Environmental Review Form for Argonne National Laboratory

Form:	ANL-985
Version:	5
Your Form ID:	ANL-985-1686
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Created By:	Geiser, Urs W.

Creator

Badge:	**34072**	Name:	**Geiser, Urs W.**
Cost Center:	**254**	Division:	**ESH**
Job Title:	**Directorate Safety Manager, PSE**	Employee Type:	**Regular Full-Time Exempt**
Building:	**241**	Lab Extension:	**2-3509**

General Information

Project/Activity Title: Precipitation Reactor for Advanced Battery Cathode Materials

ASO NEPA Tracking No.: Type of Funding: CRADA

B & R Code: Identifying Number: 2022-22018

SPP Proposal Number: CRADA Proposal Number: 2022-22018

Work Project Number: ANL Accounting Number: (Item 3a in Field Work Proposal)

Other (explain):

List appropriate NEPA Owners:

Division: CSE 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

Full concentration gradient (FCG), high-nickel mixed metal (nickel-manganese-cobalt) oxide (NMC), where each precipitate particle has a nickel-rich core and a manganese-rich outer layer, is an essential ingredient for the sponsor's effort to create electric aircraft batteries, where it is utilized as a cathode material. Argonne will procure and set up a specialized precipitation reactor that allows the synthesis of up to 7 pounds in one batch of this material. This process and the use of the material have previously been demonstrated at a smaller scale. Argonne will produce an initial batch of initially 6 kg of FCG NMC, perform quality testing, and report on the performance and physical properties. Argonne will subsequently produce a final batch of 14 kg ot GCG NMC and report on any safety testing of the material. The precipitation reactor may be returned to the sponsor. If not, it will become available to CSE researchers for future preparations of similar materials under different funding, and this ERF will serve as a NEPA review for additional proposals that make use of it.

Description of Affected Environment

The work takes place indoor in a chemical hood in an established laboratory in building 200. It is a slight scale-up from bench scale chemistry activities. The principal effects on the environment are chemical use, waste generation, and energy consumption.

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
	Project evaluated for Pollution Prevention and Waste Minimization			The process uses the minimum amount of starting chemicals to achieve the sponsor's goal.

1.	opportunities and details provided under items 2, 4, 6, 7, 8, 16, and 20 below, as applicable		◉	○	The process has already been optimized on a smaller scale. See comments below regarding waste water. Spill trays are used to capture accidental spills.
2.	Air Pollutant Emissions		◉	○	A very small fraction of the ammonium hydroxide is expected to vent out of the reaction mixture as ammonia gas in diluted form into the laboratory exhaust system, well below levels where permits would have to be updated.
3.	Noise		○	◉	
4.	Chemical/Oil Storage/Use		◉	○	Starting materials include transition metal sulfates, ammonium hydroxide solution, sodium hydroxide, and water. For a 3 kg batch, about 8 kg of starting chemicals and 10-13 liters of water are required. In addition, small amounts of dilute solutions of oxalic, hydrochloric, nitric, or sulfuric acid are used to clean labware and the reactor.
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	◉	○	The mixed metal oxide solid waste is not RCRA hazardous, but it will nevertheless be disposed of through the Argonne Waste Management department. Incidental quantities of characteristic hazardous waste, e.g. organic solvents such as ethanol or dilute mineral acids for cleaning, will be staged in a satellite accumulation area, following LMS-PROC-103, prior to disposal by NWM-Waste Management. The process waste is composed of dissolved sodium sulfate salts in water at a pH that is not RCRA hazardous (ca. 2 kg of sodium sulfate in 100-200 liters of water, per 3 kg batch). As part of the process, suspended solids will be filter-pressed out of the waste water, which is collected in drums and disposed of as non-RCRA hazardous chemical waste (preferred method over disposing in laboratory sink).
	9c.	Radioactive Mixed Waste	○	◉	
	9d.	Radioactive Waste	○	◉	
	9e.	Asbestos Waste	○	◉	
	9f.	Biological Waste	○	◉	
	9g.	No Path to Disposal Waste	○	◉	
	9h.	Nano-material Waste	○	◉	

10.	Radiation	○	◉	
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	◉	○	The proposed work at Argonne will take place in a 1950s era research building that is part of a historic district that has been determined eligible for listing in the National Register of Historic Places, due to its historic contributions to nuclear energy research and development. The proposed work is consistent with the current utilization of the building, and no modifications will be necessary.
16.	Disturbance of Pre-existing Contamination	○	◉	
17.	Energy Efficiency, Resource Conserving, and Sustainable Design Features	○	◉	
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	○	○	
	Special Sources of Groundwater (such			

30.	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 Part 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

Add Approver

Approver Name	Approver Badge	Reason	Delete
Applegate, Daniel V.	37844	Environmental Compliance Rep for CSE	

Notifications

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

Badge	Name	Division	Delete
53140	Schikora, Michelle S.	PSE	
219421	Veselka, Christopher Thomas	PSE	
50882	Amine, Khalil	CSE	

ASO-CX Number

ASO-CX- 392

Comments:

The DOE approval of this NEPA ERF CX is tracked as ASO-CX-392.

Approval

Approver	Action	Date Routed	Action Date	Approval Reason / Comments	Approval Type
Geiser, Urs W.	APPROVED	2021-11-18	2021-11-18 16:34:51.0	Creator :	PRIMARY
Geiser, Urs W.	APPROVED	2021-11-18	2021-11-18 16:34:51.0	Allows access to the form :	PRIMARY
Geiser, Urs W.	APPROVED	2021-11-18	2021-11-18 16:34:51.0	Project Manager :	PRIMARY
Applegate, Daniel V.	APPROVED	2021-11-18	2021-11-18 16:39:57.0	Environmental Compliance Rep for CSE :	PRIMARY
Geiser, Urs W.	APPROVED	2021-11-18	2021-11-18 16:34:51.0	NEPA Owner Approval for Argonne Environmental Review :	PRIMARY
Ptak, Jill S.	APPROVED	2021-11-18	2021-11-22 11:31:45.0	ANL NEPA Reviewer : **Work falls outside limits of ANL Sitewide Generic Bench-Scale Research CX due to amount of material used**	PRIMARY
Hellman, Karen B.	APPROVED	2021-11-22	2021-12-13 08:33:07.0	ANL-985 Review and Approval :	PRIMARY
Dunn, Michael W.	APPROVED	2021-12-13	2021-12-13 13:12:11.0	ANL-985 ANL Deputy COO Review and Approval :	PRIMARY
Joshi, Kaushik N.	APPROVED	2021-12-13	2021-12-15 15:56:22.0	ANL-985 DOE-ASO Review and Approval : **The DOE approval of this NEPA ERF CX is tracked as ASO-CX-392.**	PRIMARY
Siebach, Peter Rudolf	APPROVED	2021-12-15	2022-01-03 09:07:03.0	ANL-985 DOE NEPA Compliance Officer Review and Approval :	PRIMARY