

DOE-ID NEPA CX DETERMINATION

SECTION A. Project Title: In Situ Measurement and Validation of Uranium Molten Salt Properties at Operationally Relevant Temperatures – University of Connecticut

SECTION B. Project Description

The University of Connecticut, in collaboration with the University of South Carolina, Clemson University, Oak Ridge National Laboratory, and Stanford Synchrotron Radiation Lightsource, proposes to use advanced spectroscopic and scattering methods to provide information, at the atomic and molecular scale, of molten salt. Synchrotron-based x-ray absorption fine structure (XAFS) spectroscopy and Raman spectroscopy will be used at operationally relevant temperatures to measure the local and intermediate structure as well as speciation of chloride fuel salts (NaCl, ZrCl, UCl₃) for fast-spectrum applications and fluoride fuel salts (7LiF, UF₄) primarily for thermal spectrum applications.

SECTION C. Environmental Aspects / Potential Sources of Impact

Radioactive Material Use/Waste Generation – Molten salt fuel compositions in the form of powder or pellets weighing approximately 1 gram will be used. Samples will be handled in an air-free, contained glovebox. Radionuclides (uranium) with an approximate activity of 10 microcuries of samples will be used during experiments. At most, 10 microCuries of radioactive waste will be generated through the handling and testing of samples. All work with radioactive material will be conducted at Clemson University in labs specifically designed as rad labs and those handling radioactive material will be appropriately trained and monitored in accordance with university policy.

The University of South Carolina will use less than 20 grams of natural or depleted uranium. 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.

Chemical Use/Storage – Lab chemicals for sample preparation include standard solvents, mixing media, and cleaning chemicals. The handling of chemicals and waste disposal will be handled in accordance with Clemson University's and the University of South Carolina's existing policies and procedures.

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 designed to systematically investigate four fuel salt compositions at operationally relevant temperatures under in situ conditions.

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 08/02/2018