

# DOE-ID NEPA CX DETERMINATION

**SECTION A. Project Title: Cold Spray Repair & Mitigation of Stress Corrosion Cracks in Spent Nuclear Fuel Dry Storage Containers – Purdue University**

**SECTION B. Project Description**

Purdue University, in collaboration with Sandia National Laboratory and VRC Metal Systems, proposes to demonstrate cold spray repair and mitigation of chloride-induced stress corrosion cracking (SCC) and pits in AISI 304 stainless steel dry storage canisters. The project will optimize the repair process and gain a scientifically informed understanding of SCC mechanisms. Within an integrated feedback loop, SCC will first get excavated from representative AISI 304 stainless steel coupons, then cold spray to fill the excavated volume. Repair parameters will vary and the SCC susceptibility of each repair will be evaluated. Microstructure, electrochemistry, and crack propagation studies will then be conducted.

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

**Chemical Use/Storage** – Chemicals will be used at Purdue University during the performance of the work effort in order to prepare specimens for metallographic examination. Cleaning solvents and electropolishing etchants will also be used. The laboratory has existing safety and handling procedures in place, including Standard Operating Procedures (SOPs) for electropolishing, etching, and chemical disposal, as well as appropriate material safety data sheets available in the laboratory.

**Chemical Waste Disposal** – Chemical waste from the solvents, electropolishing, or etching solutions generated at the laboratory, will be disposed of in accordance with SOP guidelines established by the laboratory and approved by the Purdue University Radiation & Environmental Management group.

**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 aimed at evaluating cold spray to repair and mitigate chloride-induced stress corrosion cracking.

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 08/03/2018