PMC-ND
(1.08.09.13)

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

RECIPIENT: The Pennsylvania State University **STATE:** PA

PROJECT TITLE: Advanced Anion Exchange Membranes with Tunable Water Transport for High Performance, Long Lifetime and PGM-Free AEMFCs

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0001874	DE-EE0008433	GFO-0008433-001	

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.
B3.15 Small-scale indoor research and development projects using nanoscale materials	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 funding to Pennsylvania State University (Penn State) to develop/synthesize novel anion exchange membrane (AEM) chemistries and incorporate the AEMs into Alkaline anion exchange membrane fuel cells (AEMFCs) for testing.

Proposed project activities would include polymer electrolyte synthesis/optimization, membrane fabrication (e.g. physical and chemical characterization), membrane characterization, catalyst layer fabrication and lamination to the membrane, ionomer formulation, fuel cell testing, integration of polymer electrolyte materials into operating AEMFCs, and fuel cell performance and durability testing (e.g. neutron imaging, polarization curves, and electrochemical impedance spectroscopy).

Polymer synthesis, membrane casting, and membrane characterization would occur at Penn State, (University Park, PA). Membrane casting and membrane characterization would take place at 3M's facility in Saint Paul, MN. Fuel cell testing would occur at the National Renewable Energy Laboratory (NREL – Golden, CO) and at University of South Carolina (USC- Columbia, SC). Limited membrane characterization would be carried out at NREL and USC, primarily in fuel cell hardware, although some ex-situ membrane characterization may also be performed at NREL. The National Institute of Standards and Technology (NIST - Gaithersburg, MD) would also be involved in the neutron imaging that USC performs. USC would access NIST fuel cell neutron imaging facilities through the general call for

outside user proposals from the NIST Center for Neutron Research (NCNR).

Project work would involve the handling of reactive chemicals, solvents, and pressurized gasses. Fuel cell testing would also include activities that can present an electrical hazard. All project activities would be performed in existing, purpose-built laboratory environments. Any potential risks would be mitigated through up-to-date health and safety training, monitoring and oversight, and the use of proper protective equipment. Catalysts to be used at USC and NREL both include nanomaterials. The catalysts would be kept in sealed vials until combined with solvents and polymers to form catalyst layers. They would not be used as free powders and would not present an inhalation risk. Any organic vapor emissions resulting from project work would be controlled through venting via chemical fume hoods. All activities would be conducted in accordance with Federal, state, and local health, safety, and environmental regulations.

Any work proposed to be conducted at a DOE laboratory may be subject to additional NEPA review by the cognizant DOE NEPA Compliance Officer for the specific DOE laboratory prior to initiating such work. Further, any work conducted at a DOE laboratory must meet the laboratory's health and safety requirements.

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.

Insert the following language in the award:

You are required to:
Any work proposed to be conducted at a DOE laboratory may be subject to additional NEPA review by the cognizant DOE NEPA Compliance Officer for the specific DOE laboratory prior to initiating such work. Further, any work conducted at a DOE laboratory must meet the laboratory's health and safety requirements.

Note to Specialist :

Fuel Cell Technologies Office
This NEPA determination requires a tailored NEPA provision.
Review completed by Jonathan Hartman, 10/10/2018

SIGNATURE OF THIS MEMORANDUM CONSTITUTES A RECORD OF THIS DECISION.

NEPA Compliance Officer Signature: Electronically Signed By: Casey Strickland Date: 10/10/2018

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