

DOE-ID NEPA CX DETERMINATION

SECTION A. Project Title: Expansion of BISON Capabilities to Predict the Dynamic Response of Irradiated Fuel Rods – University of New Hampshire

SECTION B. Project Description

The University of New Hampshire proposes to expand the capabilities of BISON and MOOSE to simulate the structural dynamic response of fuel rods and fuel assemblies during handling and transportation. The study will be divided into five major phases: (i) further development and validation of the coupling between MOOSE and BISON to simulate the dynamic response of fuel rods, (ii) validation of the MOOSE Contact modulus (using both Dirac and Constraint options) utilizing experimental results and the incorporation of a robust cyclic contact algorithm to appropriately represent the interaction between cladding and pellets, (iii) incorporation of nonlinear spring models into the Tensors Mechanics module in MOOSE to simulate the effect of spacer grids on the degree of restraint of the fuel rods; (iv) expansion of the capabilities of the MOOSE Tensor Mechanics module to model frequency-independent damping, (v) validation studies and holistic evaluation of the dynamic response of fuel rods and fuel assemblies.

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 aimed at expanding the capabilities of BISON and MOOSE through validation using experimental data.

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 06/29/2017