PMC-ND
(1.08.09.13)

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

RECIPIENT: University of Delaware **STATE:** DE

PROJECT TITLE: Electrochemical Production of Formic Acid from Carbon Dioxide in Solid Electrolytes

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0002203	DE-EE0009287	GFO-0009287-001	GO9287

Based on my review of the information concerning the proposed action, as NEPA Compliance Officer (authorized under DOE Policy 451.1), 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 the University of Delaware to design, develop, fabricate, and test a CO2 electrolyzer prototype that would convert carbon dioxide to formic acid which would be tested for performance in a 1-5 liter bioreactor.

Proposed project activities would include the design, development, fabrication, and testing of components. The project would develop components of an electrolysis system, including the membrane, anode, and cathode that make up the electrode and the electrocatalysts that enable the conversion. Electrodes would be tested over a span of 200 hours for durability. A cathode catalyst would be selected, scaled up, and tested on a reactor 100 cm2 or larger for stability. Findings would be used to design and fabricate a larger electrochemical cell, over 750 cm2, which would then be tested for durability over 1000 hours. A lab-scale electrolyzer would be integrated with a 1-5 liter bioreactor and aim to maintain 100 hours of performance. Technoeconomic and life-cycle assessments would be conducted at various phases of the project and ultimately, the potential for CO2 emission reduction would be assessed.

University of Delaware would oversee the project. University of Delaware, Rice University, and National Renewable Energy Laboratory (NREL) would design, fabricate, and test electrode materials, membrane materials, and CO2 electrolyzer prototypes. University of Delaware would also conduct technoeconomic analysis and life-cycle assessments. OCO Inc, using lab facilities at the Applied Process Engineering Laboratory (APEL) in Richland, WA, would design, fabricate, and test a tall cell electrolyzer incorporating cathode materials received from NREL. All project activities would be performed in existing, purpose-built facilities. No modifications to existing facilities, ground disturbing activities, or changes to the use, mission, or operation of existing facilities would be required as part of this project. No additional permits or authorizations would be required.

Project activities would involve the use and handling of various hazardous materials, including metals, chemicals, industrial solvents, and nanoscale catalyst materials. Any risks associated with the handling of these materials would be mitigated through adherence to established health and safety policies and procedures. Protocols would include personnel training, personal protective equipment, engineering controls, monitoring, and internal assessments. Established standard operation procedures would be followed at each site to synthesize, handle, store, and dispose of nanosized materials. All waste products would be disposed of by licensed waste management service providers. University of Delaware and its project partners would observe all applicable Federal, state, and local environmental, health, and safety laws regulations.

Any work proposed to be conducted at a federal facility may be subject to additional NEPA review by the cognizant federal official and must meet the applicable health and safety requirements of the facility.

NEPA PROVISION

DOE has made a final NEPA determination.

Notes:

Bioenergy Technologies Office
This NEPA determination does not require a tailored NEPA provision.
Review completed by Shaina Aguilar on 11/30/2020.

FOR CATEGORICAL EXCLUSION DETERMINATIONS

The proposed action (or the part of the proposal defined in the Rationale above) fits within a class of actions that is listed in Appendix A or B to 10 CFR Part 1021, Subpart D. To fit within the classes of actions listed in 10 CFR Part 1021, Subpart D, Appendix B, a proposal must be one that would not: (1) threaten a violation of applicable statutory, regulatory, or permit requirements for environment, safety, and health, or similar requirements of DOE or Executive Orders; (2) require siting and construction or major expansion of waste storage, disposal, recovery, or treatment facilities (including incinerators), but the proposal may include categorically excluded waste storage, disposal, recovery, or treatment actions or facilities; (3) disturb hazardous substances, pollutants, contaminants, or CERCLA-excluded petroleum and natural gas products that preexist in the environment such that there would be uncontrolled or unpermitted releases; (4) have the potential to cause significant impacts on environmentally sensitive resources, including, but not limited to, those listed in paragraph B(4) of 10 CFR Part 1021, Subpart D, Appendix B; (5) involve genetically engineered organisms, synthetic biology, governmentally designated noxious weeds, or invasive species, unless the proposed activity would be contained or confined in a manner designed and operated to prevent unauthorized release into the environment and conducted in accordance with applicable requirements, such as those listed in paragraph B(5) of 10 CFR Part 1021, Subpart D, Appendix B.

There are no extraordinary circumstances related to the proposed action that may affect the significance of the environmental effects of the proposal.

The proposed action has not been segmented to meet the definition of a categorical exclusion. This proposal is not connected to other actions with potentially significant impacts (40 CFR 1508.25(a)(1)), is not related to other actions with individually insignificant but cumulatively significant impacts (40 CFR 1508.27(b)(7)), and is not precluded by 40 CFR 1506.1 or 10 CFR 1021.211 concerning limitations on actions during preparation of an environmental impact statement.

The proposed action is categorically excluded from further NEPA review.

SIGNATURE OF THIS MEMORANDUM CONSTITUTES A RECORD OF THIS DECISION.

NEPA Compliance Officer Signature: Electronically Signed By: Roak Parker Date: 12/1/2020

NEPA Compliance Officer

FIELD OFFICE MANAGER DETERMINATION

- [x] Field Office Manager review not required
- [ ] Field Office Manager review required

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

Field Office Manager's Signature: _____ Date: _____

Field Office Manager