

# DOE-ID NEPA CX DETERMINATION

**SECTION A. Project Title: Rapid, Non-Radioactive Methods for Prediction and Quantification of Radiolytic Radical Decomposition Products in Nuclear Separations – Clemson University**

**SECTION B. Project Description**

Clemson University proposes to establish correlations between high-throughput, non-radioactive radical assays and classical  $\gamma$ -radiolysis methods for determining monoamide radiolytic stability and degradation products. These non-radioactive radical assays will be a valuable screening tool to quickly examine low-technology-readiness-level (TRL) complexants prior to traditional but low-throughput and high-cost  $\gamma$ -radiolysis studies of stability. The ability to rapidly identify the most radiolytically stable complexants will greatly accelerate development of industrial separations processes. The outcomes of the proposed research will accelerate DOE work toward single-cycle solvent extraction processes and help translate laboratory-scale separations to industrial scales to facilitate fuel cycle separations research, without which civilian nuclear power in the U.S. has a limited future.

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

Standard chemicals used for this research project, such as solvents, non-hazardous reagents, and acids, will be stored according to required chemical safety standards. Approximately 10 L of chemical waste/month (primarily organic solvent waste) will be generated per month during the first several months while chemical synthesis is underway; this amount is expected to fall to approximately 4 L per month for the remainder of the project. This chemical waste will be disposed of according to Clemson's Hazardous Waste Management procedures and policies (complete procedures and policies can be found at <https://www.clemson.edu/research/oes/hazardouswaste/>).

**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). For purposes of this category, "demonstration actions" means actions that are undertaken at a scale to show whether a technology would be viable on a larger scale and suitable for commercial deployment. Demonstration actions frequently follow research and development and pilot projects that are directed at establishing proof of concept.

Justification: The activity consists of an investigation to develop complexants that are stable to radiolytic damage to enable scale-up of these separations processes for industrial use.

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

Approved by Jason Anderson, DOE-ID NEPA Compliance Officer, on 08/12/2021.