Russia's Role in Countering Nuclear Terrorism

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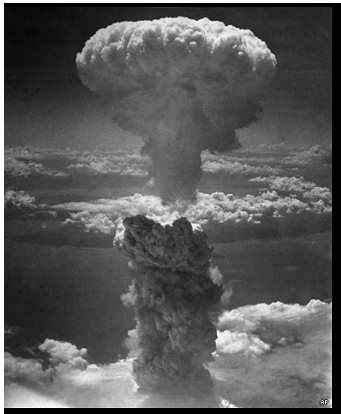
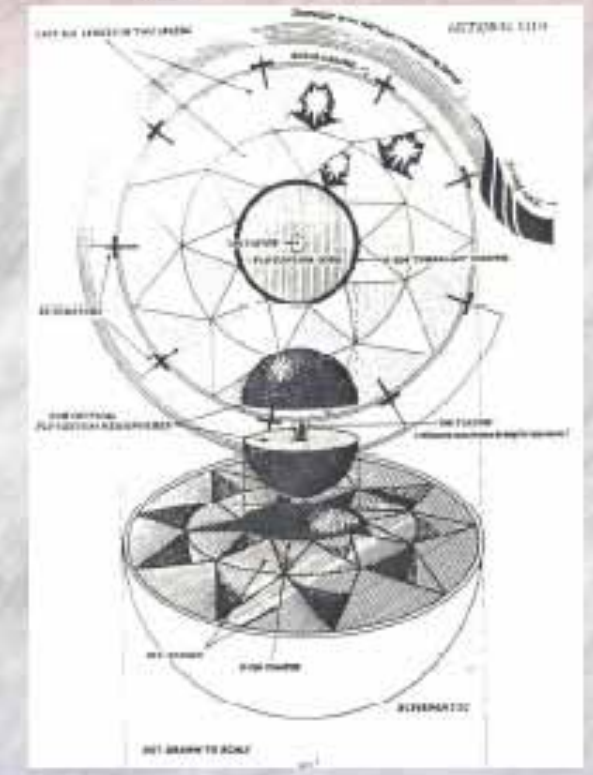


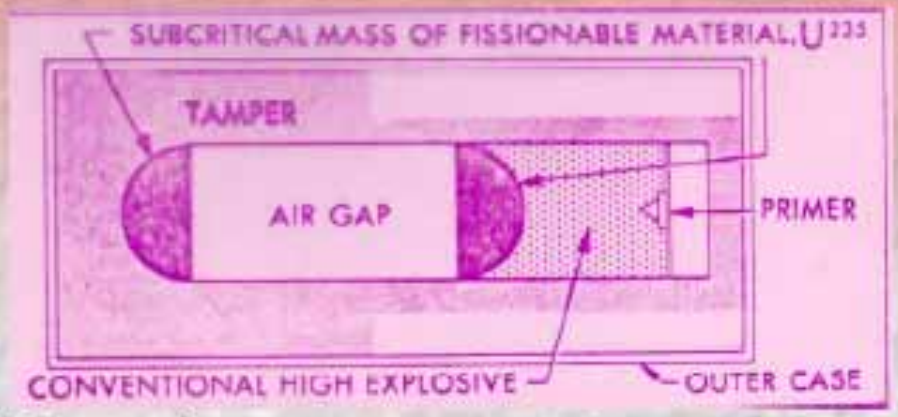
The Threat of Nuclear Proliferation and Nuclear Terrorism

- **States** - Seeking local dominance or deterrence; most dangerous also seeking asymmetric threat to challenge outside powers
- **Violent Non-State Groups** - Some seeking to cause massive injury; *al Qaeda highly likely to use WMD if available*
- **Interconnection** – Governments or elements in some proliferant states strongly support terrorist goals; may transfer WMD to terrorist organizations
- ***More non-state groups embracing extreme violence. More state "elements" (vs. "states") may be supporting them***

Improvised Nuclear Device (IND)

- Design is needed





- Key is access to *Special Nuclear Material*
- Varieties
  - Gun-assembled
  - Implosion system

