



## Department of Energy

Argonne Site Office  
9800 South Cass Avenue  
Argonne, Illinois 60439

**MAR 11 2015**

Dr. Peter B. Littlewood  
Director, Argonne National Laboratory  
President, UChicago Argonne, LLC  
9700 South Cass Avenue  
Argonne, IL 60439

Dear Dr. Littlewood:

**SUBJECT: NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) DETERMINATION FOR ARGONNE NATIONAL LABORATORY (ARGONNE)**

The Argonne Site Office (ASO) approves the following as a categorical exclusion (CX) under Appendix B (to 10 CFR Part 1021, Subpart D, Integrated DOE NEPA Implementing Procedures, December 1996), Category B 3.6 "Siting/construction/operation/decommissioning of facilities for bench-scale research, conventional laboratory operations, small-scale research and development and pilot projects."

- Scale up of Lithium Ion Battery Material Recycling, Building 369, ASO-CX-312

Therefore, no further NEPA review is required. However, if any modification or an expansion of the scope is made to the above project, additional NEPA review will be necessary.

Enclosed please find a copy of the approved Environmental Review Form (ERF) for the project. If you have any questions, please contact Kaushik Joshi of my staff at (630) 252-4226.

Sincerely,

A handwritten signature in cursive script that reads "Joanna M. Livengood".

Joanna M. Livengood  
Manager

Enclosure:  
As Stated

cc: J. Stauber, ANL, w/encl.  
J. Spangenberg, ANL, w/encl.  
W. Brocker, ANL, w/encl.  
K. Joshi, ASO, 201, w/encl.  
M. McKown, SC-CH, w/encl.  
P. Siebach, SC-CH, w/encl.



## Environmental Review Form for Argonne National Laboratory

**Project/Activity Title:** Scale up of Lithium Ion Battery Material Recycling

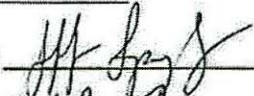
**ASO NEPA Tracking No.** ASO-CX-312 **Type of Funding:** \_\_\_\_\_

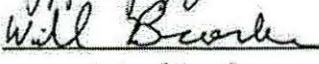
**B&R Code** \_\_\_\_\_


**Identifying number:** C1500601 **WFO proposal #** \_\_\_\_\_ **CRADA proposal #** C1500601

**Work Project #** \_\_\_\_\_ **ANL accounting # (item 3a in Field Work Proposal)** \_\_\_\_\_

**Other (explain)** \_\_\_\_\_

**Project Manager:** Jeffrey Spangenberg **Signature:**  **Date:** 2/17/15

**NEPA Owner:** William A. Brocker **Signature:**  **Date:** 02/17/2015

**ANL NEPA Reviewer:** Joel Stauber **Signature:**  **Date:** 2/17/15

I. **Description of Proposed Action:** The proposed action is to design, build and test a 100 gallon sized system to separate and recover materials from lithium ion battery manufacturing scrap; specifically, the trimmings of anodes and cathodes from LiFePO<sub>4</sub> and LiMnO<sub>2</sub> battery manufacture that are supplied by our research partners. Testing will include up to 10 separate runs by the conclusion of this work. The anode consists of a copper foil coated with graphite while the cathode is an aluminum foil coated with the particular active cathode material. To separate the coating from the foil the trimmings are placed in a tank and either nitric or sulfuric acid is pumped into the tank at or near room temperature. The mixture is agitated for several minutes. The acid causes the coating to detach from the foil and the agitation helps to remove the coating from the foil and to become suspended in the acid solution. Once the coatings are removed the acid solution is pumped from the agitating tank to a storage tank. Water is then pumped into the agitation tank and briefly agitated to rinse any remaining acid off of the foil. The water is then pumped back to its storage tank and, if needed, neutralized. The acid solution is pumped through a filter to recover the coating material. The agitating tank is opened and the foil is removed. The acids and rinse water are reused. Previous testing has shown small amounts of NO<sub>2</sub> and SO<sub>2</sub> gas evolution during the acid agitation phase of the process. Part of this work is to determine the amount of these gases that are generated. The system will be kept under negative pressure and will be routed through a Bionomic Industries Scrubpac Ventclean model 2LC to remove any NO<sub>2</sub> or SO<sub>2</sub> that may be given off. Heat may be generated during the agitation phase of the operation. A chiller with heat exchanger will be used to remove any heat generated.

