

A Dedicated Laboratory for Radioactive Sample Handling

PI: Amir Bahadori, Kansas State University

Co-PIs: Jeremy Roberts, Walter McNeil,
Alan Cebula

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ABSTRACT:

The Kansas State University (KSU) TRIGA Mark II Nuclear Reactor Facility proposes to establish a dedicated Sample Handling Laboratory. The KSU Reactor, operating since 1962, is an integral part of the KSU Nuclear Engineering (NE) program, and is used on a weekly basis for teaching, training, and research. Neutron activation analysis (NAA) and nuclear transmutation have been historical areas of strength at the KSU Reactor, but due to current sample handling procedures and available irradiation facilities, use of these technologies is presently limited. The first objective of this project is to improve the KSU Reactor infrastructure for irradiation and analysis of radioactive samples. This will be accomplished by reinstalling the pneumatic transfer system terminus in the reactor core, redirecting the associated sample insertion and removal point to a KSU Reactor-controlled room, and installing new pneumatic transfer system control components. The pneumatic transfer system will be capable of transporting a sample directly to an advanced counting station present in the KSU Reactor Sample Handling Laboratory for immediate analysis. The second objective is to improve the pre- and post-irradiation sample handling procedures to minimize contamination between the sample and the environment. This will be accomplished by acquiring a glove box and a high-precision balance. The proposed work will enhance the quality, safety, and efficiency of operation at the KSU Reactor, while simultaneously improving the facility's research, teaching, and training capabilities. It is expected that at the conclusion of this project, students and faculty will be able to participate in more diverse research opportunities, and more investigators will find the KSU Reactor to be an attractive facility for performing research.