

# **The SHINE Path to a Reliable Domestic Supply of Mo-99**

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## **ABSTRACT**

The SHINE system employs an accelerator-driven, low-enriched uranium (LEU) solution in a geometry optimized for high-efficiency isotope production (including iodine-131 and xenon-133). Neutrons produced by deuterium-tritium fusion reactions in the accelerator gas target drive fission in the subcritical LEU solution. The process produces medical isotopes that fit seamlessly into existing supply chains while eliminating the use of weapons-grade uranium and reliance on aging nuclear reactors. The SHINE facility is designed to supply over half of U.S. demand for molybdenum-99. In 2013, SHINE demonstrated accelerator operation at full output (April), completed preliminary design of the facility (May), and submitted its construction permit application to the NRC (May). In April 2014, SHINE and GE Healthcare signed a long-term supply agreement to provide GE with molybdenum-99 on a regular basis once the facility is operational. SHINE expects to receive a construction permit in 2015 and to be producing molybdenum-99 in 2017.