

# DOE-ID NEPA CX DETERMINATION

**SECTION A. Project Title: An Investigation To Establish Multiphysical Property Dataset of Nuclear Materials Based on In-Situ Observations and Measurements, NEAMS: Nuclear Energy Advanced Modeling and Simulation – Purdue University**

**SECTION B. Project Description**

Purdue University proposes to investigate the prediction of microstructure feature change as a function of irradiation energy using in-situ observation through in-situ ion irradiation transmission electron microscope experiments, measurement of change in thermal and mechanical properties under simulated reactor loads as a function of microstructure using in-situ TEM experiments, measurement of thermal and mechanical properties as a function of change in loading, temperature, and environment with an account of nanoscale to micron scale feature sizes in unirradiated and irradiated microstructures using nano- and micromechanical surface enhanced Raman spectroscopy measurements, and establishing microstructure-property correlation based on experimental data including uncertainty quantification. The samples will be based on Zircaloy-4 and Zircaloy-2.

**SECTION C. Environmental Aspects / Potential Sources of Impact**

The research would involve microstructural studies of Zircaloy. 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: 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 assessing the microstructure of Zircaloy for research purposes.

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

Approved Jack Depperschmidt, DOE-ID NEPA Compliance Officer on 08/11/2014