DOE-ID NEPA CX DETERMINATION

CX Posting No.: DOE-ID-17-039

SECTION A. Project Title: Experimental and Computational Studies of Stress Corrosion Cracking of Alloys 308/309 and 82/182 Weldments in Corrosive and Radiation Environment – University of Illinois at Urbana-Champaign

SECTION B. Project Description

The University of Illinois proposes a systematic study of Alloy 308/309 and 82/182 weldments exposed to simulated LWR coolant environments during constant extension rate tests (CERTs) and no-load immersion tests. The goal of the proposed experimental program is to correlate crack initiation and IGSCC to 1) GB orientation, 2) local GB chemistry and oxidation, 3) and localized deformation, and 4) displacement cascade damage via proton irradiation. The experimental protocols are designed to separate the effect of irradiation from environmental factors such as LWR water chemistry and applied load *and to* determine the synergistic effect of irradiation, water chemistry, and tensile stress. Associated modeling activities will expand the Grizzly code for modeling IGSCC and develop a kinetic rate theory code to model RIS in these materials.

SECTION C. Environmental Aspects / Potential Sources of Impact

The university has procedures in place to handle any waste that will be generated through this project. The action would not create additional environmental impacts above those already permitted 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.

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 aimed at investigating the performance of alloy weldments during exposure to ion radiation damage.

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 06/29/2017