Source of slide: K. Todd Wilber, NNSA, DOE, "Overview of Radiological/Nuclear Devices and Response"

Department of Homeland Security briefing:

For an IND, an adversary requires three things, beginning with the nuclear material

1. A sufficient quantity of weapon usable nuclear material

- **We do not believe terrorists can enrich uranium or breed plutonium**
- **Sources of special nuclear material:**
  - **Divert or steal from reactor or other fuel cycle facility that has HEU**
  - **Acquire through state sponsor**

Department of Homeland Security
Nuclear Assessment Program

Homeland Security

DHS Briefing, continued

An adversary also requires a working design, and must build the IND

2. A gun or implosion system design

- **The information is out there (so is misinformation)**

3. Construction

- **A small team of qualified individuals could probably do it, given technical expertise, operational capability**

Source: "Nuclear Smuggling," Department of Homeland Security Nuclear Assessment Program, http://www.exportcontrol.org/library/conferences/1379/005_Proliferation_Threat_Brief-Nuclear_Smuggling_-_Zachary_K.pdf

DHS Briefing, continued

A nuclear terrorist attack is a real possibility

- **Willingness and intent to engage in mass destruction has been clear since the 1993 WTC bombing**
- **There are no insurmountable technical barriers to designing and building an IND**
- **Acquiring weapon usable material is the key barrier**

Source: "Nuclear Smuggling," Department of Homeland Security Nuclear Assessment Program, http://www.exportcontrol.org/library/conferences/1379/005_Proliferation_Threat_Brief-Nuclear_Smuggling_-_Zachary_K.pdf

Feasibility of Using HEU from Civilian Facilities to Create Nuclear Material for a Bomb

- Scenarios examined by DOE scientists:
  - Adequate quantities available - Solid target waste: oxide mix in 80 gram containers (easily transportable).
  - HEU extraction is dependant on well-known chemical processes
  - Low radiation levels for handling target waste (13-37 mrem/hour per gram HEU, 20 cm. distance, 3 years cooling time, typical target burn-up (2-4%)) = contact handling feasible in 3 years (Argonne study, Spring 2007)
- Spent non-power reactor HEU-fuel rods:
  - Higher quantities and burn-up levels = longer cooling times necessary, similar extraction technologies

International Agreements

- Nuclear Safety and Security Summit, Moscow, 1996
  - creation of “a program for preventing and combating illicit trafficking in nuclear material to ensure increased cooperation among our governments in all aspects of prevention, detection, exchange of information, investigation and prosecution in cases of illicit nuclear trafficking.
- International Convention for the Suppression of Acts of Nuclear Terrorism
- Convention on the Physical Protection of Nuclear Material, amended in 2005
- Protocol To The Convention For The Suppression Of Unlawful Acts Against The Safety Of Maritime Navigation
- Other international legal instruments related to combating nuclear terrorism

