

DOE-ID NEPA CX DETERMINATION

SECTION A. Project Title: Simulated Used Nuclear Fuel Dissolution as a Function of Fuel Chemistry and Near Field Conditions – Washington State University

SECTION B. Project Description

The Washington State University in collaboration with Pacific Northwest National Laboratory and the University of Sheffield, proposes to explore the effects of 1) fuel microstructure and chemistry using single- and multi-species doping, 2) cladding presence, and 3) corroded canister and/or overpack material, on UO_2 dissolution and corrosion as a function of relevant parameters to include, for example, temperature, pH, and irradiation (or proxy for it). Tasks include:

1. Synthesis and microstructural characterization of doped UO_2 materials;
2. Batch test, Single-pass-flow and related dissolution experiments on doped UO_2 coupons in various water types, pH, and oxidizing/ reducing environments
3. Dissolution testing of simulated interfaces of various fuel/ cladding/ canister combinations, including analysis by AFM techniques such as scanning electrochemical microscopy.

SECTION C. Environmental Aspects / Potential Sources of Impact

Radioactive material use, radioactive waste generation, and some mixed waste generation will occur, likely UO_2 and lesser ThO_2 powders and source chemicals. This chemical use will be overseen by WSU's Radiation Safety Office. < 5 L of mixed waste is estimated. U and Th depending on quantities will either be radioactive waste or hazardous waste. WSU also has a dedicated Environmental Health & Safety Department to manage the waste generated in the research laboratory.

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 aimed at investigating simulated used nuclear fuel dissolution.

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 07/10/2017