
SMR Full Scope Simulator for Upgrading The Ohio State University Nuclear Engineering Program Research and Infrastructure

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ABSTRACT:

The overall objective of the proposal is to enhance the educational and research capabilities of the Nuclear Engineering Program at The Ohio State University (OSU). Proposed equipment will improve infrastructure to perform research in advanced reactor risk, reliability, safety and security characterization and improvement, and in support of its Nuclear Science User Facility in the form of OSU's Nuclear Reactor Laboratory. Risk, reliability, safety and security characterization will be enhanced through acquiring and installing the NuScale full scope simulator (E2). The E2 environment is representative of the advanced automation features that are being introduced into a new generation of advanced reactors and distinguishes itself from the current generation of light water reactors. For instance E2 incorporates a process library of computer-based procedures and automations to ensure that operators are performing the correct actions on the correct unit; a tiered notification system that informs operators of abnormal conditions and provides alarms, cautions, and notices; Fully Automated Sequences, where operators can elect to change power, change electrical output, and control selected equipment; Integrated Emergency Procedures that graphically inform the operator of the condition of the reactor safety functions and also link to applicable procedures

Acquired infrastructure will support activities that address advanced instrumentation needs of a number of DOE's programs including Advanced Reactor Concepts, and directly benefit the Nuclear Energy Enabling Technologies crosscutting efforts in Advanced Sensor and Instrumentation. Capabilities acquired through this program will further strengthen and expand the OSU's long-term leadership in the area of Instrumentation and Control (I&C) and Safety, and will provide an extended support to its Nuclear Science User Facility to perform advanced research and education at the Ohio State University Nuclear Reactor Laboratory. This critical upgrade will be a boost to current nuclear engineering program efforts to modernize and advance current graduate education research and establish a robust program in undergraduate education by adding a new course in Advanced Reactor Operations and by adding experiment modules for the study of crew reliability for advanced reactors in the human reliability course.