

PMC-ND

(1.08.09.13)

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



RECIPIENT: Northeastern University

STATE: MA

**PROJECT TITLE :** Enabling Efficient Water Splitting with Advanced Materials Designed for High pH Membrane Interface

<b>Funding Opportunity Announcement Number</b>	<b>Procurement Instrument Number</b>	<b>NEPA Control Number</b>	<b>CID Number</b>
DE-FOA-0001647	DE-EE0008082	GFO-0008082-001	GO8082

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:

<b>A9 Information gathering, analysis, and dissemination</b>	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.)
<b>B3.6 Small-scale research and development, laboratory operations, and pilot projects</b>	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.
<b>B3.15 Small-scale indoor research and development projects using nanoscale materials</b>	Siting, construction, modification, operation, and decommissioning of facilities for indoor small-scale research and development projects and small-scale pilot projects using nanoscale materials in accordance with applicable requirements (such as engineering, worker safety, procedural, and administrative regulations) necessary to ensure the containment of any hazardous materials. Construction and modification activities would be within or contiguous to a previously disturbed or developed area (where active utilities and currently used roads are readily accessible).

## Rationale for determination:

The U.S. Department of Energy (DOE) is proposing to provide federal funding to Northeastern University (NEU) to create durable, high-performance materials and interfaces for advanced water splitting to enable a pathway for reducing costs for hydrogen production using anion exchange membrane (AEM)-based electrolysis.

The project would improve fundamental understanding of how both hydrogen and oxygen evolution reactions occur and would lead to novel platinum group metal-free catalyst materials. The project would also involve development of improvements in membranes, ionomers, and gas-evolution electrodes. NEU (Boston, MA) would focus on catalyst development and characterization. University of Delaware (Newark, DE) would synthesize and characterize polymer construction and evaluate gas-evolving electrodes. Activities at Advent Technologies (Boston, MA) include construction and evaluation of gas evolving electrodes. Collaboration is proposed to occur with the HydroGEN Energy Materials Network (EMN) National Laboratory consortium including efforts related to multiscale modeling and computation, model simulations of the membrane catalyst interface and use of advanced ionomers, durability protocols and validation of electrolyzer materials.

No modifications or changes to existing facilities would be necessary at any of the project locations and no new permits, additional licenses and/or authorizations would be necessary to complete project work. Laboratory work would involve the use of hazardous materials including powders, corrosive acids, and organic and inorganic solvents and would generate small quantities of hazardous wastes. NEU and its sub-recipients would provide safe research environments consistent with local, state, and federal regulations. All project workers would undergo training on the safe handling of materials and devices in the laboratory. Synthesized catalysts may contain small quantities of micro- and nano-powders. Potential human health risks of nanoparticles would be prevented by handling these substances within a fume hood while wearing gloves, a lab coat, and eye glasses/goggles. Nanoparticle waste would be collected in solid hazardous waste canisters and disposed of as hazardous waste by a designated NEU contractor.

Based on the review of the proposal, DOE has determined the tasks within BP1 of the proposal fit 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. Tasks and subtasks within BP1 of the proposal are categorically excluded from further NEPA review.

**NEPA PROVISION**

DOE has made a conditional NEPA determination for this award, and funding for certain tasks under this award is contingent upon the final NEPA determination.

Insert the following language in the award:

You are restricted from taking any action using federal funds, which would have an adverse affect on the environment or limit the choice of reasonable alternatives prior to DOE/NNSA providing either a NEPA clearance or a final NEPA decision regarding the project.

Prohibited actions include:

Budget Period 2 and Budget Period 3

This restriction does not preclude you from:

All tasks and subtasks associated with Budget Period 1

If you move forward with activities that are not authorized for federal funding by the DOE Contracting Officer in advance of the final NEPA decision, you are 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 requires a tailored NEPA provision.

Review completed by Chris Rowe on 7/11/2017

**SIGNATURE OF THIS MEMORANDUM CONSTITUTES A RECORD OF THIS DECISION.**

NEPA Compliance Officer Signature:  Casey Strickland  Date: 7/12/2017  
NEPA Compliance Officer

**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: \_\_\_\_\_ Date: \_\_\_\_\_  
Field Office Manager