Managing Safety, Security, and Safeguards (3S) Relationship:
A National Regulatory Authority Perspective
United States Nuclear Regulatory Commission

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• **Mission:** “To license and regulate the nation's civilian use of byproduct, source, and special nuclear materials in order to ensure the adequate protection of public health and safety, promote the common defense and security, and to protect the environment.”

• **Primary Functions:**
  - Establish rules and regulations within United States of America
  - License civilian use of nuclear materials
  - Provide oversight through inspection, enforcement, and evaluation of operational experience
  - Conduct research in support of regulatory decisions/actions
  - Respond to emergencies
• **New States Interested in Nuclear Power**
  – Requests guidance from international community

• **International Atomic Energy Agency (2007)**
  – Issued Nuclear Energy Series Document (NG-G-3.1)
  – *Milestones in the Development of a National Infrastructure for Nuclear Power*

• **G8 Summit in Hokkaido, Tokayyo, Japan (2008)**
  – Participants pledged support of the Guidance Document
  – International initiative issued on *safety, security and safeguards* (3S) in a State’s nuclear energy infrastructure
  – Canada, France, Germany, Italy, Japan, Russia, United Kingdom, and United States of America (President of European Commission)
Resurgence of Nuclear Energy

New Reactor Construction (IAEA – PRIS 2013)
## Resurgence of Nuclear Energy

### Fuel Cycle Facilities Planned or Under Construction (IAEA – INFCIS)

<table>
<thead>
<tr>
<th>Country</th>
<th>Planned</th>
<th>Construction</th>
<th>Commissioning</th>
<th>In Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>8</td>
<td>0</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Brazil</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>3</td>
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<tr>
<td>Bulgaria</td>
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<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>France</td>
<td>1</td>
<td>3</td>
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<td>Germany</td>
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<td>20</td>
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<tr>
<td>India</td>
<td>1</td>
<td>2</td>
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<td>20</td>
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<tr>
<td>Japan</td>
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<td>1</td>
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<td>12</td>
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<td>3</td>
<td>0</td>
<td>10</td>
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<td>Russian Federation</td>
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<td>1</td>
<td>0</td>
<td>23</td>
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<td>Slovakia</td>
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<td>0</td>
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<td>1</td>
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<tr>
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<td>0</td>
<td>1</td>
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<tr>
<td>Ukraine</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>United States of America</td>
<td>2</td>
<td>5</td>
<td>0</td>
<td>79</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>18</strong></td>
<td><strong>21</strong></td>
<td><strong>4</strong></td>
<td><strong>294</strong></td>
</tr>
</tbody>
</table>

(*) Please note that the list might not include all of the facilities in the world due to the unavailability of the data.

(+) Planned includes: Planned, Under Study-Assessment, Siting-Design phases.
(+) StandBy includes: Stand by, Refurbishment phases.
(+) Decommissioned includes: Decommissioning, Decommissioned phases.
(+) Other includes: Cancelled, Deferred, Unknown phases.
International Obligations

- **Safety** –
  - Concerned with the achievement of proper operating conditions,
  - Prevention of accidents or mitigation of accident consequences,
  - Protection of workers, the public and the environment from undue radiation hazards
  - IAEA Safety Standards

- **Security** –
  - Challenges of prevention and detection of, and response to, theft, sabotage, unauthorized access,
  - Includes illegal transfer or other malicious acts involving nuclear material, other radioactive substances or their associated facilities.
  - IAEA - INFCIRC/225

- **Safeguards/Non-proliferation** –
  - Timely detection of diversion of significant quantities of nuclear material from peaceful nuclear activities to the manufacture of nuclear weapons,
  - Other nuclear explosive devices for purposes unknown,
  - And deterrence of such diversion by the risk of early detection
  - IAEA - INFCIRC/153 and INFCIRC/540
U.S. Regulatory Framework

- U.S. Legal and Regulatory Framework
  - US NRC ensures licensees establish adequate measures to provide:
    - Nuclear safety
    - Security of the U.S.
    - Safeguard nuclear material
  - Title 10 of Code of Federal Regulations (10CFR)
    - Cornerstone to providing international assurance nuclear facility used for peaceful purposes
    - Provides necessary controls over all three elements of 3S-Concept
    - Each life-cycle phase of civilian nuclear facility regulated through 10CFR
3S-Concept by Design (3SBD)

• **US NRC is Supportive of 3SBD Concept**
  - Issued a policy statement on the regulation of advanced reactors—recognized the relationship between safety, security and safeguards
  - Federal Register Notice 73 FR 60612, October 14, 2008

• **Design Phase of a Facility**
  - Take advantage of the close relationship between safety, security and safeguards in specific structures, systems and components
  - Maintain a reliable amount of autonomy between the individual elements

• **Consider Safety, Security and Safeguards Relationship During Modifications**
  - Over-designing one element of the safety, security and safeguards relationship could create problems with other elements
Safeguards Implementation in U.S.

Facility Design Considerations—Safeguards & Security

International & Regional Treaties

Nuclear Facility Design Considerations
(1) State Diversion
(2) Sub-National Threat and Sabotage

State System of Accounting for and Control of Nuclear Material (SSAC)

IAEA Agreements
INFCIRC/153
INFCIRC/540

State Diversion “Safeguards”
(10CFR Part 75)

IAEA Material Control and Accounting Verifies International Declaration of Nuclear Material

IAEA Guidance
SSAC Guidance
IAEA/SG/INF/2

Sub-National Material Theft “Material Control and Accounting”
(10CFR Part 74)

Domestic Material Control and Accounting Enables State Declaration to IAEA

IAEA Agreement
INFCIRC/225/Rv5

Sub-National Theft and Sabotage “Physical Security”
(10CFR Part 73)

Domestic Physical Security Enables Material Control
Graphic 3S Relationship

Schematic showing the relationships between each "S" in the 3S concept. (Choi, 2011)
Summary

• Creating a Balance
  – Safe peaceful use of nuclear energy and nuclear non-proliferation are supported by the concept of strengthening the relationship between safety, security and safeguards in a successful nuclear program.

• Recognizing International Guidance
  – G8 international initiative issued on safety, security and safeguards in a State’s nuclear energy infrastructure is further supported by the IAEA guidance document *Milestones in the Development of a National Infrastructure for Nuclear Power (NG-G-3.1)*

• US NRC Supports Managing the Safety, Security and Safeguards Relationship
  – Policy statement on the regulation of advanced reactors includes consideration of the relationship between security, emergency preparedness, threat of theft, and international safeguards.