

DOE-ID NEPA CX DETERMINATION

SECTION A. Project Title: Predictive Characterization of Aging and Degradation of Reactor Materials in Extreme Environments – Northwestern University

SECTION B. Project Description

Northwestern University proposes to understand and predict long-term effects of irradiation, temperature, and stress on material microstructures and their macroscopic behavior through a suite of unique experimental techniques, augmented by a mesoscale computational framework. Work will include in situ transmission electron microscopy (TEM) under heating and small-scale mechanical testing, in situ TEM under heavy ion irradiation and helium implantation, and quantitative in situ TEM on irradiated samples during nanoindentation.

SECTION C. Environmental Aspects / Potential Sources of Impact

The research would use in situ TEM and ion irradiation of Zircaloy-4 and HT9. 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 in situ TEM and ion irradiation of Zircaloy-4 and HT9 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 11/14/2013