

# DOE-ID NEPA CX DETERMINATION

**Project Title:** Extension of MSTDB to Provide a High-Quality, Validated Thermochemical Database for  
**SECTION A.** Predicting/Simulating Corrosion in Molten Salt Reactor Systems

## SECTION B. Project Description

The University of South Carolina proposes to develop thermochemical models and values for corrosion-related systems (i.e., primarily systems with chrome, iron, and nickel plus others as needed), expanding the scope of a general thermodynamic database that is under development in the broader molten salt reactor program. To accomplish this research, the program will fabricate, test, and model halide salt samples. Samples will be in the form of powder or pellets with samples weighing approximately ~100 mg each. Samples will be prepared in a glovebox and sealed furnace in air-tight crucibles for thermal measurements. Samples may also be characterized by traditional methods of microscopy and microanalysis including scanning electron microscopy and x-ray diffraction.

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

Radioactive Material Use, Radioactive Waste Generation, Chemical Use/Storage: Approximately 10 microCuries of samples containing natural or depleted uranium will be used during experiments. At most, the 10 microCuries of radioactive waste will be generated through the handling and testing of samples and the preparation of samples for analysis as described above. This waste will be in the form of used samples, contaminated gloves and related disposable laboratory items for cleanup and contamination control. Any liquid waste will be converted to solid before disposal. This waste is collected in the existing radioactive materials laboratory using existing procedures and disposed of using existing procedures on campus. This amount is within the license of the existing laboratory and the disposal amount is typical for this lab on an annual basis. The laboratory is approved by University of South Carolina Radiation Safety Office and the license is granted by the State of South Carolina. The radioactive waste generated on campus is picked up by personnel in the university Environmental Health & Safety office when requested. Information on the exact form of the depleted uranium (powder or larger pieces) is required. It is transported by them to their processing area in Benson School. Once received in that facility, the solid waste, usually consisting of lab paper, gloves, and incidental waste is packed into drums. Any powder is required to be contained to prevent an inhalation hazard while processing the waste. The external readings on the drums are checked to make sure any packaging requirements are not exceeded. All drums of solid waste are then picked up by a licensed contractor who transports waste to a final disposal facility.

**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 to develop thermochemical models and values for corrosion-related systems for the molten salt reactor program.

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 8/10/2020