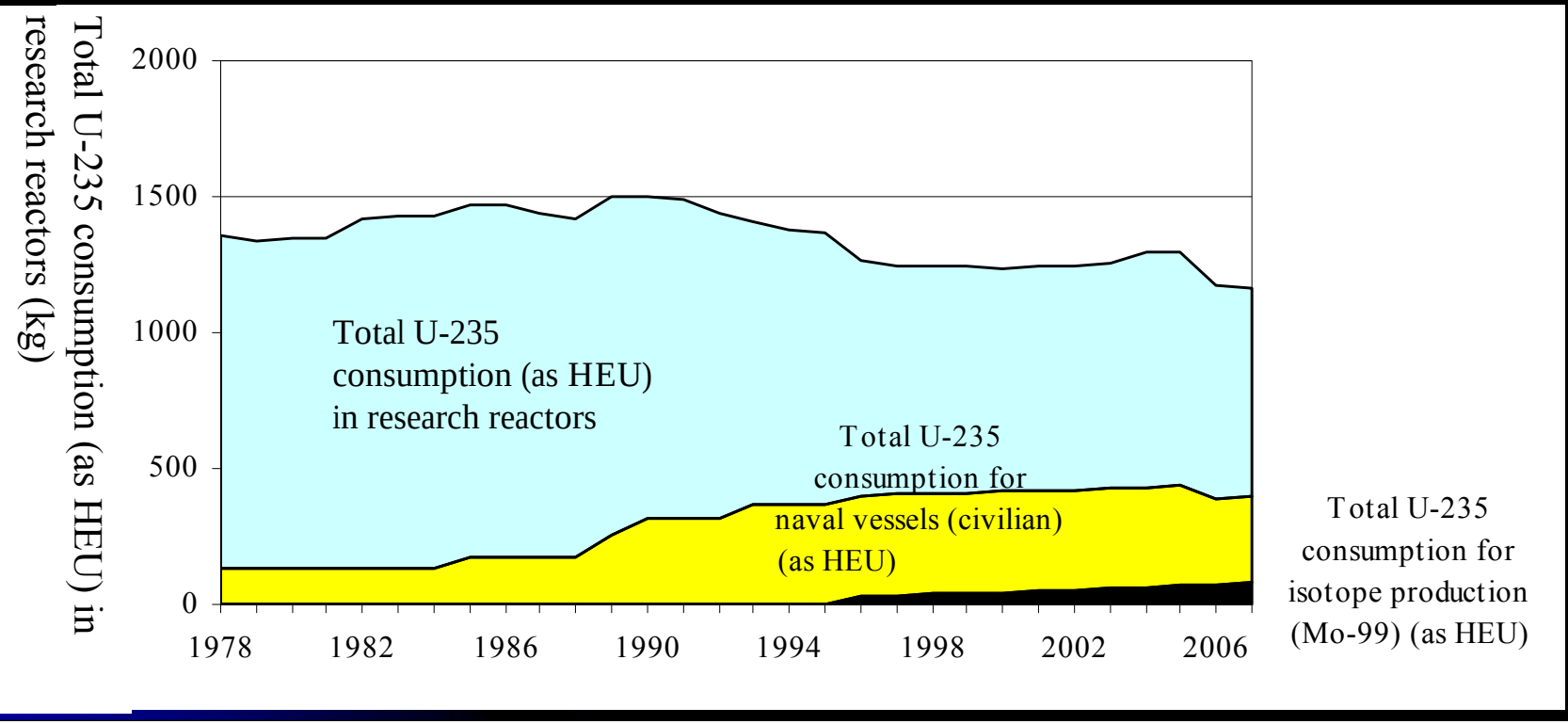
Global Initiative to Combat Nuclear Terrorism

- Priorities:
  - preventing the availability of nuclear material to terrorists;
  - improving the capabilities of participating nations to detect, search for, and prevent trafficking in such materials;
  - promoting information sharing and law enforcement cooperation;
  - establishing appropriate legal and regulatory frameworks;
  - minimizing the use of highly enriched uranium and plutonium in civilian facilities and activities;
  - denying safe haven and financial resources to terrorists; and
  - strengthening our response capabilities to minimize the impact of any nuclear terrorism attack.

Joint Statement, Global Initiative to Combat Nuclear Terrorism, Astana, June 12, 2007

