

# DOE-ID NEPA CX DETERMINATION

**SECTION A. Project Title: Correlating Thermal, Mechanical, and Electrical Coupling Based Multi-Physics Behavior of Nuclear Materials through in-situ Measurement – Purdue University**

**SECTION B. Project Description**

Purdue University proposes to evaluate the effects of irradiation on thermomechanical coupling for Zircaloy as function of temperature and environment change using complementary in-situ experiments. The focus is on establishing an elaborate in-situ experimental setup that can not only predict change in thermal properties and their correlation with mechanical properties as a function of stress, temperature, and environment, but also on correlating such changes to changes in microstructural and chemical features under the effect of irradiation.

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

Chemical Use/Storage / Chemical Waste Disposal – The project involves processing of Zircaloy samples at Penn State which will be characterized for ion bombardment experiments at Nuclear Engineering department and for CO<sub>2</sub> and chlorinated water dependent thermomechanical property measurements at aeronautics and astronautics (ARMS). Radiological and Environmental Mgmt. picks up chemical waste and processes material through an EPA permitted Part B RCRA facility. The samples will be preserved for future data and for checking on reproducibility of reported experimental data.

**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 evaluating Zircaloy samples for research purposes.

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 10/30/2013