technologies, challenge and/or enhance the management of safeguards.

USING TECHNOLOGY TO STRENGTHEN SAFEGUARDS

Advances in technology are moving from 'emerging' to 'emerged', presenting both challenges and opportunities for safeguards. Next generation reactors and fuel cycle facilities introduce novel designs that raise questions related to what types of measures and instruments need to be developed. New reactor designs may use fuel more efficiently and some may even be considered 'proliferation resistant', but they also need to be designed with safeguards in mind. An ageing nuclear fleet is creating the need to develop new facilities to handle

PROJECTS

[Governing Uranium](#) The international obligations that accompany the global production, trade, and protection of uranium

[Safeguarding the Nuclear Fuel Cycle](#) Examining the resiliency of the verification system that underpins the nuclear non-proliferation regime

LEADERSHIP

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the storage and permanent disposal of nuclear waste. At the same time, advances in other areas of technology, such as computer sciences, are presenting solutions for how to better collect and manage growing volumes of safeguards data. Accordingly, the safeguards system needs to keep pace and adapt in developing new approaches as technology moves beyond theory and experimentation to commercialization. If not, the robust system of safeguards that has evolved over the last several decades could be weakened.

Stimson's Safeguards program goes into the field, visiting facilities below and above ground to better understand technology and how safeguards information is managed. We also investigate and test technology for its potential to strengthen safeguards. Whether applying blockchain technologies to safeguards information management or considering new methods for inspecting materials underground, the team considers how adopting new technologies may affect legal obligations and whether current measures still apply or require updating. Our approach combines methodologies of field and archival research with convening stakeholders to add input to ongoing research and advance awareness about the future of nuclear facilities and their safeguards. We also directly engage industry and policymakers, including providing interactive tools for awareness raising and outreach, such as the Governing Uranium website.

Stimson is unique in its focus on how advances in technology impact the resiliency of the non-proliferation regime, whether studying drilling technology, information technology, or advances in particle physics. Coupled with the emergence of new nuclear facilities such as geological repositories and multinational fuel cycle facilities, the team brings together stakeholders to identify shared approaches for moving forward. Our focus is on determining how technology can be used to strengthen safeguards and how new kinds of nuclear facilities may impact the current system of safeguards obligations. Our work explores how multi-stakeholder engagement can help generate political and administrative acceptance of new and innovative technical solutions to evolving safeguards challenges.

Contact

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