Environmental Review Form for Argonne National Laboratory

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Created By:	Woodford, John B.

Creator

Badge:	**51790**	Name:	**Woodford, John B.**
Cost Center:	**254**	Division:	**ESH**
Job Title:	**Safety Specialist 5**	Employee Type:	**Regular Full-Time Exempt**
Building:	**208**	Lab Extension:	**2-0910**

General Information

Project/Activity Title: Application of Advanced Materials Processing to Enable Direct Production of Fast Reactor Fuel Alloys

ASO NEPA Tracking No.:

Type of Funding:

B & R Code:

Identifying Number: 2021-21150

SPP Proposal Number:

CRADA Proposal Number: 2021-21150

Work Project Number:

ANL Accounting Number:

(Item 3a in Field Work Proposal)

Other (explain):

List appropriate NEPA Owners:

Division: CFC NEPA Owner:

Financial Plans

To select a Financial Plan, click the magnifying glass icon to open a search window.

Cost Center: Project: Phase: Task:

Description of Proposed Action

The proposed research effort would focus on integration of advanced electrorefining co-deposition and molten salt monitoring techniques to produce an alloy containing uranium and transuranic elements in a controlled composition range. The work at Argonne would be method development using depleted uranium, and would use lanthanides as surrogates for transuranic elements. Argonne would begin by identifying key electroanalytical sensor measurements to characterize the state of the molten salt melt from which the alloy is to be deposited. Once those measurements are identified, the next step would be to demonstrate their utility for process control by depositing kilogram quantities of the surrogate alloy using Argonne's existing co-deposition cathode and verifying the composition of the alloy. The electrorefiner contains approximately 170 kg molten salt (LiCl, KCl, UCl3, and lanthanide chlorides). (Note that the electrorefiner can be used to deposit pure U metal, with the proper voltage setting and cathode.) Following successful production of the surrogate alloy, Argonne would then upgrade their electrorefiner module with a larger co-deposition cathode and scale the process up. The project is expected to take a total of 32 months, with the final 6-8 months devoted to technology transfer and report preparation. Once Argonne demonstrates the production of 4-5 kg of DU/surrogate actinide alloy having the desired composition, the completed technology would then be transferred to Oklo, Inc., Argonne's industrial partner in a DOE CRADA, for them to use to fabricate fuel elements for their advanced reactor design.

Description of Affected Environment

The work would take place in one of the existing inert-atmosphere gloveboxes in Building 205, Room J-118. The glovebox already contains an electrorefining setup, which would be used and modified as described in the section above. Note that the glovebox has previously been contaminated with cadmium, so any items removed from it are treated as having cadmium present.

Potential Environmental Effects

- Attach explanation for each "yes" response near bottom of form.

- **See Instructions for Completing Environmental Review Form.**

Section A (Complete For All Projects)			Yes	No	Explanation
1.	Project evaluated for Pollution Prevention and Waste Minimization opportunities and details provided under items 2, 4, 6, 7, 8, 16, and 20 below, as applicable		◉	○	The method development process would use depleted uranium and lanthanide surrogates for the actinide(s) contained in the final fuel formulation, conserving valuable and hard-to-replace source materials. The furnace holding the electrorefiner is insulated, to reduce energy use and maintain a constant temperature. The uranium metal used as feedstock for the electrorefining process was previously deposited using the refiner, and the bulk of the final alloy product (with the exception of small samples for testing) will be retained in the glovebox for use as feedstock in future projects.
2.	Air Pollutant Emissions		○	◉	
3.	Noise		○	◉	
4.	Chemical/Oil Storage/Use		◉	○	The crucible for the electrorefiner holds approximately 170 kg molten salt, which contains LiCl, KCl, UCl3, and chlorinated misch metal (mostly CeCl3, with some NdCl3, GdCl3, and other lanthanide chlorides). Depleted uranium and its alloys would be used as feedstock for the process. Tungsten rods housed in alumina sheaths would be used for the electrochemical sensor. The furnace is insulated with Zircar refractory insulation.
5.	Pesticide Use		○	◉	
6.	**Toxic Substances Control Act (TSCA) Substances**				
	6a.	Polychlorinated Biphenyls (PCBs)	○	◉	
	6b.	Asbestos or Asbestos Containing Materials	○	◉	
	6c.	Other TSCA Regulated Substances	○	◉	
	6d.	Import or Export of Chemical Substances	○	◉	
7.	Biohazards		○	◉	
8.	Effluent/Wastewater (If yes, see question #12 and contact Peter Lynch (HSE) at 2-4582 or lynch@anl.gov)		○	◉	
9.	**Waste Management**				
	9a.	Construction or Demolition Waste	○	◉	
	9b.	Hazardous Waste	○	◉	
	9c.	Radioactive Mixed Waste	◉	○	The glovebox is contaminated with cadmium from previous research, so all low-level radioactive waste removed from the glovebox is considered to be mixed waste. The waste will be accumulated, managed, and documented in accordance with LMS-PROC 310 (Radioactive Waste Disposal). Personnel who generate waste and those who prepare waste requisitions are required to complete the chemical waste generator and radioactive waste generator training.
	9d.	Radioactive Waste	◉	○	The salts and alloys contain depleted uranium, the bulk of which will be retained for future work. Any salts or alloy samples needing to be disposed of once the work has been completed would be disposed of in accordance with LMS-PROC-310 (Radioactive Waste Disposal). Note that per 9c, any low-level waste that has been in the glovebox would have to be disposed of as mixed waste.
	9e.	Asbestos Waste	○	◉	
	9f.	Biological Waste	○	◉	
	9g.	No Path to Disposal Waste	○	◉	
	9h.	Nano-material Waste	○	◉	
					The salts and alloys contain depleted uranium (DU). Although the radiation hazard from

