

MCNP-PoliMi Simulation of Neutron-Imaging Measurements for Mass Determination for a Trough of UO₃

B. R. Grogan, J. T. Mihalczko, J. A. Mullens
Oak Ridge National Laboratory
P.O. Box 2008, MS-6010, Oak Ridge, TN 37831-6010

ABSTRACT

To accurately determine the mass of UO₃ powder in a covered trough, the trough must be opened and cleaned out and the material inside must be weighed. This process is expensive and time consuming, and it presents a contamination hazard. The Nuclear Materials Identification System (NMIS) offers a possible alternative by using active interrogation with a deuterium-tritium neutron generator to image the system and determine the density distribution and the mass of the UO₃ powder without opening the trough. The MCNP-PoliMi code was used to model several imaging measurements by the NMIS and estimate how accurately the mass of the UO₃ powder could be determined as a function of measurement time.