



**THE SECURITY OF RADIOACTIVE SOURCES:
*The Road to Sustainability and Resilience***

Presentation by
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Outline of Presentation

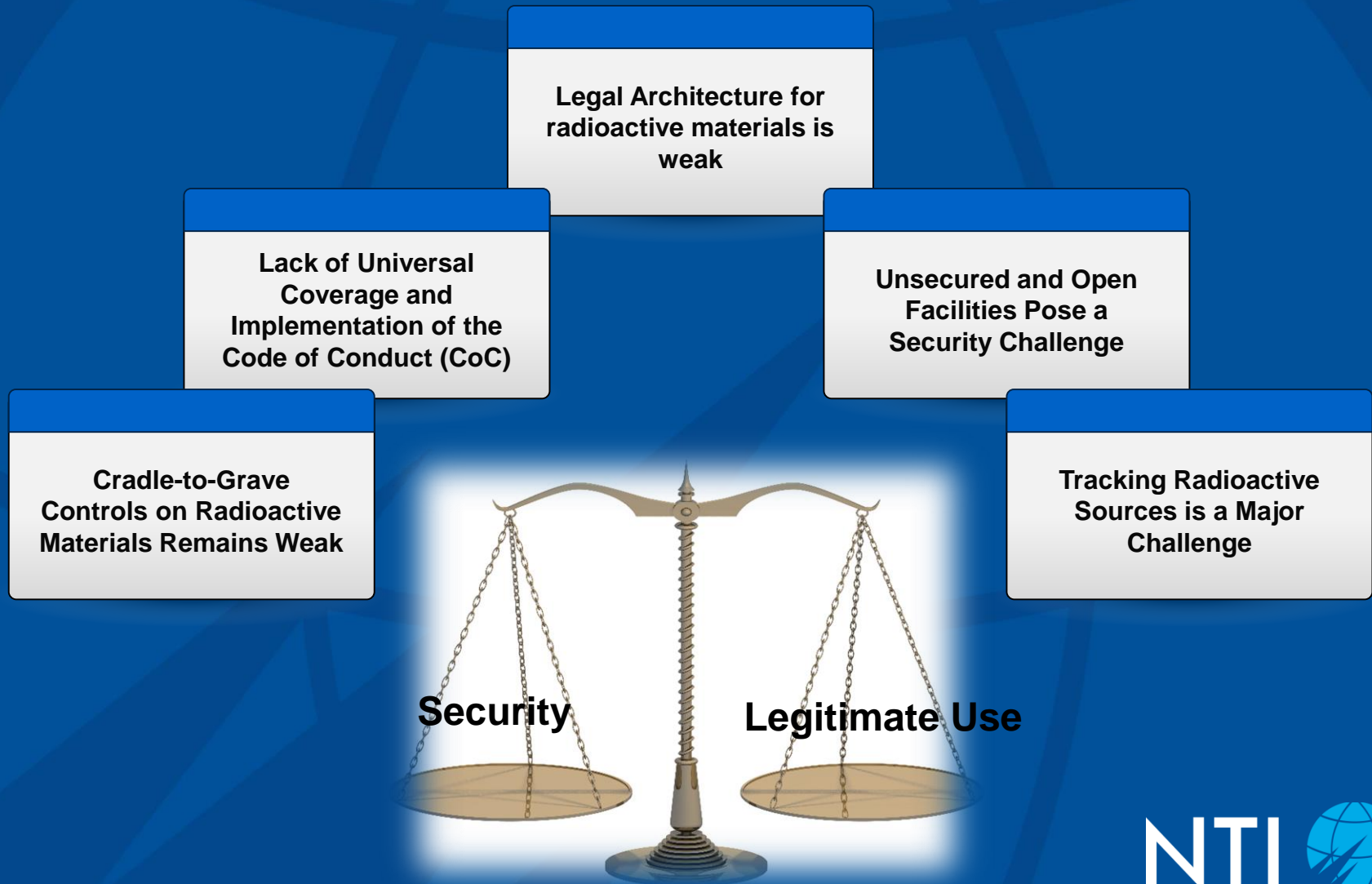
- Threat of Radiological Terrorism
- Challenges of Securing Radioactive Material
- Current Initiatives Contributing to the Security of Radioactive Material
- Different Mechanisms for Achieving Source Security
- How to Benchmark Progress?

