

DOE-ID NEPA CX DETERMINATION

SECTION A. Project Title: Developing a Macro-scale SiC-cladding Behavior Model Based on Localized Mechanical and Thermal Property Evaluation on Pre-and Post-irradiation SiC-SiC Composites – University of California-Berkeley

SECTION B. Project Description

The University of California-Berkeley, in collaboration with Oak Ridge National Laboratory (ORNL), proposes to develop a fundamental understanding of the macroscopic behavior of SiC-SiC composite structures based on the microscopic properties of each individual component (SiC matrix, fiber, and interphases). Novel characterization techniques will be developed in this work to assess micro-scale mechanical and thermal properties. This proposed characterization and modeling work will provide a critical link between constituent level micro-scale mechanical and thermal properties and more accurate simulation of SiC-based cladding behavior in light water reactor (LWR) applications.

SECTION C. Environmental Aspects / Potential Sources of Impact

Radioactive Material Use /Radioactive Waste Generation – UC Berkeley will receive reactor irradiated SiC/SiC composites from ORNL. The samples are going to be gram size. SiC/SiC does not activate significantly in a neutron environment. The university EH&S has procedures in place to handle all materials. Currently, samples up to 750mR/h can be used, and the specimens involved with this project are expected to be far below that threshold.

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 university-scale research aimed at investigating SiC used for LWR cladding.

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

Approved by Jack Depperschmidt, DOE-ID NEPA Compliance Officer on 08/25/2015