DOE-ID NEPA CX DETERMINATION
Idaho National Laboratory

CX Posting No.: DOE-ID-INL-21-105

SECTION A. Project Title: Co-Deposition Electrode Assembly for FCF Mk-V Electrorefiner

SECTION B. Project Description and Purpose:

The 'Co-Deposition Electrode Assembly for FCF Mk-V Electrorefiner' project is to design, build, and test a co-deposition electrode assembly in the Mk-V electrorefiner (ER) within the Argon Cell at the Fuel Conditioning Facility (FCF) at Materials Fuel Complex (MFC). The purpose of the project is to test the ability to co-deposit uranium and plutonium on a solid cathode rod.

Historically, the Mk-V ER, which contains roughly a half cubic meter of molten salt, has been used to treat Experimental Breeder Reactor II (EBR-II) blanket elements. The processing of this blanket material has accumulated plutonium in the bulk salt. Previous tests have been performed to extract mixed uranium/plutonium from the bulk salt in a pool of liquid cadmium. The proposed experimental assembly will be used to evaluate the extraction of uranium/plutonium material when recovered as a solid deposit without cadmium. Extracted materials will be sampled and returned to the Mk-V ER salt.

The project will install an electrode assembly for future research. The project will utilize radiological and chemical material that is already within the argon cell. No new waste will be generated, and the air emissions emitted from the project are controlled in compliance with INL Sitewide Permit to Construct and Facility Emission Cap P-2020 0045 (PER-152 Rev1). Therefore, no new APAD is required.

With the exception of the electrode assembly, the project will utilize existing equipment in the FCF argon cell. The project will also not generate any additional waste other than the waste that will already be generated from processing material in FCF. The waste material generated will be returned to the initial process and back to its original form/location. There will be no removal of material from the argon cell in FCF. The cables that run the equipment will be fed through existing penetration(s) of the argon cell wall and will not disturb the existing paint on the walls, etc. (potentially contain PCBs given the age of FCF).

The electrode assembly design is to be completed in FY21 and fabrication will be initiated thereafter. Fabrication of components will occur on-site at MFC and a large portion will go off-site for fabrication under a subcontract. Experiments with the assembly are expected to begin in late FY22 and, after initial testing, may continue intermittently as research needs are identified.

SECTION C. Environmental Aspects or Potential Sources of Impact:

Air Emissions

The proposed action has the potential to generate chemical and radionuclide air emissions in the argon cell at FCF. However, these emissions are controlled by INL Sitewide Permit to Construct and Facility Emission Cap P-2020.0045 (PER-152 Rev1) and are monitored continuously with a 40 CFR 61 Subpart H compliant stack monitoring system. An Air Permit Applicability Determination (APAD) is not required because the materials that will be used in these experiments are materials currently used in and produced by the processes described in PER-152 and therefore would not change the emissions from FCF. Furthermore, the proposed action, when combined with the current facility operations, would not cause FCF to exceed or approach the PER-152 fuel processing limit of 5,000 kg per year and would not necessitate a modification to PER-152.

Discharging to Surface-, Storm-, or Ground Water

N/A

Disturbing Cultural or Biological Resources

FCF (MFC-765) is eligible for nomination to the National Register of Historic Places; therefore a cultural resource review and clearance from the Cultural Resource Management Office (CRMO) is required. The project will not change the aesthetics or the structure of the building.

Generating and Managing Waste

Project activities have the potential to generate low-level and industrial waste. Project personnel will work with WGS to characterize and properly disposition waste.

Releasing Contaminants

Project activities would include the routine use of chemicals by the Analytical Lab and/or HFEF during characterization. All chemicals utilized by the project would be managed in accordance with laboratory procedures.

Using, Reusing, and Conserving Natural Resources

All recyclable materials will be reused and recycled where economically practicable. All applicable waste will be diverted from disposal in the landfill where conditions allow.

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"

Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Final Environmental Impact Statement and Record of Decision (DOE/EIS-0203, 1995) and supplemental analyses (DOE/EIS-0203-SA-01 and DOE/EIS- 0203-SA-02) and the Amended Record of Decision (1996)

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 "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."

In addition, research and development for used nuclear fuel management is within the scope of DOE's Programmatic Spent Nuclear Fuel (SNF) Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Final Environmental Impact Statement and Record of Decision (DOE/EIS-0203, 1995) and supplemental analyses (DOE/EIS-0203-SA-01 and DOE/EIS-0203-SA-02) and the Amended Record of Decision (February 1996).

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: 06/24/2021