Threat Landscape

- Terrorists groups have stated their intention to acquire and use radiological materials in a dirty bomb.
- Terrorist use of a dirty bomb is more likely than use of a nuclear device.
- The ingredients for a dirty bomb are located at thousands of sites in more than 150 countries, many of them poorly secured.
- Security arrangements for radioactive sources must be resilient and sustainable to the evolving terrorism landscape.



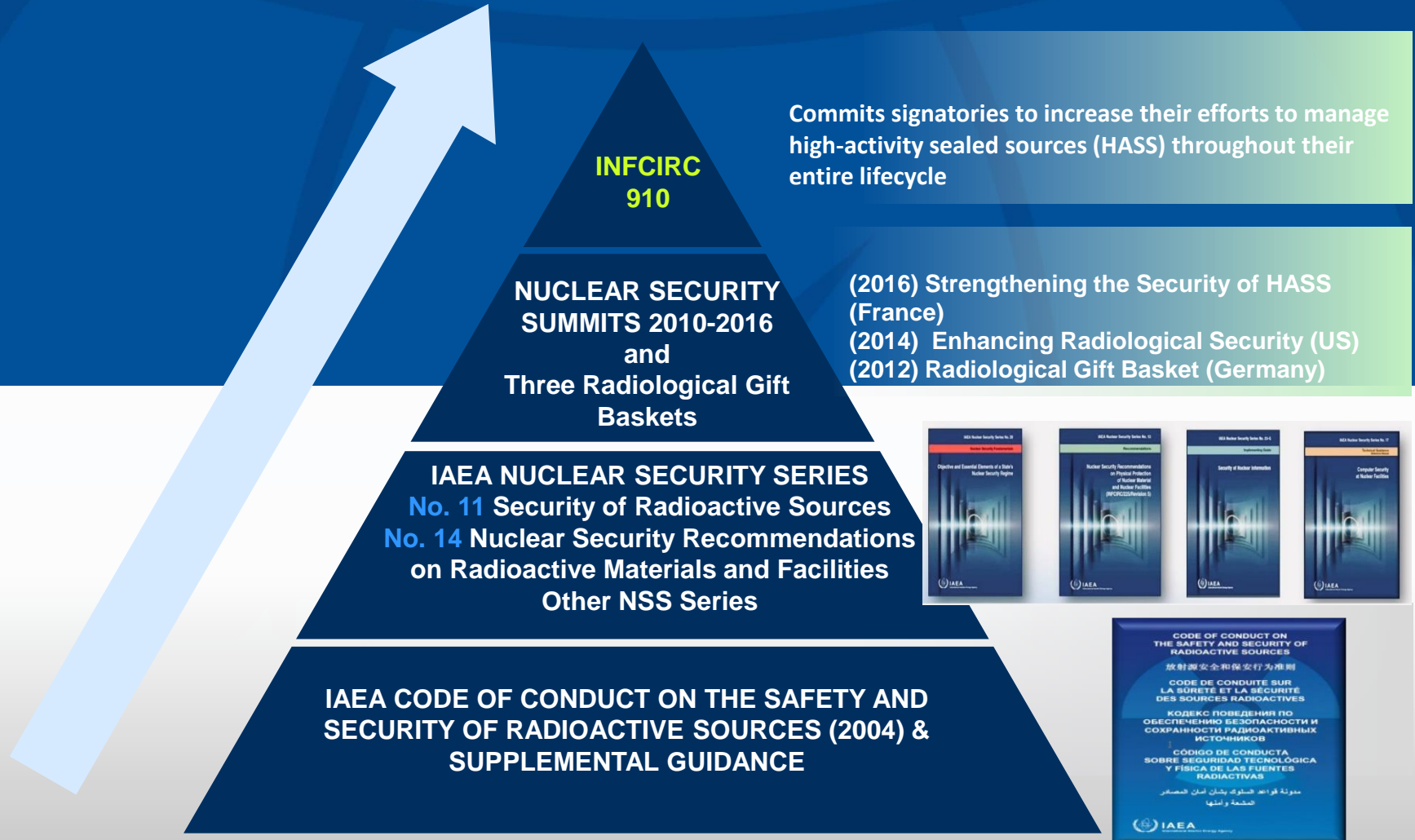
Challenges of Securing Radioactive Material



Institutional Challenges

- Diverse user community and multiple applications
- Safety orientation of regulators and operators
- Limited financial and personnel resources
- Sustaining security equipment and knowledge is challenging
- Reliance on external organizations for law enforcement response
- Less than full appreciation of radiological threat and urgency to implement risk mitigation actions
 - Many States lack the capacity for developing a threat assessment.

