

DOE-ID NEPA CX DETERMINATION

SECTION A. Project Title: Radiative Heat Transport and Optical Characterization of High Temperature Molten Salts – University of Wisconsin

SECTION B. Project Description

The University of Wisconsin proposes to experimentally investigate radiative heat transport in molten salts, and to add functionality to a thermal-hydraulics system code for radiative heat transport in participating media. In Task 1, highly resolved measurements of the optical absorption and emissivity of liquid salts will be obtained, as a function of temperature and impurity concentrations, as well as the emissivity of solid materials immersed in the salts. Measurements will be made on a range of non-fuel-bearing salt mixtures, including flibe, flinak, KF-ZrF₄, LiF-ZrF₄, and others, including fission-product-bearing salts. Task 2 includes experimental measurements of heat transfer coefficients at temperatures at which radiation contributes significantly to heat transfer; measurements will be made with flibe molten salt, taking advantage of existing flibe loop infrastructure. In Task 3, a CFD code-to-code comparison exercise will be performed.

SECTION C. Environmental Aspects / Potential Sources of Impact

Chemical Use/Storage / Chemical Waste Disposal - Chemical use and chemical disposal will be done in accordance to UW Environmental Health and Safety (EH&S) department, and disposal of liquid and solid chemical waste is also done through UW EH&S. The work involves BeF₂ work, in the form of flibe, in quantities of under 10 kg. Respiratory protection, beryllium laboratory monitoring, and beryllium health monitoring is done in accordance to UW EH&S, and UW Occupational Health Office. Beryllium-contaminated waste is disposed in accordance to UW EH&S guidance, and through their waste disposal services.

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 investigating radiative heat transport in molten salts.

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