

DOE-ID NEPA CX DETERMINATION

SECTION A. Project Title: Enhanced Characterization of Concrete Mineralogy using Multi-Modal Tools – Board of Trustees of the University of Illinois

SECTION B. Project Description

The Board of Trustees of the University of Illinois, in collaboration with the University of Tennessee – Knoxville (UTK) and Oak Ridge National Laboratory (ORNL), proposes to investigate the effects of radiation exposure, via ion irradiation, on stress fractures in samples of concrete. The chemical nature and mineralogical characteristics of the aggregate directly influence the extent of radiation-induced volumetric expansion (RIVE). Concrete samples will be prepared at the University of Illinois Urbana-Champaign (UIUC), irradiated at UTK, and analyzed at both UIUC and ORNL. The tasks associated with this project are (1) Improve the spatial resolution of inputs to MOSAIC; (2) Validate the outputs from MOSAIC and address any discrepancies between predicted output and experimental data; and (3) Evaluate the response of concrete to a wide radiation energy spectrum. Existing laboratory facilities will be used.

SECTION C. Environmental Aspects / Potential Sources of Impact

Chemical Use/Storage and Chemical Waste Disposal – Sample preparation will involve cleaning with solvents such as acetone and methanol and disposal of the same.

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 activities to improve model capabilities for predicting stress fractures in irradiated concrete.

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 08/07/2019