

Identifying 21st Century Safeguards Challenges and Opportunities

IMPORTANCE OF IAEA SAFEGUARDS

The international safeguards system is a central pillar of the nuclear nonproliferation regime, and the entire global community has a major stake in maintaining its effectiveness and credibility. IAEA safeguards are the primary international mechanism available to monitor nuclear activities and serve as the basis for verification of states' commitments under the Nuclear Non-Proliferation Treaty. The application of international safeguards promotes international confidence in peaceful uses of nuclear energy, deters and provides possible early warning of incipient nuclear weapon programs, and serves as a metric for Member States to make judgments regarding compliance with IAEA Board of Governors and UN Security Council resolutions.

CHALLENGES TO INTERNATIONAL SAFEGUARDS



Expanding Workload:

- Growing burden due to greater numbers of facilities and amounts of material under safeguards
- An evolving mandate that requires investigation of undeclared activities
- A global nuclear renaissance means nuclear power expanding to new areas

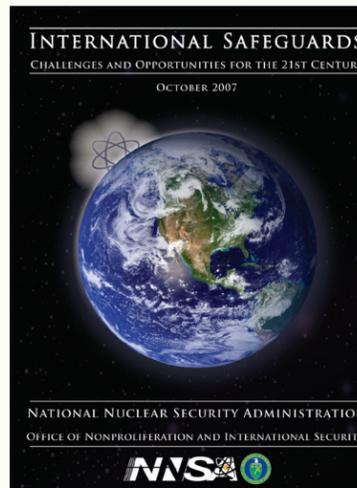
Limited Resources:

- Static IAEA budget and staffing
- Attrition among safeguards professionals at both the IAEA and in the United States
- Loss of critical facilities and infrastructure



THE NEXT GENERATION SAFEGUARDS INITIATIVE

NNSA conducted a fundamental review of safeguards, which concluded that the United States should, "Launch a Next Generation Safeguards Initiative to strengthen safeguards policies and institutions, coordinate U.S. safeguards research and development, and revitalize the U.S. safeguards technology and human capital base."



NGSI Supports United States Government Nonproliferation Priorities:

April 5, 2009 President Barack Obama, Remarks in Prague:

"Together we will strengthen the Nuclear Non-Proliferation Treaty as a basis for cooperation...To strengthen the treaty, we should embrace several principles. We need more resources and authority to strengthen international inspections. We need real and immediate consequences for countries caught breaking the rules or trying to leave the treaty without cause. And we should build a new framework for civil nuclear cooperation...so that countries can access peaceful power without increasing the risks of proliferation."



April 6, 2009 Deputy Secretary of State James Steinberg, Remarks at the Carnegie International Nonproliferation Conference:

"We must improve the verification system. Adherence to the IAEA's protocol must become a duty, not an option. We should explore means of augmenting the IAEA safeguards authorities, and the agencies should receive the increased resources it needs to carry out its rapidly growing responsibilities."

April, 2009 U.S. Amb. to the IAEA Schulte, Remarks on Behalf of Energy Secretary Steven Chu at the IAEA International Ministerial Conference:

"The United States is committed to increasing the capabilities of the IAEA to better carry out all of its vital functions. Key among them is improved international safeguards. The United States has launched a program to build next generation safeguards technologies and a new community of safeguards experts; to assist full use of IAEA inspection authorities; and to foster a culture of safeguards, security and safety in nations using nuclear energy."

July 6, 2009 Joint Statement by President Barack Obama of the United States of America and President Dmitry Medvedev of the Russian Federation on Nuclear Cooperation:

"Recognizing the important role of safeguards in promoting confidence in the peaceful use of nuclear energy and in addressing proliferation threats, we will work together to expand opportunities for bilateral and multilateral cooperation to strengthen the overall effectiveness and efficiency of the international safeguards system."



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NEXT GENERATION SAFEGUARDS INITIATIVE

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OFFICE OF NONPROLIFERATION AND INTERNATIONAL SECURITY



Next Generation Safeguards Initiative (NGSI)

In 2008, the United States Department of Energy (DOE) / National Nuclear Security Administration (NNSA) launched the Next Generation Safeguards Initiative (NGSI), a



An inspector checks a piece of safeguards equipment.

robust, multi-year program to develop the policies, concepts, technologies, expertise, and international infrastructure necessary to strengthen the international safeguards system as its mission evolves over the next 25 years. The safeguards system is a central pillar of the nuclear nonproliferation regime, and the global community

has a major stake in maintaining its effectiveness and credibility. While NGSI has a U.S. domestic focus, its underlying purpose is international; this initiative cannot succeed as a purely domestic effort. Only by combining U.S. technical and scientific assets with the resources of international partners will we all be able to keep pace with the emerging safeguards challenges. NGSI will work with the International Atomic Energy Agency (IAEA) and international partners to keep pace with emerging challenges and provide a foundation for a broader global commitment to international safeguards.



