

DOE-ID NEPA CX DETERMINATION

SECTION A. Project Title: X-ray diffraction tomography analysis of SiC composite tubes neutron-irradiated with a radial high heat flux – Oak Ridge National Laboratory

SECTION B. Project Description

Oak Ridge National Laboratory (ORNL) proposes to investigate the lattice strain distribution in silicon carbide (SiC) fuel cladding, subject to neutron irradiation under a high-radial heat flux. The project will use x-ray diffraction computed tomography (XRD-CT) techniques to experimentally verify modeling results for the stress state. The intent is to improve the thermomechanical modeling capability for a SiC-based accident tolerant fuel (ATF) cladding for light water reactors (LWRs).

SECTION C. Environmental Aspects / Potential Sources of Impact

Radioactive Material Use – Three radioactive ceramics specimens will be tested by x-ray exposure at Brookhaven National Laboratory (BNL). The tested specimens will be kept at ORNL for future usage.

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: B3.6 Siting, construction, modification, operation, and decommissioning of facilities for small-scale research and development projects; conventional laboratory operations (such as preparation of chemical standards and sample analysis); and small-scale pilot projects (generally less than 2 years) frequently conducted to verify a concept before demonstration actions, provided that construction or modification would be within or contiguous to a previously disturbed or developed area (where active utilities and currently used roads are readily accessible). Not included in this category are demonstration actions, meaning actions that are undertaken at a scale to show whether a technology would be viable on a larger scale and suitable for commercial development.

Justification: The activity consists of an investigation into strain distribution in fuel cladding.

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

Approved by Jason Sturm, DOE-ID NEPA Compliance Officer on 8/3/2020