

PMC-ND
(1.08.09.13)

U.S. DEPARTMENT OF ENERGY

OFFICE OF ENERGY EFFICIENCY AND RENEWABLE ENERGY

NEPA DETERMINATION



RECIPIENT: University of Michigan

STATE: MI

PROJECT TITLE: Optimized Hydrogen Adsorbents via Machine Learning and Crystal Engineering

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0001647	DE-EE0008093	GFO-0008093-002	GO8093

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 federal funding to the Regents of the University of Michigan (UM) to use machine learning techniques to predict and reverse engineer new metal organic frameworks (MOFs) that show promise for high hydrogen storage capacity. Only Budget Period 1 (BP1) was negotiated at the outset of the project. Accordingly, BP1 activities received a conditional NEPA Determination on July 20, 2017. Upon completion of BP1, a Go Decision was reached. Budget Periods 2 and 3 (BP2 and BP3) have now also been negotiated. This NEPA review will apply to all BP2 and BP3 activities.

The proposed project activities for BP2 and BP3 would carry on work previously completed under BP1, which focused on the identification of MOFs using machine learning, as well as the identification and use of additives to shape MOF morphology. Proposed activities for BP2 would include computer modelling/analysis of previously identified MOFs, cataloging computer-generated MOFs, synthesis and characterization of MOFs, and performance of crystal growth experiments to control for MOF sorbent morphology and particle size. Activities to be performed under BP3 would include synthesis/testing of optimal MOF candidates and experimental validation of volumetric capacities.

All activities would be performed at existing, purpose-built laboratory facilities at UM's main campus in Ann Arbor, MI and at the Ford Motor Company's (Ford) Fuel Cell Center in Dearborn, MI. Both entities regularly conduct work similar in nature to that included as part of this project. No physical modifications to existing facilities or ground disturbing activities would be undertaken as part of the proposed project. No change in the use, mission or operation of existing facilities would arise out of these efforts. No additional permits, licenses or authorizations would be required to perform project activities.

Project work would involve the use and handling of metals, organic solvents, high pressure hydrogen, and high pressure carbon dioxide. All such handling would be carried out in-laboratory. Risks associated with the performance of these activities would be mitigated through adherence to established health and safety policies and

procedures, including employee training, the use of proper protective equipment, engineering controls, monitoring, and internal assessments. Each entity is equipped with active safety plans, safety systems, and safety processes. The facilities also have hazardous waste removal that comply with government standards. UM and Ford would observe all applicable Federal, state, and local health, safety and environmental laws and regulations.

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

Note to Specialist :

Fuel Cell Technologies Office

This NEPA determination does not require a tailored NEPA provision.

Review completed by Jonathan Hartman, 10/22/2018

SIGNATURE OF THIS MEMORANDUM CONSTITUTES A RECORD OF THIS DECISION.

NEPA Compliance Officer Signature:



Casey Strickland

NEPA Compliance Officer

Date: 10/22/2018

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: