PMC-ND
(1.08.09.13)

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

RECIPIENT: Northwestern University **STATE:** IL

PROJECT TITLE: Characterization and Accelerated Life Testing of a New Solid Oxide Electrolysis Cell

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0001647	DE-EE0008079	GFO-0008079-002	GO8079

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 federal funding to Northwestern University (Northwestern) to design, develop, and fabricate novel solid oxide electrolysis cells (SOECs) for efficient hydrogen production. Only Budget Period 1 (BP1) was originally negotiated and was reviewed by GFO-0008079-001 in July 2017. There was a Go/No Go decision point after BP1 that was passed so this NEPA review is for the remaining project activities in BP2 and BP3.

Northwestern would develop mechanistic degradation models that can realistically predict long-term SOEC durability, using input data from an accelerated testing approach combining electrochemical life testing with quantitative micro-structural and micro-chemical evaluation. Project work would occur within dedicated research laboratories on the Northwestern campus in Evanston, IL. BP1 activities were for demonstrating that the fabrication, life testing, characterization and modeling efforts would work together, as well as confirm that the theoretical model provided results in agreement with the experimental results. To accomplish this, Northwestern fabricated baseline SOECs for accelerated electrochemical life testing and used micro-structural and chemical characterization to quantify any changes to the baseline cells. The results were used to guide the theoretical work for electrolyte degradation during electrolysis operation. BP2 and BP3 activities are extensions of the work completed within BP1. BP2 work would develop advanced SOECs, and obtain more extensive life testing, model development, and long-term performance predictions. BP3 work would study optimized SOECs and determine projected long-term durability. Collaboration is proposed to occur with the HydroGEN Energy Materials Network National Laboratory consortium.

The project would involve the use and handling of various hazardous materials including metals and industrial solvents. All such handling would occur in-lab with proper hazardous material handling and disposal practices. All hazardous materials would be managed in accordance with federal, state, and local environmental regulations. The project would follow applicable health and safety guidelines and requirements of the Northwestern Office for Research Safety including employee training, proper protective equipment, engineering controls, monitoring, and

internal assessments.

NEPA PROVISION

DOE has made a final NEPA determination.

Notes:

Fuel Cell Technologies Office
This NEPA determination does not require a tailored NEPA provision.

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: Casey Strickland Date: 11/16/2018

NEPA Compliance Officer

FIELD OFFICE MANAGER DETERMINATION

☑ 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