DOE-ID NEPA CX DETERMINATION

CX Posting No.: DOE-ID-21-020

SECTION A. Project Title: High Resolution Scanning Acoustic Microscopy System for High Throughput Characterization of Materials and Nuclear Fuels – North Carolina State University

SECTION B. Project Description

North Carolina State University (NCSU) proposes to acquire a state-of-the-art high resolution scanning acoustic microscopy system along with accessory sample synthesis and potentiostat setups to provide a unique high throughput nondestructive characterization platform to investigate microstructures and materials defects in nuclear fuels, sensor materials, cladding materials, reactor structural materials and 3D printed components. Through the use of the advanced frequency-dependent sonic wave sensing technique to detect changes in acoustic impedances of materials, the proposed confocal scanning acoustic microscopy system offers a unique high sensitivity nondestructive characterization capability with largely accelerated measurement time, thus enabling high throughput inspection of defects within nuclear fuels and materials for nuclear energy systems. The high-resolution scanning acoustic microscopy system along with accessory sample synthesis and potentiostat setups will be housed in one dedicated laboratory at NCSU's Burlington Engineering Laboratories. As a unique high throughput nondestructive material characterization platform, NCSU will use the requested equipment for: (1) the research related to nuclear science and engineering programs of interest to DOE NE R&D mission; and (2) the learning of undergraduate and graduate students of nuclear engineering. It will be shared with other internal and external researchers who are interested in nuclear energy studies and could serve as a Nuclear Science User Facilities (NSUF) partner facility to support the broad nuclear energy community.

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: B1.31 Installation or relocation and operation of machinery and equipment (including, but not limited to, laboratory equipment, electronic hardware, manufacturing machinery, maintenance equipment, and health and safety equipment), provided that uses of the installed or relocated items are consistent with the general missions of the receiving structure. Covered actions include modifications to an existing building, within or contiguous to a previously disturbed or developed area, that are necessary for equipment installation and relocation. Such modifications would not appreciably increase the footprint or height of the existing building or have the potential to cause significant changes to the type and magnitude of environmental impacts.

Justification: The activity consists of the acquisition and installation of a state-of-the-art high resolution scanning acoustic microscopy system to enhance high throughput materials characterization.

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.