Initiatives Contributing to the Security of Radioactive Sources



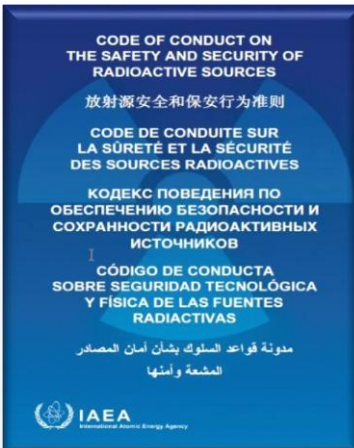
DIFFERENT MECHANISMS FOR ACHIEVING RADIOACTIVE SOURCES SECURITY

RISK MITIGATION STRATEGIES

Prevent Source Material Acquisition

...Terrorist(s) must be able to first acquire radioactive materials in order to build an RDD.

✓ PRIORITIZE HIGHEST RISK MATERIAL(S)



✓ PROTECT

- Implement radiological security regulations;
- Introduce physical security requirements for the **full life-cycle** of radioactive materials;
- Implement transportation security measures to protect sources during movement.

✓ REPLACE

REDUCE the total amount of material in circulation and the global reliance on radioactive sources through replacement with viable non-isotopic alternative technologies



✓ REMOVE & DISPOSE OF DISUSED AND UNWANTED SOURCES

- Implement cradle-to-grave policies to address the end-of-life management of sources.

