

# Argonne Chemical-Processing Activities in Support of the Development of $\gamma, n$ Production of Mo-99

D.A. Rotsch, P. Tkac, J. Harvey, G.F. Vandegrift  
Chemical Science and Engineering  
Argonne National Laboratory  
9700 Cass Avenue, Argonne IL. 60439 – USA

## ABSTRACT

Technetium-99m, currently provided to consumers from  $^{99}\text{Mo}/^{99\text{m}}\text{Tc}$  generators, is well-known for its uses in radiopharmaceuticals. Argonne National Laboratory is assisting NorthStar Medical Radioisotopes in developing accelerator-based production of  $^{99}\text{Mo}$  using photonuclear reaction  $^{100}\text{Mo}(\gamma, n)^{99}\text{Mo}$  with enriched  $^{100}\text{Mo}$  targets.  $^{100}\text{Mo}$ -enriched metallic discs are irradiated, dissolved in  $\text{H}_2\text{O}_2$ , converted to  $\text{K}_2\text{MoO}_4$  with  $\text{KOH}$ , and then loaded onto a TechneGen Generator.  $^{99\text{m}}\text{Tc}$  and  $^{99/100}\text{Mo}$  are loaded onto a column in the TechneGen Generator and the  $^{99/100}\text{Mo}$  washed from the column.  $^{99\text{m}}\text{Tc}$  is then eluted from the column, purified and ready for chelation. Once the  $^{99/100}\text{Mo}$  feed solution has decayed, the solution needs to be treated to recover and recycle the valuable  $^{100}\text{Mo}$ . To reuse  $^{100}\text{Mo}$ , the FDA requires that recycled materials are at or below the purity of the original material. Experimental data on dissolution of sintered Mo disks, separation of  $^{99\text{m}}\text{Tc}$  from  $^{99/100}\text{Mo}$  using TechneGen generator, and recovery of Mo will be presented.