

# DOE-ID NEPA CX DETERMINATION

**SECTION A. Project Title: Integral Experimental Investigation of Radioisotope Retention in Flowing Lead for the Mechanistic Source Term Evaluation of Lead Cooled Fast Reactor – University of New Mexico**

**SECTION B. Project Description**

The University of New Mexico, in collaboration with Brigham Young University (BYU) and Westinghouse Electric Company, proposes to investigate the integral effects of radioisotope interactions with liquid lead to support the following technical goals: (1) evaluating the mechanistic source term of the Lead-cooled Fast Reactor (LFR), (2) developing a universal integral effect test methodology for liquid metal source term evaluations, and (3) establishing a basis for the comparison of radioisotope retention between lead and sodium. This research will advance the LFR licensing pathway by establishing the phenomenological foundation of the interaction between fission products and liquid lead. The major objectives of the proposed research are to: (1) conduct stagnant lead testing to collect solubility and compound formation data of key isotopes, (2) investigate bubble transport and scrubbing in flowing lead, (3) assess the vaporization of radio isotopes from the coolant, (4) develop physics-based empirical correlations for the integral effects of the aforementioned phenomena, and (5) evaluate its impacts on the licensing strategies of LFR and implications on SFR mechanistic source term evaluations.

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

Chemical Use/Storage and Waste Disposal – The amount of lead used for this project will be very limited (<10 liters/month). Pure lead will be used without any source of contamination in an isolated environment. The proposed research will not have any impact on the environment. Small quantities (benchtop lab scale) of chemicals will be used in a hood and disposed through BYU Risk Management.

**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 aimed at establishing the phenomenological foundation of the interaction between fission products and liquid lead.

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 08/03/2018