

SECTION A. Project Title: Instrumentation for Enhanced Safety, Utilization, and Operations Infrastructure at the NCSU PULSTAR Reactor – North Carolina State University**SECTION B. Project Description**

North Carolina State University proposes to upgrade and enhance the safety, operations, and utilization infrastructure of its PULSTAR reactor. This upgrade will include: (1) installation of modern reactor console instrumentation to support the continued safe and reliable operation of the PULSTAR reactor, and (2) installation of comprehensive and facility-wide radiation protection and moisture/temperature sensor systems. The replacement of the current compensated ion chamber and uncompensated ion chamber power monitoring system of the PULSTAR reactor is necessary for its continued operation. The current systems are obsolete and will no longer be supported by the vendor. The new instrumentation will provide functionality for intermediate power range monitoring, coolant flow SCRAM to enable trips, over-power control rod reverse, over-power scrams, and automatic power feedback control. In addition, installation of a comprehensive and facility wide radiation monitoring system will enhance radiation protection capabilities in the PULSTAR reactor (and associated laboratories) and will be in direct support of the general safety culture of the facility. Furthermore, adding the ability to monitor moisture and temperature in and around the reactor's biological shield will allow for early detection of reactor pool water leaks and support rapid identification and mitigation of related abnormalities. The proposed upgrades support current and future research and education activities that can be performed at the PULSTAR reactor, which are of direct relevance to the mission of DOE NE and Nuclear Science User Facilities (NSUF) objectives. The PULSTAR reactor is available to users nationally and worldwide.

SECTION C. Environmental Aspects / Potential Sources of Impact

The university has procedures in place to handle any waste that will be generated through this project. The action would not create additional environmental impacts above those already occurring at the university.

SECTION D. Determine the Level of Environmental Review (or Documentation) and Reference(s): Identify the applicable categorical exclusion from 10 CFR 1021, Appendix B, give the appropriate justification, and the approval date.

Note: For Categorical Exclusions (CXs) the proposed action must not: 1) threaten a violation of applicable statutory, regulatory, or permit requirements for environmental, safety, and health, including requirements of DOE orders; 2) require siting and construction or major expansion of waste storage, disposal, recovery, or treatment facilities; 3) disturb hazardous substances, pollutants, contaminants, or CERCLA-excluded petroleum and natural gas products that pre-exist in the environment such that there would be uncontrolled or unpermitted releases; 4) adversely affect environmentally sensitive resources. In addition, no extraordinary circumstances related to the proposal exist which would affect the significance of the action, and the action is not "connected" nor "related" (40 CFR 1508.25(a)(1) and (2), respectively) to other actions with potentially or cumulatively significant impacts.

References: B2.2 Installation of, or improvements to, building and equipment instrumentation (including, but not limited to, remote control panels, remote monitoring capability, alarm and surveillance systems, control systems to provide automatic shutdown, fire detection and protection systems, water consumption monitors and flow control systems, announcement and emergency warning systems, criticality and radiation monitors and alarms, and safeguards and security equipment).

Justification: The activity consists of the purchase, installation, commissioning and testing of equipment to enhance reactor safety and uninterrupted utilization of the PULSTAR reactor and associated facilities.

Is the project funded by the American Recovery and Reinvestment Act of 2009 (Recovery Act) Yes No

Approved by Jason Anderson, DOE-ID NEPA Compliance Officer, on 07/23/2021.