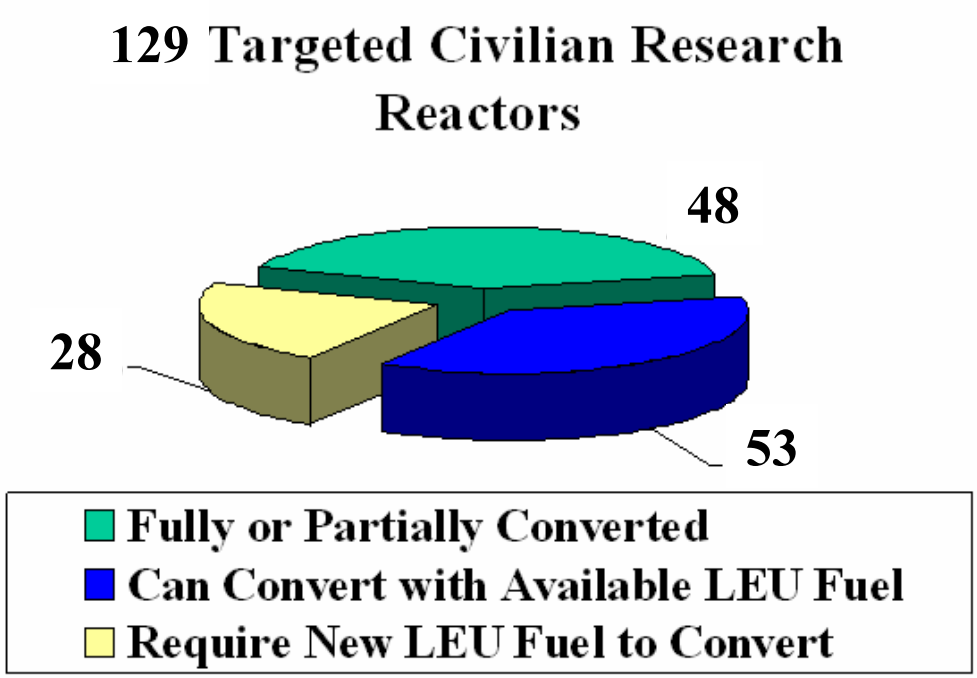
Civilian HEU Uses

- Research and test reactors
- Critical assemblies
- Medical isotope production
- Fast reactors
- Icebreakers



Reduced Enrichment for Research and Test Reactors (RERTR) Program

- Established in 1978, the RERTR program supports the minimization and, to the extent possible, elimination of the use of HEU in civil nuclear applications by working to convert research reactors and radioisotope production processes to the use of LEU fuel and targets throughout the world.
- RERTR program develops the LEU fuels and targets necessary for conversion *and* works to convert research reactors and radioisotope production processes to the use of LEU fuel and targets throughout the world and in the United States
- RERTR program targets **129 civilian reactors for conversion**
  - These reactors process *large quantities of HEU* and can be converted because a suitable LEU fuel is available or under development



- 41% of targeted mission complete
- Avoided use of 250 kilograms of HEU worldwide per year = *10 nuclear weapons* per year

ZPPR Reactor, Idaho National Lab

- Operated 1969-1992
- Deactivation Planned by September 2009
- Disassembly and disposition of the reactor

The past: corroded HEU drums,Y-12 Building 9206

The future: a new $549 million facility for HEU storage with security features including:

- High fences topped by razor wire
- Barriers line the entry route, placed strategically to stall terrorist assaults.
- Massive concrete walls with many gun ports

The Highly Enriched Uranium Materials Facility

Russian Research Reactor Fuel Return (RRRFR) Program

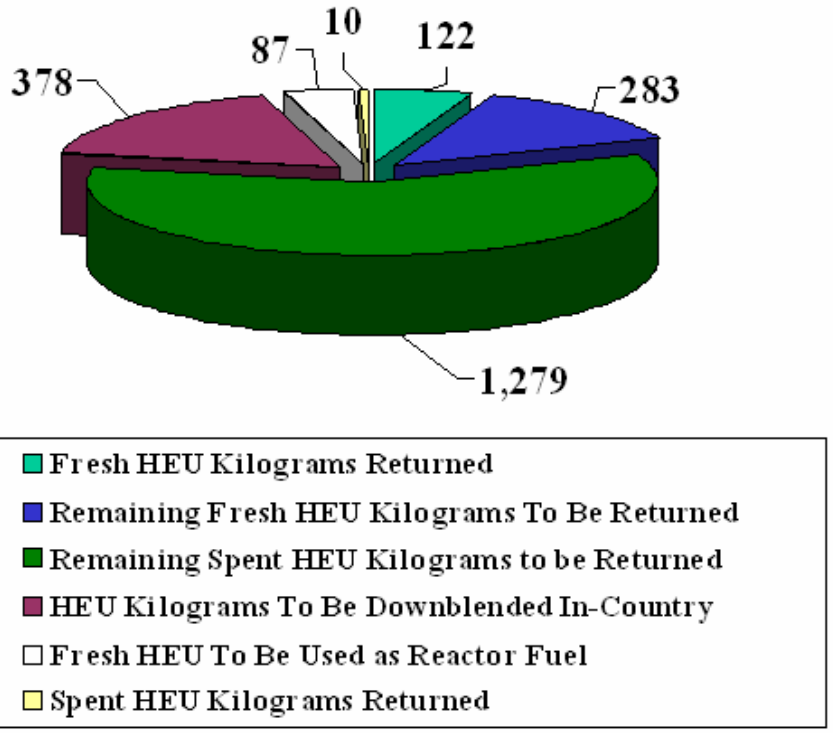
Goal: eliminate HEU stockpiles at Soviet-/Russian-supplied research reactors worldwide

