DOE-ID NEPA CX DETERMINATION

CX Posting No.: DOE-ID-17-021

SECTION A. Project Title: Nanostructured Ceramic Membranes for Enhanced Tritium Management – Clemson University

SECTION B. Project Description

Clemson University proposes to investigate a novel use of interfacial hydrated layers of ionic conducting ceramic materials for tritiated water (HTO) adsorption and recovery.

The research tasks include:

- Materials selection, processing, and structural characterization
- Characterization of hydrogen isotope adsorption, mobility, and isotope exchange
- Computational predictions and economic analysis.

SECTION C. Environmental Aspects / Potential Sources of Impact

Radioactive Material Use/Radioactive Waste Generation/Chemical Use/Storage/Chemical Waste Disposal – Chemicals including metal oxide starting materials will be utilized to fabricate new chemical compounds or phases that allow potential incorporation of nuclear waste elements. This solid synthesis work will involve surrogates. No radioactive materials will be used. Towards the end of the project, select materials may be exposed to low environmental levels of tritium for absorption tests. The disposal of waste from ceramic processing and tritium exposure will be handled in accordance with Clemson'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 aimed at investigating the unique properties of ionic conducting ceramic materials for tritiated water concentration and recovery.

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 6/28/2017