

DOE-ID NEPA CX DETERMINATION

SECTION A. Project Title: Experimental Measurements of Fission Product Retention in Liquid Sodium – University of Wisconsin

SECTION B. Project Description

The University of Wisconsin, in collaboration with Argonne National Laboratory, proposes to: (1) Perform a detailed review of the available literature documenting the existing data on the solubility of fission and metallic components in sodium. (2) Conduct a series of experiments to obtain high fidelity data on radionuclide retention in liquid sodium for gases, aerosols, and solid particles. To achieve this, X-Ray imaging of gas bubbles, sodium pool sampling at different elevations and time in a sodium column, and gas mass spectroscopy will be implemented into the experimental system. To reduce the error and develop robust techniques, a preliminary water facility identical to the experimental sodium facility will be used to help validate the preparation and release of gases, aerosols, and particles into the fluid column. (3) Perform comparisons between experimental data and the results from computational tools. The results of the comparisons will be used to inform the experiments and to provide recommendations for future code development efforts. (4) Train several students in aspects related to the sodium-cooled fast reactor (SFR) technology. This includes working with sodium by conducting the experiments and developing a better understanding of relevant SFR source term phenomena.

SECTION C. Environmental Aspects / Potential Sources of Impact

Chemical Use/Storage – Sodium metal will be used (approximately 3 gallons). The chemical is contained and stored on site and filtered to clean for reuse. The Tantalus facility has been specially designed to handle dealing with sodium with extensive safety systems and environmental protection with a sodium scrubber. The coolant used is from a chilled water system, and no wastewater is used.

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 evaluating fission product retention in liquid sodium.

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 08/14/2018