2,159 kilograms of Russian-origin fresh and spent research reactor fuel from Soviet/Russian-supplied research reactors are eligible to be returned to Russia or down blended in country

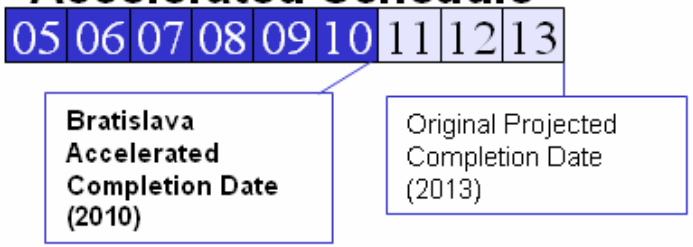
Russia agrees to take back fresh and spent fuel from Soviet-/Russian-supplied research reactors on the condition that the research reactors agree to convert to LEU fuel or shutdown

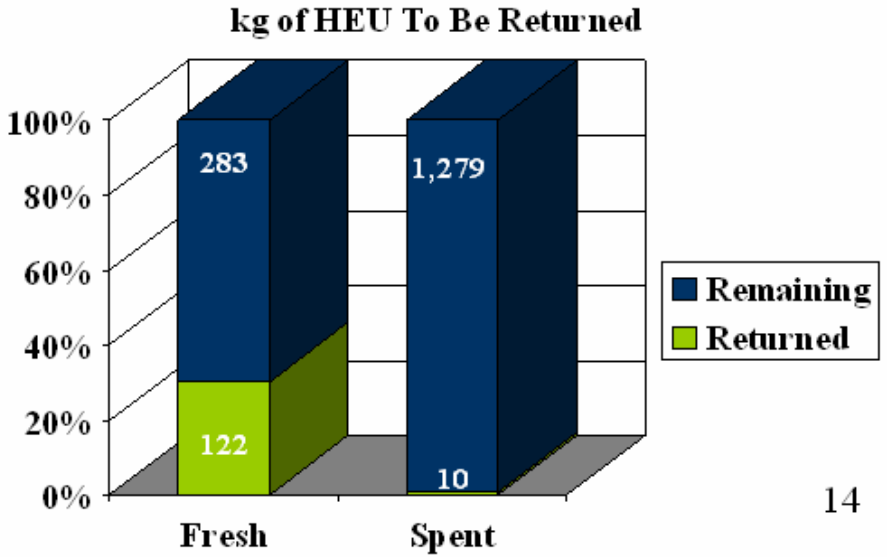
To date, 132 kilograms of Russian-origin HEU repatriated through 9 shipments.

Disposition Paths for 2,159 kg of Russian-origin HEU



Accelerated Schedule





Opportunities

- Shut down obsolete and old reactors
  - Savings on security upgrades and operational costs in the long run
- Consolidate research to few viable reactors – centers of excellence and ensure highest security standards at these centers
  - Make them part of the Russian proposal on international nuclear fuel cycle centers
- Focus on developing new LEU fuels and technologies using LEU or other non-HEU alternatives
  - Opportunities for exports, long-term supplies