2018 Mo-99 TOPICAL MEETING ON
MOLYBDENUM-99 PRODUCTION TECHNOLOGY DEVELOPMENT

SEPTEMBER 23-26, 2018
HILTON KNOXVILLE HOTEL
KNOXVILLE, TN

Accelerator Based Production of Mo-99: Photonuclear Approach

S. Chemerisov,[1] R. Gromov[1], P. Tkac[2], J. Bailey[1], D. Rotsch[2], C. Jonah[1], G. Vandegrift[2]
Argonne National Laboratory, 9700 South Cass Avenue, Argonne IL 60439, United States
[1]Experimental Operations and Facilities Division
[2]Chemical and Fuel Cycle Technologies Division

ABSTRACT

The National Nuclear Security Administration's (NNSA) Office of Material Management and Minimization (M^3), in partnership with commercial entities and the US national laboratories, is working to accelerate the establishment of a reliable domestic supply of Mo-99 while also minimizing the civilian use of HEU. Argonne National Laboratory (Argonne) is supporting NorthStar Medical Radioisotopes in their efforts to become a domestic Mo-99 producer. NorthStar's production path utilizes a photonuclear reaction in an enriched Mo-100 target. In this approach, a high-power electron accelerator is used to produce the required flux of high energy photons through the bremsstrahlung process. Multiple irradiations of the natural and enriched Mo-100 targets were conducted at different beam energies to study the side reactions and effect of impurities. Other investigations include optimization of the target housing design, calculations for facility shielding, development of beam transport components, development of beam diagnostic and components reliability studies.