Environmental Review Form for Argonne National Laboratory

Click on the blue question marks (?) for instructions, contacts, and additional information on specific line items.

(?)**Project/Activity Title**: Enhanced Energy Storage Facilities to Support Expanding DOE Program

(?)**ASO NEPA Tracking No.** ASO - CX - 267 (?)**Type of Funding**: DOE - EERE
B&R Code

(?)**Identifying number**: WFO proposal # CRADA proposal #
Work Project # ANL accounting # (item 3a in Field Work Proposal) 49681
Other (explain)

(?)**Project Manager**: Dennis Dees Signature: Date: 2/17/10

(?)**NEPA Owner**: Roberta Riel Signature: Roberta Riel Date: 2/17/10

ANL NEPA Reviewer: Mark Kamuya Signature: Date: 3/29/2010

I. (?)Description of Proposed Action:

Two laboratory facilities are to be operated under this effort in Building #205 of the Chemical Sciences and Engineering Division (CSE), a laboratory-scale battery cell fabrication facility and a battery cell post-test analysis facility. The focus of both facilities will be advanced lithium-ion battery technologies. These technologies typically contain positive electrodes coated on aluminum foil comprised of a lithiated transition metal (e.g. nickel, manganese, or cobalt) oxide active material powder and high surface area carbon additive, held together by a polymer binder. The negative electrode is typically a carbon active material powder coated on copper foil with polymer binder. A porous polymer separator (e.g. polyethylene) is used to separate the electrodes. The cell layers are either wound or stacked and placed into a metal container or foil/polymer pouch. Current collector tabs are attached to the foils, an organic solvent electrolyte (e.g. lithium hexafluorophosphate in a mixture of organic carbonates) is added, and the cell is sealed.

In the laboratory-scale battery cell fabrication facility small, less than 3Ah, prototype cells will be fabricated and tested. Electrodes will be coated, using a solvent based coating process, on laboratory coating equipment designed for lithium-ion cell electrodes. The prototype cells will then be assembled using hand operated cell fabrication equipment. Because of the battery materials sensitivity to moisture, all of these operations are carried out in a state-of-the-art dry room or inert atmosphere glove box. X-ray diffraction will be used to help screen the battery active material powders before cells are assembled. The limited number of prototype cells will undergo electrochemical and thermal testing and evaluation.

The battery cell post-test analysis facility will be used to dismantle cells for diagnostic purposes after electrochemical testing and evaluation has been conducted. The facility is designed to accommodate small prototype cells, as described above, to full size electric vehicle cells that may easily have 100Ah of capacity. All cell-opening, component-manipulation, and diagnostic activities will be performed in an inert atmosphere, provided by glove boxes. Analytical diagnostic instruments used for examining the components include Fourier Transform Infrared Spectroscopy (FTIR), Raman spectroscopy, a thermogravimetric analysis unit coupled to a gas chromatograph/mass spectrometer and an optical microscope. It is important to note that the sample preparation (cell opening, disassembly, metallography) area will be separated from the characterization area. Battery cycling equipment will be used to characterize selected electrode sections.

II. (?)**Description of Affected Environment:** All proposed activities will be conducted indoors in building 205 in existing bench-scale laboratory spaces. The laboratory-scale battery cell fabrication facility will be in lab A-141 and the battery cell post-test analysis facility will be in J-102.

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 opportunities and details provided under items 2, 4, 6, 7, 8, 16, and 20 below, as applicable — Yes X No ____

2. (?)Air Pollutant Emissions — Yes X No ____

   Approximately 10 L of N-methyl-2-pyrrolidinone (NMP) will be released from the facilities annually through laboratory hoods.

3. (?)Noise — Yes ____ No X

4. (?)Chemical Storage/Use — Yes X No ____

   The following is a list of the hazardous chemicals that would likely exist in the facilities at any given time.

   1 Liter of N-methyl-2-pyrrolidinone (NMP)
   1 Liter of 1.2 Molar lithium hexafluorophosphate in ethylene carbonate/ ethyl-methyl-carbonate
   2 Liters of ethanol
   2 Liters of isopropanol
   1 Liter slurry of graphite powder suspended in NMP with polyvinylidene (PVDF) binder
   1 Liter slurry of lithiated nickel-cobalt-manganese oxide powder suspended in NMP with polyvinyldiene (PVDF) binder
   Some of the slurries may contain up to 8 wt % acetylene black powder suspended in binder (non-dispersible)

5. (?)Pesticide Use — Yes ____ No X

6. (?) Polychlorinated Biphenyls (PCBs) — Yes ____ No X

7. (?) Biohazards — Yes ____ No X

8. (?)Liquid Effluent (wastewater) — Yes ____ No X

9. (?)Waste Management

   a) Construction or Demolition Waste — Yes ____ No X
   b) Hazardous Waste — Yes X No ____

   The proposed activities may involve generation of hazardous waste. The waste will be accumulated, managed and documented in accordance with the ANL Waste Handling Procedures Manual. Generators will consult with Waste Management personnel before the generation of unusual or difficult waste streams. Personnel who generate waste and

those who prepare waste requisitions are required to complete the required training in accordance with Argonne requirements.

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 X	No ___

The proposed activities may involve generation of nano-material waste. The waste will be accumulated, managed and documented in accordance with the ANL Waste Handling Procedures Manual. Generators will consult with Waste Management personnel before the generation of unusual or difficult waste streams. Personnel who generate waste and those who prepare waste requisitions are required to complete the required training in accordance with Argonne requirements.

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 X	No ___

These factors will be considered in the planning stage of the proposed research activities.

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

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. B 3.6, siting / operation of facilities for small scale R & D 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.

ASO NEPA Coordinator Review: Ken Chiu

Signature: [signature] Date: 3/31/10

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: _____ Date: 4/5/10

Peter R. Siebach
Acting Argonne Site Office NCO

ASO NCO EA or EIS Recommendation: N/A

Class of Action: _____

Signature: _____ Date: _____

Peter R. Siebach
Acting Argonne Site Office NCO

Concurrence with EA or EIS Recommendation:

CH GLD: _____

Signature: _____ Date: _____

ASO Manager Approval of EA or EIS Recommendation:

An ____ EA ____ EIS shall be prepared for the proposed _____ and

_____ shall serve as the document manager.

Signature: _____ Date: _____

Dr. Joanna M .Livengood
Acting Manager