

DOE-ID NEPA CX DETERMINATION

SECTION A. Project Title: Bridging the Length Scales on Mechanical Property Evaluation – University of California, Berkeley

SECTION B. Project Description

The University of California, Berkeley (UCB), in collaboration with the University of Florida; Los Alamos National Laboratory; University of Oxford, UK; UK Atomic Energy Authority; Electrical Power Research Institute; and Canadian Nuclear Laboratories, proposes to bridge the length scale between macro and micro scale mechanical testing of unirradiated and irradiated metals, enhance the confidence in the obtained data, and enhance the insight provided from these techniques. This project will develop and demonstrate procedures for multi-scale mechanical testing allowing high fidelity reproducibility of data and generate bulk property data from small scale mechanical tests that hold up to engineering scale requirements. Multi-scale tensile test experiments from 1 um to 1 mm on representative F/M, austenitic, and nanostructured alloys relevant to the nuclear community will be conducted.

SECTION C. Environmental Aspects / Potential Sources of Impact

Radioactive waste will be used as part of this research. Existing material present at UCB will be used and retrieved from irradiation campaigns. Further mechanical testing will be conducted of these samples on multiple length scales using the focused ion beam machining tool as well as the PI88 nanoindenter. The sample are approximately 3 mm diameter discs with 100 um thickness. UCB operates under a State of California regulatory license and follows all the associated rules and restrictions. The Environmental Health and Safety (ESH) department handles all waste disposal and up-to-date standard operating procedures associated with radioactive work. No more than a couple of cubic inches is expected for which UCB has approval.

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.

B3.10 Siting, construction, modification, operation, and decommissioning of particle accelerators, including electron beam accelerators, with primary beam energy less than approximately 100 million electron volts (MeV) and average beam power less than approximately 250 kilowatts (kW), and associated beamlines, storage rings, colliders, and detectors, for research and medical purposes (such as proton therapy), and isotope production, within or contiguous to a previously disturbed or developed area (where active utilities and currently used roads are readily accessible), or internal modification of any accelerator facility regardless of energy, that does not increase primary beam energy or current. In cases where the beam energy exceeds 100MeV, the average beam power must be less than 250 kW, so as not to exceed an average current of 2.5 milliamperes (mA).

Justification: The activity consists of university-scale research activities aimed at bridging the length scale between macro and micro scale mechanical testing of unirradiated and irradiated metals.

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

Approved by Jason Sturm, DOE-ID NEPA Compliance Officer on 08/16/2018