DOE-ID NEPA CX DETERMINATION

CX Posting No.: DOE-ID-13-048

SECTION A. Project Title: Using Ionic Liquids for the Development of Renewable Biopolymer-Based Adsorbents for the Extraction of Uranium from Seawater and Testing Under Marine Conditions – University of Alabama

SECTION B. Project Description

The University of Alabama proposes to study the fundamental engineering parameters for a renewable high-performance adsorbent for the extraction of uranium from seawater based on a proven ionic liquid-chitin platform. Objectives include:

1) Understand how to control bulk material properties such as strength, capacity, stability to biodegradation, and anti-fouling through the homogenous blending of chitin with other biopolymers and through control of the microscale architecture of the material.
2) Understand how to control metal selectivity and capacity by developing a versatile platform for surface modification of biopolymer adsorbent materials.
3) Understand how composition, architecture, and surface treatment affect the critical performance properties for extracting uranium from seawater by measuring the performance of adsorbents under simulated and actual marine conditions.

SECTION C. Environmental Aspects / Potential Sources of Impact

Radioactive Material Use – Radioactive material (uranium) will be used for characterization and studying the systems proposed using milligram quantities for crystallographic studies and nanogram amounts of radiotracers for distribution experiments.

Radioactive Waste Generation – The radioactive materials, once consumed, will be listed as unwanted chemical/waste and will be disposed of as required by the State of Alabama and in accordance with our Radiological Safety Office.

Chemical Use/Storage – Chemicals, including various acids, will be acquired based on the proposed chemistry. The chemicals will be stored according to the Environmental Health and Safety (EHS) at the University of Alabama.

Chemical Waste Disposal/Hazardous Waste Disposal – The materials listed above, once consumed, will be listed as unwanted chemicals/waste and will be disposed of as required by the State of Alabama and in accordance with our EHS.

Water/Well Use – Water will be used for chemical reactions, as solvents, for glassware washing, and will originate from an in-house purification system at the University of Alabama.

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 evaluating uranium extraction from seawater for research purposes.

Is the project funded by the American Recovery and Reinvestment Act of 2009 (Recovery Act) ☐ Yes ☒ No

Approved by Jack Depperschmidt, DOE-ID NEPA Compliance Officer on 11/14/2013