

SECTION A. Project Title: Elucidation of Electrochemical Behavior of Technetium, Tellurium, and Iodine in Molten Salt Solutions – University of Idaho**SECTION B. Project Description**

The University of Idaho proposes to evaluate the electrochemical speciation behavior of iodide, and telluride in LiCl-KCl eutectic, LiCl, and LiCl + Li₂O electrolytes at temperatures relevant to reprocessing conditions; use rhenium as surrogate for technetium, and investigate the electrochemical, and chemical speciation properties of rhenium ions in chloride molten salts along with addition of other fission products such as Mo and Ru that are relevant to pyroprocessing of used nuclear fuels; determine the redox potentials, reaction intermediates, activity coefficients, and diffusivities as a function of concentrations and temperatures.

SECTION C. Environmental Aspects / Potential Sources of Impact

Chemical Use/Storage / Chemical Waste Disposal – The project involves evaluation of the electrochemical speciation behavior of iodide, telluride, and rhenate species in LiCl-KCl eutectic, LiCl, and LiCl + Li₂O electrolytes at temperatures relevant to reprocessing conditions. All investigations will be conducted on laboratory bench scale. Laboratory chemical reagents will be used in the experiments. Each experiment will use < 20 g of LiCl-KCl eutectic or LiCl-2wt%Li₂O. The chemical waste in the form of LiCl-KCl/LiCl-Li₂O salt mixtures will be less than 2 kg/year. Small amounts of potassium iodide (~100 g/year), lithium telluride (~100 g/year), and rhenium chloride (~50 g/year) will be in the chemical waste, and the total quantity will be less than 250 g/year. The chemical use and chemical waste will be handled according to the policies and procedures of the University of Idaho, administered through the Environmental Health and Safety unit of the Public Safety and Security Department of the university.

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 evaluating the electrochemical speciation behavior of iodide and telluride in LiCl-KCl eutectic, LiCl, and LiCl + Li₂O electrolytes.

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 07/10/2017