DOE-ID NEPA CX DETERMINATION

CX Posting No.: DOE-ID-20-084

SECTION A. Project Title: Multiscale and Multiphysical Testing-Modeling of Inorganic Microfiber-Reinforced Engineered Barrier Materials (IMEBM) for Enhancing Repository Performance

SECTION B. Project Description

The University of Nebraska proposes to develop inorganic microfiber-reinforced engineered barrier materials (IMEBM) that are less permeable and more resistant to desiccation, cracking, and chemical degradation over a long period of time in the geological environment of high-level radioactive waste repositories. This project will pursue the following actions: (1) develop and conduct an experimental program to identify the fundamental thermo, hydro, chemical, mechanical and geometrical characteristics of IMEBM constituents (bentonite and fibers) and their interaction in multiple length scales with the geological environment of the repository; (2) develop and run multiscale-multiphysics computational models to simulate the laboratory testing program; and (3) integrate the experimentation with computational modeling to validate-calibrate the model and to propose an optimal set of variables for designing an improved engineered barrier material.

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 inorganic microfiber-reinforced engineered barrier materials.

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