

DOE-ID NEPA CX DETERMINATION

Idaho National Laboratory

SECTION A. Project Title: Aqueous Separations Solutions for Materials Recovery and Waste Forms Development Campaign

SECTION B. Project Description and Purpose:

This work entails the design and characterization of new compounds, metal complexes, and extraction materials for improving solvent extraction methodologies targeting an overall goal of purification of uranium at the back end of nuclear fuel cycles. The viscometer will be used to analyze reagents sent from Oakridge National Laboratory (ORNL). Research on new reagents is geared towards improvements of thermodynamic, kinetic and hydrodynamic properties of solvent extraction processes. The project will be purchasing a hts-VROC (high temperature, high viscosity) viscometer. The small viscometer will be operated at MFC inside a contamination area (hood) using hydrocarbon (oil) solvents containing uranium. The microVISC viscometer will have a A05 chip with a viscosity range of 0.4-100cP, a temperature control, and all accessories and consumables to begin viscosity testing. The microVISC temperature controller does not use liquid, but instead Peltier based heating and cools using air circulation. Flourinert electronic liquid will be used for the hts-VROC system. The instrument does entail a rechargeable battery which will have to be handled appropriately according to Waste Generator Services (WGS) when viscometer is at end of life.

The work is to be performed at Radiochemistry Laboratory (RCL) at Materials and Fuels Complex (MFC-1702).

The project includes wet chemistry, preparation of chemical mixtures, and thermodynamic and kinetic analyses using a variety of specialized instrumentation. The various solvents used will be analyzed with volumetric flasks. Measuring viscosity of oil solution will be completed on the laboratory bench. Work with radioactive materials such as measuring mixtures with uranium is performed in controlled Contamination Areas, i.e. HEPA-filtered ventilation hoods. The materials used are radionuclide stocks (INL inventory stocks) that are recovered from experiments.

The project anticipates generating less than 7 L total of solid, hazardous, radioactive, and mixed waste per year. The total production of waste is to be expected over 5 years. Hazardous and mixed waste may include RCRA metals, corrosive waste with metals above UTS, corrosive waste with metals below UTS, oxidizers, F-listed hazardous solvents, and other organics. Most of the wastes are solidified on Imbieber beads or Acid Bond (after neutralization). Solidification will be based on aqueous pH or flash point for organics and the RCRA metals will not be adsorbed, therefore they will be logged in SAA. TRU waste will not be generated for this project.

SECTION C. Environmental Aspects or Potential Sources of Impact:

Air Emissions

Volatile chemicals may vent from the process. Small amounts of radioactive materials may be emitted from RCL. This work is consistent with the intent of the APAD for RCL (APAD INL-07-008), and will not cause an increase in emissions above the amounts estimated for the original APAD

Discharging to Surface-, Storm-, or Ground Water

N/A

Disturbing Cultural or Biological Resources

N/A

Generating and Managing Waste

The project anticipates generating less than a total of 7 L of solid, hazardous, radioactive, and mixed waste per year for 5 years. Hazardous and mixed waste may include RCRA metals, corrosive waste with metals above UTS, corrosive waste with metals below UTS, oxidizers, F-listed hazardous solvents, and other organics. Most of the wastes are solidified on Imbieber beads or Acid Bond (after neutralization) Those chemicals that cannot be adsorbed are logged into SAAs. RCL has waste tanks with specific criteria for certain chemicals. Solidification is based on aqueous pH or flash point for organics. RCRA metals cannot be adsorbed, and are logged into SAA.

Releasing Contaminants

When chemicals are used during the project there is the potential for spills that could impact the environment (air, water, soil).

Using, Reusing, and Conserving Natural Resources

Wastes will be diverted from the landfill to the extent possible.

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SECTION D. Determine Recommended Level of Environmental Review, Identify Reference(s), and State Justification: Identify the applicable categorical exclusion from 10 Code of Federal Regulation (CFR) 1021, Appendix B, give the appropriate justification, and the approval date.

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, or similar requirements of Department of Energy (DOE) or Executive Orders; (2) require siting and construction or major expansion of waste storage, disposal, recovery, or treatment or facilities; (3) disturb hazardous substances, pollutants, contaminants, or Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)-excluded petroleum and natural gas products that pre-exist in the environment such that there would be uncontrolled or unpermitted releases; (4) have the potential to cause significant impacts on environmentally sensitive resources (see 10 CFR 1021). In addition, no extraordinary circumstances related to the proposal exist that would affect the significance of the action. In addition, the action is not "connected" to other action actions (40 CFR 1508.25(a)(1)) and is not related to other actions with individually insignificant but cumulatively significant impacts (40 CFR 1608.27(b)(7)).

References: 10 CFR 1021, Appendix B to subpart D, items B3.6, "Small-scale research and development, laboratory operations, and pilot projects"

Final Site-Wide Environmental Impact Statement for the Continued Operation of the Department of Energy/National Nuclear Security Administration Nevada National Security Site and Off-Site Locations in the State of Nevada (DOE/EIS-0426, December 2014).

Justification: The proposed R&D activities are consistent with CX B3.6 from EC INL-14-024 "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); 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 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 deployment.

The environmental impacts of transferring LLW from the INL Site to the Nevada National Security Site were analyzed in the 2014 Final Site-Wide Environmental Impact Statement for the Continued Operation of the Department of Energy/National Nuclear Security Administration Nevada National Security Site and Off-Site Locations in the State of Nevada (DOE/EIS-0426) and DOE's Waste Management Programmatic EIS (DOE/EIS-200). The fourth Record of Decision (ROD) (65 FR 10061, February 25, 2000) for DOE's Waste Management Programmatic EIS established the Nevada National Security Site as one of two regional LLW and MLLW disposal sites.

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

Approved by Jason L. Anderson, DOE-ID NEPA Compliance Officer on: 03/16/2022