# DOE-ID NEPA CX DETERMINATION



CX Posting No.: DOE-ID-13-056

**SECTION A. Project Title: Multi-Resolution In Situ Testing and Multiscale Simulation for Creep Fatigue Damage Analysis of Alloy 617 – Arizona State University**

**SECTION B. Project Description**

Arizona State University proposes to develop novel testing and experimentally validated prediction methodologies for creep-dominated creep fatigue response of structural materials (nickel-based Inconel 617) for advanced reactor systems. Objectives include:

1. Perform multi-resolution in-situ and ex-situ testing and imaging analysis to investigate the fundamental creep fatigue damage mechanism
2. Develop a new creep fatigue testing procedure at the coupon level
3. Formulate and implement models for the simulation of creep fatigue damage mechanisms and their interactions at the microstructure scale
4. Conduct microstructure simulations

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

Water/Well Use / Discharge of Wastewater – Small amounts of water will be used during slow saw cutting of specimens and will be discharged to the university wastewater system.

**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 creep fatigue of a nickel-based superalloy 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 11/18/2013