

# DOE-ID NEPA CX DETERMINATION

**SECTION A. fuels** Project Title: Evaluating hydroxypyridinone-based ligands for actinide and fission products recovery in used

## SECTION B. Project Description

The University of California, Berkeley proposes to develop novel chemical approaches to separate lanthanide and actinide elements under advanced solvent extraction system conditions. The following actions are to be completed: (1) determination of distribution coefficients and separation factors for trivalent Ln and An; (2) optimization of oxidation conditions to stabilize tetravalent Ce, Th, Np, Pu, Am, and Bk; (3) speciation determination for trivalent and tetravalent mixtures; and (4) evaluation of radiolytic integrity of hydroxypyridinone-based ligands and metal ion complexes.

## SECTION C. Environmental Aspects / Potential Sources of Impact

**Radioactive Material Use:** The following isotopes will be used, with typical maximum activities per experiment indicated in parentheses: Th-232 (10 nCi), Np-237 (10 uCi), Pu-242 (10 uCi), Am-243 (10 uCi), and Cm-248 (10 uCi).

**Radioactive Waste Generation:** The university will recycle nearly all of its low-activity isotopes, and waste will mostly consist of solid radioactive waste from personnel protective equipment, plastic disposables and paper products. The activity levels will vary based upon experimental design.

**Mixed Waste Generation:** In some cases, extraction and diluent solutions may be disposed of as mixed waste, and will contain organic solvents, residual organic ligands, as well as trace-level isotopes.

**Chemical Use/Storage:** The work will involve use of aqueous buffers, organic solvents, and small molecule organic ligands. All chemicals are stored and used according to institutional policies and safety guidelines (segregation of acids and bases, separate storage of flammables, regular sampling and testing of time-sensitive chemicals, regular inventory updates, etc.).

**Chemical Waste Disposal:** Chemical waste is designated as such and disposed of according to institutional policies.

**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 novel chemical approaches to separate lanthanide and actinide elements under advanced solvent extraction system conditions.

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 8/6/2020