Next Generation Safeguards Initiative

Enhancing International Safeguards: Challenges and Opportunities for the 21st Century

Adam M. Scheinman
U.S. Department of Energy/National Nuclear Security Administration

June 2008
Overview

1. Introduction
2. Challenges to the Safeguards System
3. Fundamental Safeguards Review
4. Next Generation Safeguards Initiative
5. International Cooperation
6. Summary
“Strengthening of the safeguards system to ensure its effectiveness, credibility and independence” is one of the major challenges likely to face the IAEA in the 2020 timeframe.

IAEA 20/20 Vision for the Future, February 2008

“The U.S. Department of Energy will launch this year a Next Generation Safeguards Program.”

Energy Secretary Bodman, IAEA GenCon, September 2007
Global expansion of nuclear energy

Number of countries with nuclear power reactors could soon double; increasing strain on safeguards

- Countries with Nuclear Power
- Countries Considering Nuclear Power
Diffusion of sensitive nuclear technology

Enrichment and reprocessing bring nuclear weapons capability within reach of possessor

Libya’s gas centrifuges, supplied through the Khan network
Expanding IAEA responsibilities

New facilities, materials, Additional Protocol reporting, and demands in Iran, North Korea and India place huge strains on IAEA resources and safeguards credibility

<table>
<thead>
<tr>
<th></th>
<th>1984</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>NNWS with Comprehensive Safeguards Agreements</td>
<td>41</td>
<td>154</td>
</tr>
<tr>
<td>NNWS with INFCIRC/66 Agreements</td>
<td>11</td>
<td>3</td>
</tr>
<tr>
<td>NWS with Voluntary Offers</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Safeguarded Nuclear Installations</td>
<td>451</td>
<td>659</td>
</tr>
<tr>
<td>Significant Quantities of Safeguarded Sensitive Material</td>
<td>1,090</td>
<td>11,874</td>
</tr>
<tr>
<td>New Enrichment Plants planned/under construction</td>
<td>~1</td>
<td>6+</td>
</tr>
<tr>
<td>Additional Protocols Implemented</td>
<td>0</td>
<td>84</td>
</tr>
</tbody>
</table>
Shrinking safeguards technology base

The technologies and community of experts available to support international safeguards has thinned:

- Aging technology
- Retirements
- Competing missions
- Shrinking U.S. complex
Objective: Examine the challenges that the system must confront today and over the next 25 years.

Scope: (1) policies and authorities; (2) technology development; (3) human and financial resources

Recommendation: Establish an integrated U.S. initiative that leverages DOE and other technical asset and international partnerships

Result: Launch Next Generation Safeguards Initiative
### NGSI Goals:

- Strengthen safeguards policies and approaches
- Revitalize the U.S. safeguards technology and human capital base
- Improve integration of safeguards objectives with international cooperation programs
- Promote a “safeguards culture” through nuclear infrastructure development
NGSI: Technology Development

At declared facilities, make safeguards more efficient and effective through incorporation of advances in automation, measurement, and information technology

Priorities

- Measurement techniques, timeliness, and uncertainty
- Remote / unattended monitoring systems
- Design verification tools and authentication technologies
- Information search, collection, extraction, analysis, and management tools for safeguards analysts
- Advanced safeguards for fuel cycle facilities: e.g. safeguards-by-design
Technology needed for detection and investigation of undeclared nuclear activities, especially at or near declared facilities

Priorities

- Robust, multi-functional field-portable instruments for use during visits / inspections
- In-field sample screening, e.g.
- Certify additional analytical labs
The international safeguards community faces a human capital crisis, with professionals required across a broad range of safeguards-relevant disciplines.

**Priorities**

- Expand outreach and partnerships to enable international partners to study safeguards at U.S. national laboratories and universities
- Establish mentoring / training program for young safeguards professionals
- Provide expanded training for safeguards personnel across the board (IAEA, State Systems of Accounting & Control, Labs)
- Attract new safeguards professionals into the field
The IAEA can accomplish much of its expanded mission under its existing legal authorities.

**Priorities**

- Universal adoption of the Additional Protocol and the revised SQP
- Reinforce information-driven, state-level approach to safeguards
- Sharing of proliferation information with the IAEA; special inspections
- Nexus between effective safeguards and peaceful nuclear sharing
No state alone can strengthen international safeguards: requires a shared commitment to build capacity

**Needed:** Combination of Multilateral, Regional, and Bilateral activities to build a safeguards “culture”

**Forms of Cooperation**

- **Strengthen State Systems of Accounting and Control**
  - Coordinate assistance to adopt best practices for safeguards, safety, and security
- **Collaboration / test advanced safeguards technologies**
- **Cooperative demonstrations of safeguards applications**
- **Groupings for safeguards professionals**
- **Safeguards education**
NGSI: a catalyst for a larger international commitment to strengthen the international safeguards system

NGSI: Next Steps

• Developing 5-year plan for safeguards technology, human capital development, and international outreach
• Surveying safeguards technology relevant programs across government, academia, and industry
• Pilot safeguards course for next generation experts
• Accelerate safeguards technology development: focus on new reactors; fuel cycle facilities
• International working meeting to be held in Washington next September