



# Global Threat Reduction Initiative



Briefing for the IAEA Nuclear Security Symposium  
April 2, 2009



# GTRI Program

## GTRI MISSION

Reduce and protect vulnerable nuclear and radiological material located at civilian sites worldwide by providing support for countries' own national programs

## GTRI is:

- A part of President Obama's comprehensive strategy to prevent nuclear terrorism;
- The key organization responsible for implementing the U.S. HEU minimization policy.

## A National Priority

"Lead a global effort to secure all nuclear weapons materials at vulnerable sites within four years"

President Barack Obama  
White House Website

### Convert



**Convert** research reactors from the use of highly enriched uranium (HEU) to low enriched uranium (LEU)

These efforts result in permanent threat reduction by minimizing and, to the extent possible, eliminating the need for HEU in civilian applications – each reactor converted or shut down eliminates a source of bomb material.

### Remove



**Remove** and dispose of excess nuclear and radiological materials; and

These efforts result in permanent threat reduction by eliminating bomb material at civilian sites – each kilogram or curie of this dangerous material that is removed reduces the risk of a terrorist bomb.

### Protect



**Protect** high priority nuclear and radiological materials from theft and sabotage

These efforts result in threat reduction by improving security on the bomb material remaining at civilian sites – each vulnerable building that is protected reduces the risk until a permanent threat reduction solution can be implemented.

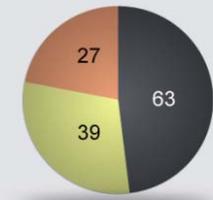


# Convert

## Convert research reactors and medical isotope production processes from the use of HEU to LEU

- Assisting reactor operators to perform feasibility studies and safety analyses required for regulatory approval to convert and procure LEU replacement fuels,
  - **By 2018, convert or verify the shutdown prior to conversion of 129 reactors**
  - **To date, 63 completed (49%)**
  - **In the first 4½ years after GTRI was established, the program converted or verified the shutdown of 24 reactors.**
  - **In the 4½ years prior to GTRI's creation, only 1 reactor was converted**
- Developing and qualifying new high-density U-Mo LEU fuel to convert high performance reactors, and;
- Developing a U-Mo LEU fuel fabrication capability to produce the new high-density fuel.
- Establishing a reliable domestic supply of the critical medical isotope Mo-99 using LEU

**Reactors Converted**  
(as of December 2008)

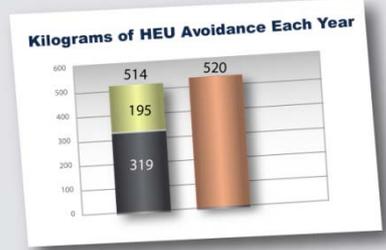


49% complete

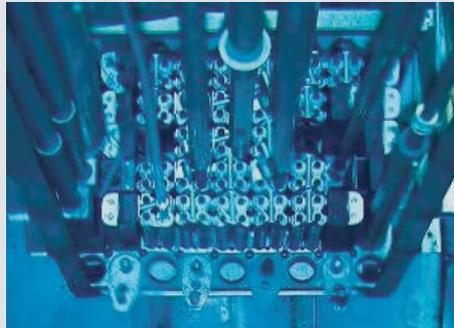
- Converted or shutdown prior to conversion - 63
- Planned to convert with existing LEU - 39
- Planned to convert with new high density LEU under development - 27

Total - 129

There are an additional 78 HEU reactors currently outside the scope of GTRI because they are used for defense missions or they have a unique design that cannot use LEU fuel currently under development.



- The 63 reactors converted or shutdown to date result in 319 Kg of HEU avoidance each year.
- The 39 reactors that can convert with existing LEU would result in an additional 195 Kg of HEU avoidance each year.
- The 27 high performance reactors that need the new high density LEU to convert would result in an additional 520 Kg of HEU avoidance each year.



The unique fuel assembly design for the High Flux Isotope Reactor (HFIR)



Preparing HEU for removal from a research reactor core to allow for conversion to LEU



# Fiscal Year 2009 Priorities

## CONVERT PROGRAM

- **Reactor Conversions**
  - Convert 2 additional research reactors in the United States (Wisconsin, NRAD) and assist with the conversion of several international research reactors (such as in Hungary, Japan)
    - **Complete Presidential commitment for U.S. domestic reactor conversions 2 years ahead of schedule.**
  - Work with the IAEA to update a comprehensive worldwide database to include:
    - **large pulse reactors, critical facilities, and reactors with a defense orientation**
  - Evaluate expansion of the program beyond the current 129 research reactors, particularly to include research reactors in Russia, and brief recommendations to NNSA management by the end of April
- **Reliable, Domestic Supply of the Medical Isotope Mo-99 without HEU**
  - National Academies' study of January 14, 2009 on the feasibility of LEU for production of medical isotopes
  - Ensure the establishment of U.S. supply without using HEU
  - Evaluate Mo-99 waste disposition options
- **Fuel Development for High Performance Research Reactors**
  - Fuel Fabrication Capability - Seek approval to perform an accelerated laboratory and contractual procurement approach to ensure LEU fuel is available to begin conversions by 2012
  - Fuel Development – Demonstrate acceptable fuel behavior at the prototypic scale within the expected envelope of power and burn-up irradiation conditions for the 3 NRC-regulated reactors