

PMC-ND

(1.08.09.13)

**U.S. DEPARTMENT OF ENERGY
OFFICE OF ENERGY EFFICIENCY AND RENEWABLE ENERGY
NEPA DETERMINATION**

**RECIPIENT:**Liox Power, Inc**STATE:** CA

PROJECT TITLE: Electrolyte Assisted Hydrogen Storage Reactions

| Funding Opportunity Announcement Number | Procurement Instrument Number | NEPA Control Number | CID Number |
|--|--------------------------------------|----------------------------|-------------------|
| DE FOA 0001412 | DE-EE0007849 | GFO-0007849-002 | GO7849 |

Based on my review of the information concerning the proposed action, as NEPA Compliance Officer (authorized under DOE Order 451.1A), I have made the following determination:

CX, EA, EIS APPENDIX AND NUMBER:

Description:

A9 Information gathering, analysis, and dissemination Information gathering (including, but not limited to, literature surveys, inventories, site visits, and audits), data analysis (including, but not limited to, computer modeling), document preparation (including, but not limited to, conceptual design, feasibility studies, and analytical energy supply and demand studies), and information dissemination (including, but not limited to, document publication and distribution, and classroom training and informational programs), but not including site characterization or environmental monitoring. (See also B3.1 of appendix B to this subpart.)

B3.6 Small-scale research and development, laboratory operations, and pilot projects Siting, construction, modification, operation, and decommissioning of facilities for smallscale research and development projects; conventional laboratory operations (such as preparation of chemical standards and sample analysis); and small-scale pilot projects (generally less than 2 years) frequently conducted to verify a concept before demonstration actions, provided that construction or modification would be within or contiguous to a previously disturbed or developed area (where active utilities and currently used roads are readily accessible). Not included in this category are demonstration actions, meaning actions that are undertaken at a scale to show whether a technology would be viable on a larger scale and suitable for commercial deployment.

Rationale for determination:

The U.S. Department of Energy (DOE) is proposing to provide funding to Liox Power, Inc. to develop reversible hydrogen storage materials suitable for widespread transportation applications. Budget Period 1 (BP1) consisted of experimentation and evaluation of multiple component complex and destabilized hydride materials. A NEPA review was conducted for this budget period on December 22, 2016. A conditional determination was made, in which CX's A9 and B3.6 were applied. Budget Periods 2 and 3 (BP2 and BP3) were not reviewed at that time, as these budget periods would only be negotiated upon meeting the first Go/No-Go milestone and obtaining DOE approval to continue funding. As these conditions have now been met, this NEPA determination will review these final two budget periods.

BP2 and BP3 would build on the work from the first phase of the project, and would focus specifically on lowering the temperature and pressure of hydrogenation in electrolyte-containing, high-gravimetric systems, evaluating systems for potential application of electrolyte additives, and demonstrating electrochemically promoted hydrogenation and dehydrogenation. Proposed project activities under BP2 would include an electrolytes survey (e.g. literature survey and materials characterization), electrochemical analysis (e.g. hydrogen evolution, rehydrogenation), assessment of applicability of electrolyte-assisted hydrogen cycling to hydrogen storage materials, verification of electron balance and cell design for rehydrogenation, and demonstration of hydrogen cycling (i.e. dehydrogenation and rehydrogenation). Activities under BP3 would include electrolyte optimization, optimization of a hydride/electrolyte formulation, demonstration of reversible storage, and demonstration of electrochemically-driven hydrogen cycling.

All work activities would be completed by Liox Power and its project partner HRL Laboratories at existing, purpose built laboratory facilities in Pasadena, CA and Malibu, CA, respectively. Project activities would involve the use and handling of hazardous materials, including industrial solvents, at both locations. Only sub-kg or sub-liter quantities of materials and chemicals would be used and/or produced as part of this project. Handling of these materials would occur in-lab. Any health and safety hazards would be mitigated through adherence to each entity's existing

corporate health and safety policies and procedures. These include employee training, the use of proper protective equipment, engineering controls, monitoring, and internal assessments. A fume hood would be used during desorption experiments, mitigating emissions risks associated with desorption experiments. No changes in the use, mission or operation of existing facilities would be required as part of this project. No additional permits would be required in order to perform the project work activities.

Based on the review of the proposal, DOE has determined the proposal fits within the class of action(s) and the integral elements of Appendix B to Subpart D of 10 CFR 1021 outlined in the DOE categorical exclusion(s) selected above. DOE has also determined that: (1) there are no extraordinary circumstances (as defined by 10 CFR 1021.410(2)) related to the proposal that may affect the significance of the environmental effects of the proposal; (2) the proposal has not been segmented to meet the definition of a categorical exclusion; and (3) the proposal is not connected to other actions with potentially significant impacts, related to other proposals with cumulatively significant actions, or an improper interim action. This proposal is categorically excluded from further NEPA review.

NEPA PROVISION

DOE has made a final NEPA determination for this award

Insert the following language in the award:

If the Recipient intends to make changes to the scope or objective of this project, the Recipient is required to contact the Project Officer, identified in Block 15 of the Assistance Agreement before proceeding. The Recipient must receive notification of approval from the DOE Contracting Officer prior to commencing with work beyond that currently approved. If the Recipient moves forward with activities that are not authorized for Federal funding by the DOE Contracting Officer in advance of a final NEPA decision, the Recipient is doing so at risk of not receiving Federal funding and such costs may not be recognized as allowable cost share.

Note to Specialist :

Fuel Cell Technologies Office
This NEPA determination does not require a tailored NEPA Provision.
NEPA review completed by Jonathan Hartman, 08/27/2018

SIGNATURE OF THIS MEMORANDUM CONSTITUTES A RECORD OF THIS DECISION.

NEPA Compliance Officer Signature: _____



NEPA Compliance Officer

Date: 8/28/2018

FIELD OFFICE MANAGER DETERMINATION

Field Office Manager review required

NCO REQUESTS THE FIELD OFFICE MANAGER REVIEW FOR THE FOLLOWING REASON:

- Proposed action fits within a categorical exclusion but involves a high profile or controversial issue that warrants Field Office Manager's attention.
- Proposed action falls within an EA or EIS category and therefore requires Field Office Manager's review and determination.

BASED ON MY REVIEW I CONCUR WITH THE DETERMINATION OF THE NCO :

Field Office Manager's Signature: _____

Field Office Manager

Date: _____