

## Recommendations from an ( $\alpha,n$ ) Nuclear Data Scoping Study

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Neutrons and gamma rays emitted from the ( $\alpha,n$ ) reaction are an important component of nondestructive assay techniques used in safeguards to determine enriched uranium and other actinide inventories within the nuclear fuel cycle. Uncertainties in the reaction cross section, total neutron yield, neutron spectrum, and gamma spectrum from these reactions can negatively impact the determination of the mass of actinides of interest and can represent several significant quantities in unaccounted material over time. Recently, the Office of Defense Nuclear Nonproliferation, Research and Development funded a scoping study to understand the impact of ( $\alpha,n$ ) reaction data to the nonproliferation mission. The scoping study examined the current state of the nuclear data, and the limitations of the current codes used to predict the ( $\alpha,n$ ) neutron and gamma source terms. A particular focus was placed on nuclear data important to the assay of  $^{235}\text{U}$  cylinders. The nuclear data needs were prioritized, and recommendations made for new measurements, nuclear data evaluations and code development.

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