10.	Radiation	◉	○	DU is negligible, the glovebox interior is at least a Contamination Area, and sample exchanges would be performed in accordance with applicable Argonne procedures.
11.	Threatened Violation of ES&H Regulations or Permit Requirement	○	◉	
12.	New or Modified Federal or State Permits	○	◉	
13.	Siting, Construction, or Major Modification of Facility to Recover, Treat, Store, or Dispose of Waste	○	◉	
14.	Public Controversy	○	◉	
15.	Historic Structures and Objects	○	◉	
16.	Disturbance of Pre-existing Contamination	○	◉	
17.	Energy Efficiency, Resource Conserving, and Sustainable Design Features	◉	○	The electrorefiner would be made as small as possible for the desired result. Deposited alloys would be retained for potential future projects.
Section B (For Projects that Occur Outdoors)		**Yes**	**No**	
18.	Threatened or Endangered Species, Critical Habitats, and/or other Protected Species	○	○	
19.	Wetlands	○	○	
20.	Floodplain	○	○	
21.	Landscaping	○	○	
22.	Navigable Air Space	○	○	
23.	Clearing or Excavation	○	○	
24.	Archaeological Resources	○	○	
25.	Underground Injection	○	○	
26.	Underground Storage Tanks	○	○	
27.	Public Utilities or Services	○	○	
28.	Depletion of a Non-Renewable Resource	○	○	
Section C (For Projects Outside of ANL)		**Yes**	**No**	
29.	Prime, Unique, or Locally Important Farmland	○	○	
30.	Special Sources of Groundwater (such as sole source aquifer)	○	○	
31.	Coastal Zones	○	○	
32.	Areas with Special National Designations (such as National Forests, Parks, or Trails)	○	○	
33.	Action of a State Agency in a State with NEPA-type Law	○	○	
34.	Class I Air Quality Control Region	○	○	

Categorical Exclusion

ANL NEPA Reviewer Use Only

- ○ My approval is the final approval necessary
- ◉ This form requires additional approval from DOE

To be Completed by DOE/ASO

Section D	Yes	No
Are there any extraordinary circumstances related to the proposal that may affect the significance of the environmental effects of the proposal?	○	◉
Is the project connected to other actions with potentially significant impacts or related to other proposed action with cumulatively significant impacts?	○	◉
If yes, is a categorical exclusion determination precluded by 40 CFR 1506.1 or 10 CFR 1021.211?	○	○
Can the project or activity be categorically excluded from preparation of an Environment Assessment or Environmental Impact Statement under Subpart D of the DOE NEPA Regulations?	◉	○
If yes, indicate the class or classes of action from Appendix A or B of Subpart D under which the project may be excluded: This project may be excluded under the following Category of 10 CFR 1021, Subpart D, Appendix B: B 3.6 Small-scale research and development, laboratory operations, and pilot projects.		
If no, indicate the NEPA recommendation and class(es) of action from Appendix C or D to Subpart D to Part 1021 of 10 CFR.		

Attachments

File Description:

Comments

Meeting with DOE to review draft ERF on 9/29/21

Add Approver

Approver Name	Approver Badge	Reason	Delete
Hawthorne, Krista Leigh	280523	Co-PI	

Notifications

The approval notification email will be copied to the people listed below.

Badge	Name	Division	Delete

ASO-CX Number

ASO-CX- 391

Comments:

The DOE NEPA ERF CX Approval for this project is tracked by ASO-CX-391.

Approval

Approver	Action	Date Routed	Action Date	Approval Reason / Comments	Approval Type
Woodford, John B.	APPROVED	2021-10-12	2021-10-12 16:34:35.0	Creator :	PRIMARY
Woodford, John B.	APPROVED	2021-10-12	2021-10-12 16:34:35.0	Project Manager :	PRIMARY
Hawthorne, Krista Leigh	APPROVED	2021-10-12	2021-10-12 16:56:28.0	Co-PI :	PRIMARY

Harris, Amy M.	APPROVED	2021-10-12	2021-10-14 06:48:52.0	NEPA Owner Approval for Argonne Environmental Review :	PRIMARY
Ptak, Jill S.	APPROVED	2021-10-14	2021-10-18 12:05:21.0	ANL NEPA Reviewer : **Above the ANL limit for bench-scale research; requires DOE approval**	PRIMARY
Hellman, Karen B.	APPROVED	2021-10-18	2021-10-25 08:08:36.0	ANL-985 Review and Approval :	PRIMARY
Hodge, Devin S. for Dunn, Michael W.	APPROVED	2021-10-25	2021-10-27 07:11:09.0	ANL-985 ANL Deputy COO Review and Approval :	DELEGATE
Joshi, Kaushik N.	APPROVED	2021-10-27	2021-11-08 09:08:21.0	ANL-985 DOE-ASO Review and Approval : **This DOE NEPA ERF CX Approval is tracked by ASO-CX-391.**	PRIMARY
Siebach, Peter Rudolf	APPROVED	2021-11-08	2021-11-09 15:51:33.0	ANL-985 DOE NEPA Compliance Officer Review and Approval :	PRIMARY