DOE-ID NEPA CX DETERMINATION

CX Posting No.: DOE-ID-18-055

SECTION A. Project Title: X-Ray Studies of Interfacial Molecular Complexes in ALSEP Back-Extraction – University of Illinois at Chicago

SECTION B. Project Description

The University of Illinois at Chicago, in collaboration with Argonne National Laboratory, proposes to apply state-of-the-art synchrotron X-ray techniques to achieve a fundamental understanding of the molecular-scale organization of bulk extractants and radiologically derived impurities, complexants, buffers, and metal ions at the organic/aqueous interface during Actinide-Lanthanide Separation Process (ALSEP) back-extraction. The project will propose to map the unknown territory of the organic/aqueous interface in the presence of trivalent ions and resolve how those ions are complexed as they are transported across the organic/aqueous interface. The project will also use state-of-the-art X-ray interface-sensitive techniques can be used to measure the interfacial molecular organization of chemical components that are being used to develop ALSEP, as well as investigate the effect of chemical impurities similar to those that arise due to radiolytic degradation during the treatment of spent nuclear fuel.

SECTION C. Environmental Aspects / Potential Sources of Impact

Radioactive Material Use and Radioactive and Mixed Waste Generation/Chemical Use/Storage/Waste Disposal – This project involves chemicals (i.e., dodecane, lanthanide metal ions, organic extractants, aqueous complexants and buffers). Quantities involved for the 3-year period of the project include up to 40 liters of dodecane, and up to hundreds of grams each of the other chemicals. These are common chemicals that will be used, stored, and disposed according to procedures in regular use at the University of Illinois at Chicago. Although this project also involves radioactive americium, there will not be any radioactive material use or radioactive waste generation at the University of Illinois at Chicago. Americium will be used and disposed of only at Argonne National Laboratory.

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 aimed at developing more efficient and faster metal stripping relevant to the separation of actinides from lanthanides in the nuclear fuel cycle.

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 08/03/2018