

SECTION A. Project Title: Organic Speciation and Interactions in ALSEP – One Step Partitioning Process of Minor Actinides, Lanthanides, and Fission Products – Oregon State University**SECTION B. Project Description**

Oregon State University, in collaboration with Argonne National Laboratory, proposes to investigate the nature of organic phase on the extraction side of the Actinide-Lanthanide Separation (ALSEP) process. The primary objective will be to document the naturally occurring intermolecular interactions of the proposed ALSEP extractants in the organic phase, with the ultimate goal to identify the optimal composition of the organic phase and construct an accurate model for process scaling. The effects of acid extraction on Ligand interactions and the effects of metal extractions on ligand interactions will be investigated.

SECTION C. Environmental Aspects / Potential Sources of Impact

Radioactive Material Use – It is anticipated that a small amount of radiotracer of neodymium will be prepared in the Oregon State TRIGA Reactor, with a maximum expected activity of 500 uCi. Nd decays rapidly, so the production of a long-lived radioactivity is not expected. Furthermore, solutions of Am-241 or Am-243 may be used as an analog for other trivalent actinides in this study.

Radioactive Waste Generation – The waste from this experiment using Am-241 and Am-243 may be going to be collected and Am will be recovered for the next series of experiments. For the regeneration of Am, we will use the separation procedure based on Eichrom™ DGA-chromatographic resin approved by the OSU Radiosafety and Chemical Hazard office. Radioactive waste disposal is controlled by the Radiation Safety in accordance with applicable federal and state regulations.

Chemical Waste Disposal – The aqueous waste will largely be nitric acid solutions with small amounts of perchloric acid containing small quantities of neodymium (stable isotope) in solution. No carcinogenic acids will be generated, and all acids will be disposed of properly. The organic chemical waste will be mostly presented by n-dodecane. This solvent will contain the extractant molecules to be investigated, T2EHDGA, TODGA, and HEH[EHP], as well as HDEHP and CMPO. The organic phase may contain some extracted Nd cations (stable isotope). Chemical waste disposal is controlled by the Environmental Health and Safety in accordance with applicable federal and state regulations.

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 organic speciation in actinide-lanthanide separation 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 12/11/2013