II. **Description of Affected Environment:** The installation of this system will take place in building 369. No building modifications are necessary. Existing utilities will be used for this work. All

tanks will be in secondary containment. At the conclusion of this work used nitric acid, sulfuric acid, scrubber solution and rinse water solution will need to be disposed. This work will involve 100 gallons of dilute nitric acid, 100 gallons of dilute sulfuric acid, 50 gallons of scrubber solution and 200 gallons of rinse water. All anode and cathode materials will be returned to the supplier.

III. **Potential Environmental Effects:** (Attach explanation for each "yes" response. See Instructions for Completing Environmental Review Form)

A. Complete Section A for all projects.

1. Project evaluated for Pollution Prevention and Waste Minimization Yes X No       
opportunities and details provided under items 2, 4, 6, 7, 8, 16, and 20  
below, as applicable

The proposed project has been evaluated for minimization of pollution and waste generation based on experience from earlier work. Only the minimum amount of chemicals needed will be ordered.

2. Air Pollutant Emissions Yes X No

NO2 and SO2 may be generated. These substances will be routed through a Bionomic Industries Scrubpac Ventclean model 2LC scrubber for removal. Output of the scrubber will be exhausted outside of building 369 through a dedicated exhaust system. Monitoring by IH will be conducted as necessary. FMS-SEP will be contacted to make sure that this activity falls within Argonne's Title V permit.

3. Noise Yes      No X

4. Chemical/Oil Storage/Use Yes X No

Each test will process an estimated 20 lbs. of anode or cathode battery material. (This work does not include processing any sealed batteries or any electrolyte materials). Up to 10 tests will be performed. Dilute nitric and sulfuric acid will be used, and stored while not in use, for this work. Dilute acid solutions will be made from a more concentrated acid. All acid solutions, in use or storage, will be located on secondary containment. Approximately 100 gallons of dilute nitric acid, 100 gallons of dilute sulfuric acid, 50 gallons of used scrubber solution and 200 gallons of rinse water will be needed, in total, to perform this work. Large samples anode/cathode materials processed in the high-bay area will be returned to the supplier after processing. Materials that will not be returned will be disposed of as per Argonne's Laboratory Management System (LMS).

5. Pesticide Use Yes      No X

6. Polychlorinated Biphenyls (PCBs) Yes      No X

7. Biohazards Yes      No X

8. Effluent/Wastewater (If yes, see question #12 and contact Gregg Kulma (FMS-SEP) at 2-9147 or gkulma@anl.gov) Yes X No

The laboratory drains are connected to the Laboratory waste water treatment plant for which the effluent is subject to a NPDES permit issued by the IEPA. We will consult with FMS-SEP to assure conformance with all environmental protection permits and ANL site requirements.

9. Waste Management

- a) Construction or Demolition Waste Yes      No X
- b) Hazardous Waste Yes X No

At Argonne, all RCRA hazardous waste will be accumulated (in a Satellite Accumulation Area) by personnel qualified by Argonne-specific training. Requisitions for transfer of accumulated hazardous waste to a central on-site facility will be completed by Argonne-certified personnel. The research personnel will conform to the requirements in LMS-PROC-103. All on-site handling, storage, and disposal will be performed in accordance with the RCRA Part B permit issued by the IEPA. The accumulated hazardous waste will be disposed in accordance with Argonne's Part B permit, and in accordance with the requirement in LMS-PROC-103.

- c) Radioactive Mixed Waste Yes      No X
- d) Radioactive Waste Yes      No X
- e) PCB or Asbestos Waste Yes      No X
- f) Biological Waste Yes      No X
- g) No Path to Disposal Waste Yes      No X
- h) Nano-material Waste Yes      No X
10. Radiation Yes      No X
11. Threatened Violation of ES&H Regulations or Permit Requirements Yes      No X
12. New or Modified Federal or State Permits Yes      No X
13. Siting, Construction, or Major Modification of Facility to Recover, Treat, Store, or Dispose of Waste Yes      No X
14. Public Controversy Yes      No X
15. Historic Structures and Objects Yes      No X

