



U.S. DEPARTMENT OF
ENERGY

Global Threat Reduction Initiative

NNSA
National Nuclear Security Administration
Defense Nuclear Nonproliferation

Defense Nuclear Nonproliferation



DOE/NNSA Efforts to Support the Domestic Production of Mo-99

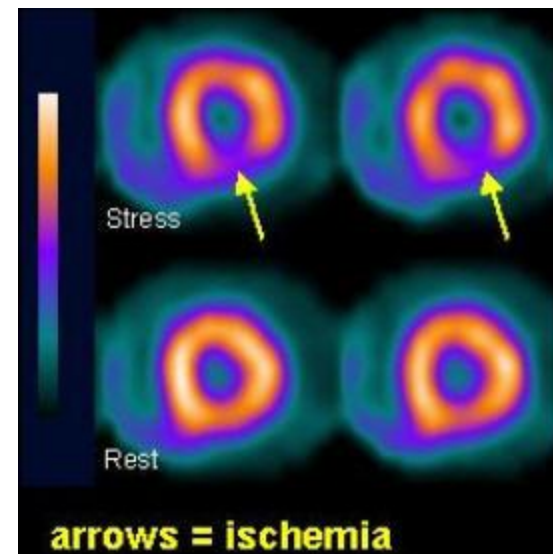
May 11, 2012



Mo-99 Policy Objectives*

Balance improving nuclear security with maintaining a reliable medical isotope supply.

- Ensure reliable supply of Mo-99 for 30 million worldwide patients annually
- Eliminate HEU use in Mo-99 production
- End subsidies and establish an economically-sound industry



* Excerpt from Office of Science and Technology Policy presentation at December 4-7, 2011 Topical Meeting in Santa Fe, NM.



GTRI Mission & Program Goals

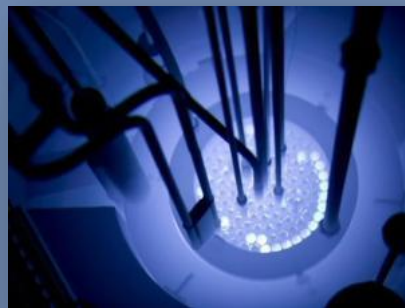
MISSION

REDUCE AND PROTECT VULNERABLE NUCLEAR AND RADIOLOGICAL MATERIAL LOCATED AT CIVILIAN SITES WORLDWIDE.

GOALS

1. CONVERT
2. REMOVE
3. PROTECT

CONVERT



CONVERT RESEARCH REACTORS AND ISOTOPE PRODUCTION FACILITIES 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.

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

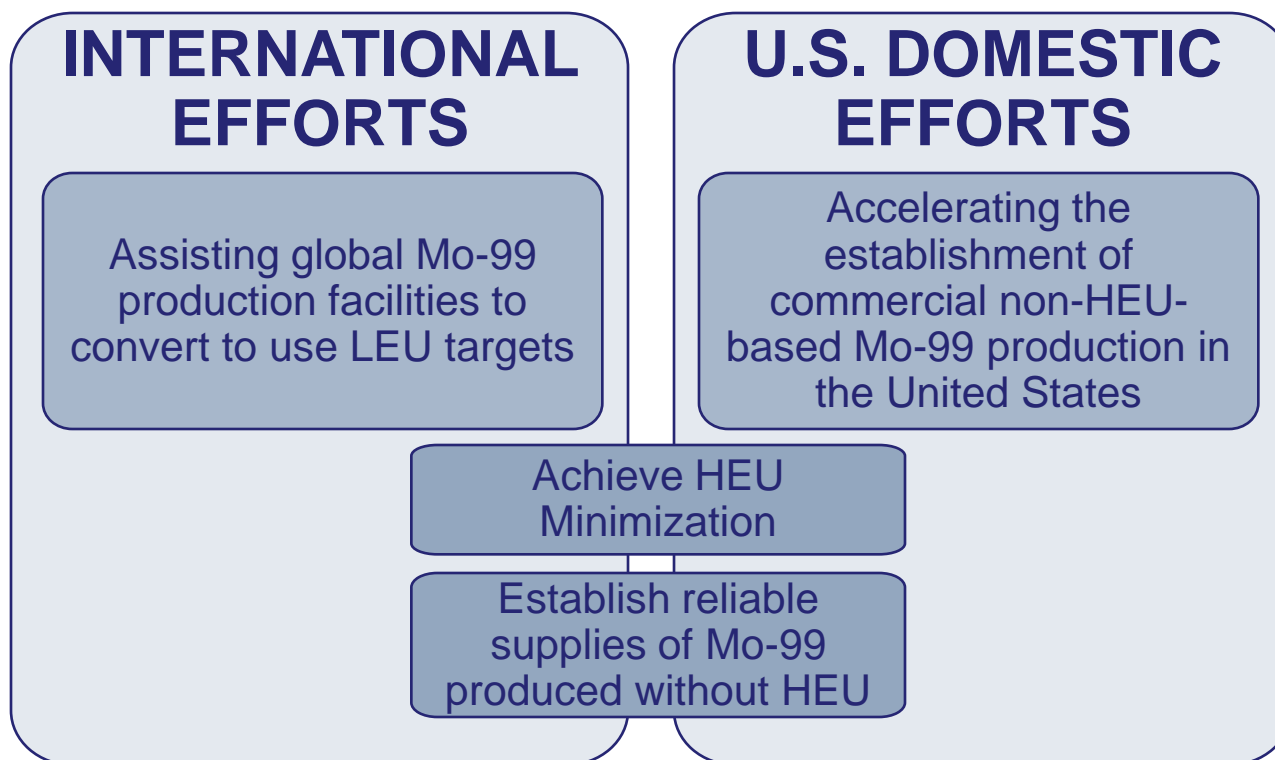
THESE EFFORTS RESULT IN THREAT REDUCTION BY IMPROVING SECURITY ON THE BOMB MATERIAL REMAINING AT CIVILIAN SITES – EACH VULNERABLE BUILDING THAT IS PROTECTED REDUCES THE RISK UNTIL A PERMANENT THREAT REDUCTION SOLUTION CAN BE IMPLEMENTED.



