DOE-ID NEPA CX DETERMINATION

CX Posting No.: DOE-ID-19-023

SECTION A. Project Title: Metal-Functionalized Membranes for Radioiodine Capture – University of Utah

SECTION B. Project Description

The University of Utah, in collaboration with Pacific Northwest National Laboratory (PNNL), proposes to develop novel membrane materials for capture of volatile iodine-129 in advanced tritium pretreatment off-gas (ATPTOG) streams generated during the aqueous-based reprocessing of used nuclear fuel. The sorbent developed through this task will be able to retain functionality in the highly corrosive off-gas and have a form suitable for implementation in a facility. The tasks associated with this project are (1) Quantification of iodine sorption capacity of metal-functionalized membranes; (2) Characterization of membrane performance under flow conditions; and (3) Synthesis and characterization of consolidated waste forms. Existing laboratory facilities will be used.

SECTION C. Environmental Aspects / Potential Sources of Impact

Chemical Use/Storage, Chemical Waste Disposal, and Hazardous Waste Generation – All chemicals and hazardous wastes will be handled and disposed of according to University of Utah policies and protocols. Standard operating procedures (SOPs) will be developed for all processes and stored in the laboratory binder next to the SDSs. Sol-gel batch volumes will be less than 200 mL. The primary chemicals used in the sol-gel preparation and membrane testing include; oxysilanes, organosilanes, sulfuric acid, nitric acid, hydrochloric acid, ammonium fluoride, ammonium hydroxide, ethanol, acetone, iodine, and various metal salts (e.g. silver nitrate, bismuth chloride). All gaseous iodine testing will be conducted within a fume hood. Iodine concentrations of 10 to 50 ppm will flow through the system at rates between 100 and 1000 sccm. The effluent will be passed through a cold trap to capture any iodine that may not have been adsorbed by the sol-gel-based capture membrane. All hazardous waste will be disposed of in the appropriate waste collection containers supplied by the University of Utah Environmental Health and Safety (EHS) office. EHS will be contacted on a regular basis to collect waste.

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 a novel molten salt filter.

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 08/28/2019