

Overview of Argonne Support for Mo-99 Medical Isotope Production: NorthStar Medical Technologies

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ABSTRACT

Argonne National Laboratory (Argonne) and Los Alamos National Laboratory (LANL) are supporting NorthStar Medical Technologies in their efforts to become a domestic ⁹⁹Mo producer. NorthStar Medical Technologies is utilizing the accelerator production technology pathway for the production of ⁹⁹Mo using a photonuclear reaction $^{100}\text{Mo}(\gamma, n)^{99}\text{Mo}$ in an enriched ¹⁰⁰Mo target. So far we have performed six demonstration of the ⁹⁹Mo production, with natural and enriched ¹⁰⁰Mo, utilizing liquid (water) and gaseous-He cooling. Those experiments have demonstrated production of the ⁹⁹Mo at relatively high beam power on the target and effective separation of the ^{99m}Tc from low-specific-activity Mo targets. Following a completion of the upgrade to the Argonne electron linear accelerator, we are conducting a series of thermal and production experiments with three different enriched-¹⁰⁰Mo target disks and at higher power and at different beam energies to optimize ⁹⁹Mo production. Other investigations include calculation for development of the requirement of the facility shielding, design of the beam-transport components, beam diagnostic, components reliability studies, and enriched molybdenum recovery and purification. This presentation will review the current status of the project.