16. Disturbance of Pre-existing Contamination Yes \_\_\_\_\_ No X

17. Energy Efficiency, Resource Conserving,  
and Sustainable Design Features Yes \_\_\_\_\_ No X

**B. For projects that will occur outdoors, complete Section B as well as Section A.**

18. Threatened or Endangered Species, Critical Habitats, and/or  
other Protected Species Yes \_\_\_\_\_ No \_\_\_\_\_

19. Wetlands Yes \_\_\_\_\_ No \_\_\_\_\_

20. Floodplain Yes \_\_\_\_\_ No \_\_\_\_\_

21. Landscaping Yes \_\_\_\_\_ No \_\_\_\_\_

22. Navigable Air Space Yes \_\_\_\_\_ No \_\_\_\_\_

23. Clearing or Excavation Yes \_\_\_\_\_ No \_\_\_\_\_

24. Archaeological Resources Yes \_\_\_\_\_ No \_\_\_\_\_

25. Underground Injection Yes \_\_\_\_\_ No \_\_\_\_\_

26. Underground Storage Tanks Yes \_\_\_\_\_ No \_\_\_\_\_

27. Public Utilities or Services Yes \_\_\_\_\_ No \_\_\_\_\_

28. Depletion of a Non-Renewable Resource Yes \_\_\_\_\_ No \_\_\_\_\_

**C. For projects occurring outside of ANL complete Section C as well as Sections A and B.**

29. Prime, Unique, or Locally Important Farmland Yes \_\_\_\_\_ No \_\_\_\_\_

30. Special Sources of Groundwater (such as sole source aquifer) Yes \_\_\_\_\_ No \_\_\_\_\_

31. Coastal Zones Yes \_\_\_\_\_ No \_\_\_\_\_

32. Areas with Special National Designations (such as National  
Forests, Parks, or Trails) Yes \_\_\_\_\_ No \_\_\_\_\_

33. Action of a State Agency in a State with NEPA-type Law Yes \_\_\_\_\_ No \_\_\_\_\_

34. Class I Air Quality Control Region Yes \_\_\_\_\_ No \_\_\_\_\_

**IV. Subpart D Determination: (to be completed by DOE/ASO)**

Are there any extraordinary circumstances related to the proposal that may affect the significance of the environmental effects of the proposal? Yes \_\_\_ No X

Is the project connected to other actions with potentially significant impacts or related to other proposed action with cumulatively significant impacts? Yes \_\_\_ No X

If yes, is a categorical exclusion determination precluded by 40 CFR 1506.1 or 10 CFR 1021.211? Yes \_\_\_ No \_\_\_

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? Yes X No \_\_\_

If yes, indicate the class or classes of action from Appendix A or B of Subpart D under which the project may be excluded. **APPENDIX B, B3.6 " SITING/CONSTRUCTION/OPERATION/ DECOMMISSIONING OF FACILITIES FOR BENCH-SCALE RESEARCH,**  
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. **CONVENTIONAL LABORATORY OPERATIONS, SMALL-SCALE RESEARCH, AND DEVELOPMENT AND PILOT PROJECTS.**

**ASO NEPA Coordinator Review:** Kaushik Joshi

Signature: Kaushik Joshi Date: 3-9-2015

**ASO NCO Approval of CX Determination:**

The preceding pages are a record of documentation that an action may be categorically excluded from further NEPA review under DOE NEPA Regulation 10 CFR Part 1021.400. I have determined that the proposed action meets the requirements for the Categorical Exclusion identified above.

Signature: Peter R. Siebach Date: 3/9/2015  
Peter R. Siebach  
Acting Argonne Site Office NCO  
PS.

ASO NCO EA or EIS Recommendation: **NOT APPLICABLE**

Class of Action: \_\_\_\_\_

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

Peter R. Siebach  
Acting Argonne Site Office NCO

Concurrence with EA or EIS Recommendation:

**NOT APPLICABLE**

CH GLD: \_\_\_\_\_

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

ASO Manager Approval of EA or EIS Recommendation:

**NOT APPLICABLE**

An  EA  EIS shall be prepared for the proposed \_\_\_\_\_ and  
\_\_\_\_\_ shall serve as the document manager.

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

Dr. Joanna M. Livengood  
Manager