

DOE-ID NEPA CX DETERMINATION

Project Title: Mitigating Stress Corrosion Cracking in Austenitic Stainless-steel Canister Welds Using Peening
SECTION A. Techniques

SECTION B. Project Description

The University of Nevada at Reno proposes to propose to develop mitigation of the possible initiation of pitting/stress corrosion cracking (SCC) in dry storage canisters austenitic stainless-steel welds by applying laser shock peening, shot peening and ultrasonic impact peening as well as indirect laser shock surface patterning methods (LSSP). Peening experiments will be carried out. The initial data for the model for predicting the induced compressive strain in the peened surfaces will be generated experimentally through a full factorial design of experiments (DOE). The strain before and after peening process will be measured and considered in the model. A multiple linear regression analysis will be implemented. Peening experiments will be carried out using DOE and multiple linear regression analysis recommended parameters. The peened surfaces will be treated with LSSP. The peened and surface patterned weld surfaces will be subjected to pitting and SCC experiments. The microstructural changes taking place in the peened and surface patterned samples will be evaluated and related to the pitting and SCC behavior.

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.

Justification: The activity consists of university-scale research activities to develop mitigation of the possible initiation of pitting/stress corrosion cracking in dry storage canisters austenitic stainless-steel welds.

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 8/10/2020