U.S. Department of Energy
Office of Nuclear Energy
National Environmental Policy Act
Determination

NEPA Identification: DOE-ID-INL-26-026

Proposed Action Title: Blykalla - Uranium Nitride Fast PTS-1

Location(s) (City/County/State):

Proposed Action Description:

The Idaho National Laboratory (INL) will support Blykalla by leading the fabrication, irradiation, and post-irradiation examination (PIE) of Uranium Nitride (UN) fuel for the Swedish Advanced Lead Reactor (SEALER). This project is intended to address gaps in the existing irradiation database by generating fuel performance data under SEALER-relevant temperatures and neutron fluxes, collecting transient performance data, and performing post-irradiation examinations. The work will be completed in three phases: fuel fabrication and assembly, irradiation campaigns, and post-irradiation examination. Three separate irradiations are expected.

Fresh UN fuel specimens will be fabricated at the Experimental Fuels Facility (EFF; MFC-794). Additional hardware components, including zirconium (Zr), molybdenum (Mo), steels, Incoloy, and Zircaloy alloys, will be fabricated at North Holmes Laboratory (NHL). A portion of the fuel specimens will be sent to the Analytical Laboratory (AL; MFC-752) for pre-irradiation characterization. The remaining fuel specimens will then be transported to the Advanced Fuels Facility (AFF; MFC-784), where they will be assembled with the fabricated hardware components and welded to form fueled irradiation capsules.

Once fabrication and qualification are complete, the fueled capsules will be transported to the ATR Test Train Assembly Facility (TTAF; TRA-1626), where they will be loaded into an aluminum basket before being transferred to the Advanced Test Reactor (ATR; TRA-670) for irradiation. Following irradiation, the aluminum basket will either be reused or disposed of in accordance with INL procedures, and the irradiated fueled capsules will be transported to INL examination facilities, including the Hot Fuel Examination Facility (MFC-785; HFEF), Irradiated Materials Characterization Laboratory (IMCL; MFC-1729), Electron Microscopy Laboratory (EML; MFC-774), or the Analytical Laboratory (AL) at Material and Fuels Complex (MFC) for post-irradiation examination and characterization.

All shipments associated with this project will occur between INL facilities. No shipments of project materials are anticipated to leave the INL site.

The waste that will be generated includes the following:

- Industrial: <1 kg at AFF and NHL.
- Hazardous: <1 L at AFF and NHL.
- Mixed Transuranic (TRU) and/or mixed Low Level Waste:
    - <3 kg at HFEF, EML, EFF, IMCL, and AL.
    - <5 gal consisting of PPE, wipes and other general lab waste at AFF, NHL, and TTAF.

The waste will be managed in accordance with facility specific requirements with assistance by Waste Generator Services.

Environmental Aspects and Impacts:

Air Emissions

Fuel fabrication is expected to generate minimal radioactive emissions in the form of uranium baring particulate. This process will be conducted within FMF's HEPA filtration before being exhausted through FMF's monitored stack. This work is consistent existing expected emissions and within the scope of work performed at FMF.

Fission gasses are expected to be generated from the irradiation of the fuel in the ATR, however they are expected to be retained within the fuel, coating, cladding, and capsule. This work is consistent with the work performed at the ATR and is not expected to increase radiological emissions.

PIE activities conducted at MFC facilizes also have the potential to generate radiological emissions, but are generally within the existing scopes of the associated facilities.

Discharging to Surface, Storm, or Ground Water

NA

Disturbing Cultural or Biological Resources

NA

Generating and Managing Waste

When wastes are generated, how they are disposed can adversely affect the environment. Managing wastes appropriately and responsibly and implementing recycling or reuse practices, where feasible, during project activities can reduce the potential impact on the environment.

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

NA

References:

B3.6 "Small-scale research and development, laboratory operations, and pilot projects"

For Categorical Exclusion Determinations:

The proposal fits within the classes of actions listed in Appendix B to 10 CFR Part 1021 or Appendix B and C of DOE's NEPA Implementing Procedures and satisfies the conditions that are integral elements of the classes of actions therein. The proposal does not: (1) threaten a violation of applicable statutory, regulatory, or permit requirements for environment, safety, and health, or similar requirements of DOE or Executive Orders; (2) require siting and construction or major expansion of waste storage, disposal, recovery, or treatment facilities (including incinerators), but the proposal may include categorically excluded waste storage, disposal, recovery, or treatment actions or facilities; (3) disturb hazardous substances, pollutants, contaminants, or CERCLA-excluded petroleum and natural gas products that preexist in the environment such that there would be uncontrolled or unpermitted releases; (4) have the potential to cause significant impacts on environmentally sensitive resources, including, but not limited to, those listed in paragraph B(4) of 10 CFR Part 1021, Appendix B; (5) involve genetically engineered organisms, synthetic biology, governmentally designated noxious weeds, or invasive species, unless the proposed activity would be contained or confined in a manner designed and operated to prevent unauthorized release into the environment and conducted in accordance with applicable requirements, such as those listed in paragraph B(5) of 10 CFR Part 1021, Appendix B.

There is no extraordinary circumstance related to the proposal that is likely to cause a reasonably foreseeable significant adverse effect or for which DOE does not know the environmental effect. Extraordinary circumstances are unique situations presented by specific proposals, including, but not limited to, scientific controversy about the environmental effects of the proposal; uncertain effects or effects involving unique or unknown risks; and unresolved conflicts concerning alternative uses of available resources.

The proposal has not been segmented to meet the definition of a categorical exclusion. Segmentation can occur when a proposal is broken down into small parts in order to avoid the appearance of significance of the total action. However, segmentation does not include proposals that are developed and potentially implemented over multiple phases where each phase results in a decision whether to proceed to the subsequent phase.

Based on my review of the proposed action, I have determined that the proposed action fits within the specified class(es) of action, the other regulatory requirements set forth above are met, and the proposed action is hereby categorically excluded from further NEPA review.

NEPA Compliance Officer

Signed by: Robert Douglas Herzog, NEPA Compliance Officer

Date Signed: 9/30/2026