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# NNSA Works to Minimize the use of HEU in Medical Isotope Production

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As part of its nuclear nonproliferation mission, the National Nuclear Security Administration (NNSA) is working to develop a sustainable means of producing the life-saving medical isotope molybdenum-99 (Mo-99), without using highly enriched uranium (HEU).

This program is part of the effort by NNSA's Global Threat Reduction Initiative (GTRI) to develop and implement technologies to minimize and, to the extent possible, eliminate the civilian use of HEU, including in research reactors and isotope production facilities worldwide.

After more than six decades of cutting-edge nuclear science, technology and engineering, NNSA's nuclear security enterprise is uniquely equipped to identify means of producing such isotopes in a way that is consistent with global efforts to prevent the proliferation of nuclear weapons.

GTRI's objective is to accelerate the establishment of a reliable Mo-99 commercial supply network that avoids a single point-of-failure and does not use proliferation-sensitive HEU, an effort that requires strong cooperation among government and industry. As the United States currently imports the majority of its Mo-99 supply from subsidized, aging facilities abroad, most of which is produced with HEU, GTRI's effort is aimed to ensure that this critical medical isotope is readily available for the American medical community, and produced in accordance with U.S. nuclear nonproliferation policy. To further this critical effort:

- GTRI makes technical expertise available, on a non-proprietary basis, to existing global producers to assist with converting their Mo-99 production processes to use low enriched uranium (LEU) targets.
- GTRI is partnered with four U.S. domestic commercial entities to accelerate the development of a diverse set of non-HEU technologies to produce Mo-99 in the United States.
- GTRI is working to accelerate the development of LEU fission technology, neutron capture technology, and accelerator technology to produce Mo-99 in the United States. GTRI's four cooperative agreement partners are:
  - B&W Technical Services Group to develop LEU Solution Reactor technology
  - GE Hitachi Nuclear Energy to develop neutron capture technology
  - NorthStar Medical Radioisotopes to develop accelerator technology
  - Morgridge Institute for Research to develop accelerator technology with LEU fission
- GTRI's cooperative agreements are implemented under a 50%-50% cost-share arrangement. GTRI's support to the total project cost of the cooperative agreement partners is up to \$25 million each.
- GTRI is also partnered with the U.S. National Laboratories to develop non-HEU-based Mo-99 production technologies. The work at the U.S. National Laboratories in support of the GTRI Mo-99 program is implemented under an open-sourced, non-proprietary basis.

To establish a reliable, non-HEU-based Mo-99 supply, GTRI's efforts are consistent with the January 2009 National Academy of Sciences' study, which concluded that it is technically and economically feasible to produce Mo-99 without the use of HEU. Recent reports released in 2010 and 2011 by the Organization of Economic Cooperation & Development – Nuclear Energy Agency's High Level Group on the Security of Supply of Medical Radioisotopes also validate the need for a reliable, full cost-recovery Mo-99 supply chain, and the feasibility of producing Mo-99 without highly enriched uranium.

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