Experts discuss next generation safeguards issues at the 2008 international meeting

In September 2008, the First Annual International Meeting on Next Generation Safeguards brought together government officials and technical experts from 11 countries as well as the IAEA

to reach a common understanding of the issues to be addressed. Since then, NNSA bilateral and IAEA engagement has continued to promote NGSI principles and expand the Initiative.

Long-range safeguards goals are being addressed in five NGSI subprograms, as outlined in the NGSI Program Plan: (1) Policy and Outreach; (2) Concepts and Approaches; (3) Technology Development; (4) Human Capital Development; and (5) Infrastructure Development.

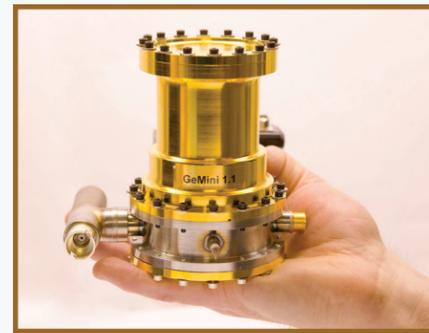
Policy Development and Outreach: A DOE/NNSA Safeguards Policy Study group has been commissioned to provide technically informed assessments to support the U.S. Government and IAEA on timely and important safeguards issues, including universal adoption of safeguards agreements and the Additional Protocol, improved effectiveness and efficiency of safeguards for the transition to a credible and efficient State-Level Approach, and IAEA budget issues. As the IAEA's mission expands faster than its budget, NGSI will work

to anticipate and fulfill future requirements for safeguards approaches with a solid technical base. The on-going evolution of IAEA safeguards from its traditional reliance on nuclear material accountancy at declared facilities to a more flexible, information-driven state-level approach to assess both the declared activities and absence of undeclared activities, will require creative concepts and new resources to fully implement.



Safeguards Analytical Laboratory

Concepts and Approaches: This subprogram is developing advanced safeguards concepts, approaches, and assessment methodologies to enhance the effectiveness, efficiency, and credibility of international safeguards. NGSI projects are developing new concepts and approaches for process monitoring, institutionalizing "Safeguards-by-Design", assessing the proliferation risk characteristics of different nuclear fuel cycle technologies, and developing safeguards approaches for enrichment plants. Institutionalizing Safeguards-By-Design will



The GeMini, a portable gamma ray spectrometer

build an important bridge between concepts and technologies by incorporating safeguards into the planning, construction, and operation of new nuclear fuel cycle facilities.

Technology Development: This subprogram supports projects to improve the timeliness and certainty of nuclear measurement technology, develop unattended and remote monitoring systems, advance data integration capabilities, and create new tools to help inspectors verify the absence of undeclared nuclear materials and activities. NGSI has launched a multi-year project under this subprogram to assess several non-destructive assay technologies for the measurement of plutonium in spent fuel. Additional technology development projects are exploring new types of detector



A portable Laser Induced Breakdown Spectroscopy (LIBS) device under development by NGSI

materials for safeguards, data authentication and containment/surveillance tools, and environmental sample analysis techniques.

Two examples of ongoing international technical cooperation are a project to improve direct measurements of plutonium in spent fuel and a project to produce three-dimensional maps combining radiation detection and laser technology data to identify unaccounted radioactive material that has accumulated inside complex nuclear fuel cycle facilities.

Human Capital Development: Another NGSI priority is to preserve and expand international safeguards expertise in the United States.



A student learns a safeguards technique at an NGSI training course

With greater and more varied human capital resources, the United States can better engage with the IAEA and support a range of IAEA staff assignments. Major efforts are underway in the United States to educate students regarding international safeguards issues and topics via curriculum development, specialized summer courses, internships and post-doctoral fellowships at U.S. National Laboratories, and mid-career transition workshops. The safeguards course materials developed by the U.S. National Laboratories will be made available to universities as a resource for faculty developing safeguards-related curricula for incorporation into new and existing courses

at the undergraduate and graduate levels, and may also be leveraged by other countries considering nuclear power programs.

Infrastructure Development: This subprogram supports the development of national infrastructures in countries with nuclear power or credible plans for nuclear power. These NGSI efforts will be tailored for country and regional needs, taking into account efforts undertaken by the IAEA and other countries. This cannot be a "one-size-fits-all" approach and must be coordinated with international partners. In an effort to achieve better coordination, the Infrastructure Development subprogram has initiated a series of international workshops to harmonize the safeguards infrastructure development assistance provided by various states and organizations.



An international safeguards infrastructure development workshop

To promote international safeguards best practices, the United States will continue to organize workshops on State Systems of Accounting and Control (SSAC), Small Quantities Protocol (SQP) adoption, and Additional Protocol implementation, in coordination with the IAEA, reaching representatives from over 50 countries. Other infrastructure workshops will focus on "safety, security, and safeguards" (3S's), human capital development strategies, and nuclear power plant development closely linked to the IAEA Milestones process.