A Request for Upgrade of the Ohio State University Research Reactor Beam Ports Infrastructure

PI: L. Raymond Cao, The Ohio State University

Collaborators: Vaibhav Sinha and Andrew Kauffman, The Ohio State University

Program: Reactor Upgrades

ABSTRACT: An important infrastructure upgrade for The Ohio State University Nuclear Reactor Laboratory (OSU NRL) is being proposed. This infrastructure is significant to improve radiation safety for increased use of the beam ports and for monitoring and instrumentation control in the operation of Beam Ports 1 and 2 at the Ohio State University Research Reactor (OSURR). The proposed infrastructure will also allow for enhanced teaching and research capabilities at the OSURR. Furthermore, the nuclear engineering curriculum will directly benefit from the requested upgrade and will allow the OSU NRL to advance its present capabilities to train and educate future work force with modern instrumentation and R&D tools. The OSU NRL utilizes Beam Ports 1 and 2 in order to accommodate training and research activities. However, Beam Port 1 is limited in its capabilities due to lack of external structural shielding, and it has not been upgraded in the last 50 years. The OSURR proposes to upgrade its infrastructure to address potential radiation safety implications of increased use of Beam Port 1, and it proposes to improve the shielding presently in use for Beam Port 2 to minimize radiation dose rates from simultaneous use of two beam facilities. The present unavailability of a proper shielding structure and the manual operation of the beam shutter assembly for Beam Port 1 limit its functionality, and expanding research modes for this beam port could increase risk for radiation exposure. The OSU NRL proposes to acquire radiation shielding materials and radiological safety instrumentation (neutron beam shutter box assembly, backstop on rail, automated barriers with audio/visual alarm, gamma/neutron monitors, neutron beam profiler/detector and surveillance camera monitoring system) to address potential radiation exposure and safety issues to reactor personnel, students and other facility users for increased usage of Beam Ports 1 and 2 of the OSURR. The proposed upgrade will immensely help the OSURR and NE curriculum in terms of research capabilities and teaching, including reactor laboratory classes for students from NE curriculum, routine operation and research performed by the facility users. The proposed infrastructure will increase the radiation safety, overall functionality and capability of the OSURR.