GTRI & Mo-99

International & U.S. Domestic Approaches

- Under its long-standing HEU minimization mission, GTRI provides assistance to research reactors and isotope production facilities to convert from the use of HEU to LEU.
- GTRI's mission includes accelerating the establishment of a reliable U.S. domestic supply of Mo-99 produced without the use of HEU.





Strategy for Reliable Non-HEU-Based Mo-99 Supply

Global Mo-99 Market – Major Producers

HEU

Non-HEU



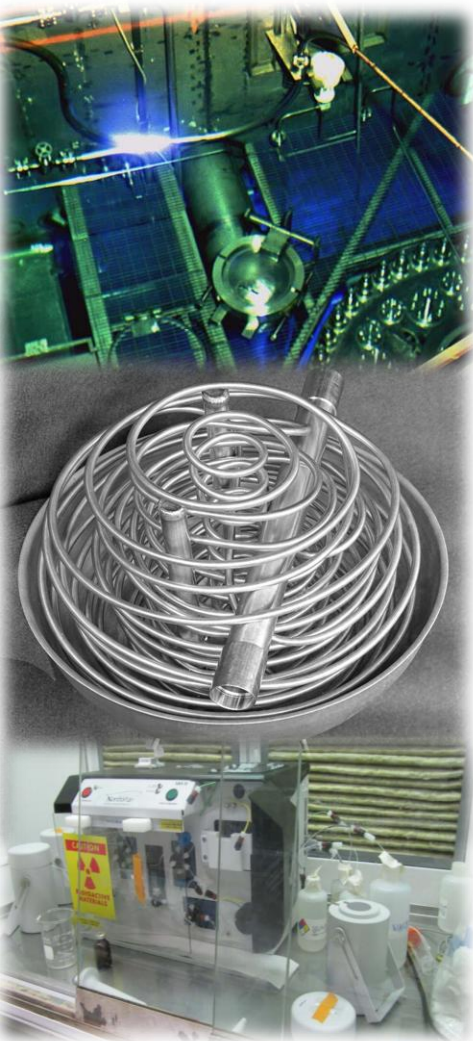
U.S. Domestic Mo-99 Projects





GTRI and U.S. Domestic Mo-99: Cooperative Agreement Partners

Objective: To accelerate existing commercial projects to meet at least 100% of the U.S. demand of Mo-99 produced without HEU.



Neutron Capture:

- On September 30, 2009, NNSA awarded a cooperative agreement to General Electric-Hitachi for \$2.3M to pursue neutron capture technology. On February 7, 2012, GEH announced its business decision to suspend progress on the project indefinitely due to market conditions.

LEU Solution Reactor Technology:

- On September 30, 2009, NNSA awarded a cooperative agreement to Babcock and Wilcox (B&W) for \$9.1M to pursue the LEU solution reactor technology.

Accelerator Technology:

- On September 29, 2010, NNSA awarded a limited-scope cooperative agreement to NorthStar Medical Radioisotopes, LLC for \$500,000 to pursue accelerator technology. On September 19, 2011, NNSA awarded an additional cooperative agreement for \$2.3M.
- On September 29, 2010, NNSA awarded a limited-scope cooperative agreement to Morgridge Institute for Research for \$500,000 to pursue accelerator technology. On April 30, 2012, NNSA awarded an additional cooperative agreement for \$10.2M.

Each cooperative agreement project is currently limited to \$25M, under a 50% - 50% cost-share arrangement.



U.S. National Laboratories Support to Mo-99 Production

GTRI makes the expertise of the U.S. National Laboratories available to:

- Support technical development of each of the Mo-99 technical pathways
- Ensure the expertise at the national laboratories is available to support the acceleration of commercial projects using non-HEU technologies

All work packages funded by NNSA outside the cooperative agreement are open-sourced, non-proprietary, non-critical-path activities.

If requested, the work conducted by the laboratories outside of the cooperative agreements is available to help inform the NRC.

