

# DOE-ID NEPA CX DETERMINATION

**SECTION A. Project Title: Evaluation of the Thermal Scattering Law for Advanced Reactor Neutron Moderators and Reflectors – North Carolina State University**

**SECTION B. Project Description**

North Carolina State University, in collaboration with X-Energy LLC, proposes to narrow the nuclear data gap for advanced nuclear reactors that are driven by thermal neutrons. This proposal will leverage the capabilities and knowhow of the primary university group working in this field to provide thermal neutron scattering law (TSL) evaluations for FLiBe liquid salts and carbon-carbon composites, which are currently missing and are required for advanced reactor development, and upgrade the TSL evaluations for nuclear/reactor graphite to include improved temperature behavior using temperature dependent phonon spectra.

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

Radioactive Material Use and Waste Generation – Nonradioactive samples (carbon and FLiBe) will be exposed to monochromatic neutron beams to measure neutron diffraction and transmission by these samples. Such measurements will produce negligible radioactivity (and therefore waste) in the samples. The experiments/measurements will be subjected to the reactor’s established protocols and procedures. The samples (before and after irradiation) will be handled and monitored by the local reactor’s technical and health physics staff to ensure safe implementation of the measurements.

**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 to provide TSL evaluations for FLiBe liquid salts and carbon-carbon composites.

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 08/09/2018