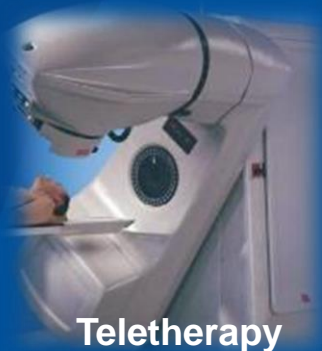


Approaches to PRIORITIZE Highest Risk Materials

These 4 radionuclides represent 99.9% of all IAEA Category 1 and 2 Sources

Category 1, Co-60

Industrial Irradiator

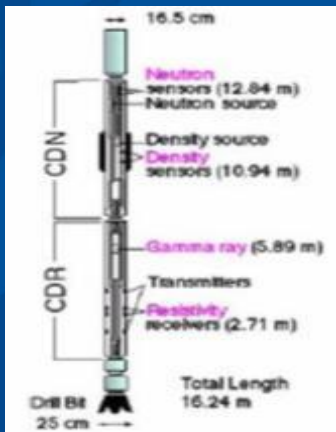


Teletherapy

Category 1, Cs-137 Self-Contained Irradiator



Category 2, Am-241/Be, Well Logging

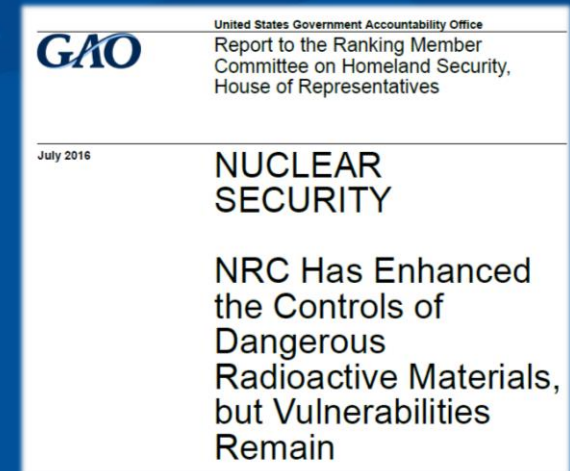


Category 2, Ir-192, Radiography



Measures to PROTECT Radioactive Sources

- ❑ Establish and update regulatory requirements, consistent with IAEA guidance, for the security of radioactive sources (not just safety).
- ❑ Establish and regularly update a national register of radioactive sources and ensure that sources are tracked through their lifecycle.
- ❑ Implement robust security upgrades, at a minimum, at facilities with IAEA Category 1 and Category 2 sources. **Explore regulatory options for Category 3 (especially sources found in aggregation).**
- ❑ Implement Security by Design (for Devices and Facilities).
- ❑ Sustain security through training of personnel, effective coordination of relevant agencies including regulator, source users (operators), transportation organizations, and law enforcement.
- ❑ Improve and sustain security for transportation of portable radioactive sources, including security for mobile sources such as radiography and oil well-logging sources (via mobile tracking or other technologies).



THE WASHINGTON POST
A secret group bought the ingredients for a dirty bomb — here in the U.S. (August 4, 2016)

“Why bother smuggling it if you can just order it with a fake license,” Trimble said.

Measures to REPLACE Radioactive Sources

- Commercially available, non-isotopic alternatives exist for most major applications of radioactive materials.
- Many countries have shifted from Co-60 teletherapy units to linear accelerators (LINACS); Challenges still exist in developing countries.
- Several countries are in the process of phasing out the use of cesium chloride blood and research irradiation in favor of x-ray technology (Norway, France and Japan).
- In partnership with New York City, the State of California, NNSA and NTI are working on a first-of-its-kind city-wide push to accelerate cesium irradiator replacements in major cities across the U.S.



Application	Isotope	Commercially Available Alternatives?
Blood and Research Irradiation	Cs-137	Yes – X-Ray
Teletherapy	Co-60	Yes - LINACS
Sterilization	Co-60	Yes – X-Ray, E-Beam, LINACS
Well Logging	Am-241	R&D needed
Radiography	Ir-192	Yes – X-Ray

Approaches to REMOVE or DISPOSE OF Disused Radioactive Sources

Challenges

- ❑ Disused sources that are improperly managed pose both a security and safety risk.
- ❑ Such materials, particularly if outside of regulatory control, are vulnerable to malicious use.
- ❑ Radioactive materials can be present in many forms, including long lived isotopes (CsCl) which prove to be challenging to manage into the future.
- ❑ Insufficient regulatory infrastructure can effect end-of-life management due to lack of disposal facilities, certified packages, expertise, and financial planning.

Best Practices

- ✓ Re-use or recycle (only for certain isotopes);
- ✓ Interim storage, including secure on-site storage;
- ✓ National repository, including surface repository or geologic repository;
- ✓ Return to supplier/manufacturer;
- ✓ Repatriation to country of origin (on a case-by-case basis)
- ✓ **All practices require predictable funding and sustainable solutions.**



How do we benchmark progress?

- **Secure** the highest activity Category I and Category II sources
 - This can be done either by comprehensive regulations (and their effective implementation) and/or physical protection upgrades
 - **Metric/Indicator: # of countries that have secured their Cat I and II sources**
- **Increase** political support by adopting INFCIRC 910
 - Only 28 countries have adopted IAEA INFCIRC 910 (even though 136 countries support the IAEA Code of Conduct)
 - We should encourage other countries to adopt 910 and do so before the December 3-7, 2018 IAEA International Conference on the Security of Radioactive Material: *The Way Forward for Prevention and Detection*
 - **Metric/Indicator: # of countries that have adopted 910**
- **Replace** the highest activity sources with alternative technologies
 - Accelerate efforts to phase-out cesium 137 (similar to Norway, France, Japan and others)
 - **Metric/Indicator: # of countries that have phased out cesium-137**

How do we benchmark progress?

- **Increase Transparency and Reporting**

- Non-legally binding nature of the IAEA Code of Conduct has resulted in varying levels of State participation and information exchange.
- Many States find it challenging to balance requests for increased information sharing while protecting information that might be considered sensitive (classified).
- During the Code of Conduct Review Meeting in 2016, the IAEA Secretariat prepared detailed guidelines on national reporting to improve consistency and facilitate comparisons between States' reports.
- **Metric/Indicator: # of countries that provide national reports**



WINS Workshop Announcement

Berlin, Germany
September 2016

**RADIOLOGICAL SECURITY: INCREASING
TRANSPARENCY AND VOLUNTARY REPORTING**



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