

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



RECIPIENT: The Curators of the University of Missouri

STATE: MO

PROJECT TITLE: Real-time Ionic Liquid Electrochemical Sensor for Highly Sensitive and Selective hydrogen Detection and Quantification

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0002792	DE-EE0010744	GFO-0010744-001	GO10744

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.
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 The Curators of the University of Missouri (UM) to design, develop, fabricate, and test a miniature electrochemical hydrogen sensor for real-time detection of hydrogen loss.

Award activities would consist of laboratory-scale research, outreach, design, characterization, and field testing. Outreach would include diversity, equity, and inclusion (DEI) activities. UM (Columbia, MO) would carry out lab testing, sensor prototyping and data validation, and data analyses. Michigan State University (East Lansing, MI) would perform computational studies to optimize the hydrogen sensor. Hydrogen sensor chip fabrication and packaging development would occur at Wayne State University (WSU; Detroit, MI). Sensor prototype development would be carried out at WSU and Oakland University (OU; Rochester, MI). OU would design the circuit and perform system tests. Field testing would occur at the National Renewable Energy Laboratory (NREL; Golden, CO). All organizations would participate in DEI activities, including hosting seminars, developing K-12 outreach programs, and communicating with minority, women, and veteran owned businesses.

Award activities would be performed at pre-existing facilities that are purpose-built to accommodate the type of laboratory work and testing to be conducted for this award. Hydrogen sensor prototypes would be deployed at outdoor field test facilities at NREL and would measure fewer than 5 cubic inches. This installation would be temporary. Hydrogen gas tanks would be used to release hydrogen slowly to test the hydrogen sensors. Emissions would be minimal and would not exceed pollution levels of national ambient air quality standards.

Award activities would involve handling and use of hazardous materials, including hydrogen gas, metals, polymers, solvents, chemicals, soldering materials, ionic liquids, metallic nanocatalysts, and silicon wafers. Handling, storage, and disposal of such materials would occur within controlled settings and would follow existing policies and procedures, including the handling and disposal of nanoscale materials. Nanoscale materials would be part of an

integrated sensor device and would pose no inhalation risk. Existing health, safety, and environmental policies and procedures would be followed at all facilities to mitigate hazards to acceptable levels. All activities would comply with existing federal, state, and local laws and regulations.

DOE has considered the scale, duration, and nature of proposed activities to determine potential impacts on resources, including those of an ecological, historical, cultural, and socioeconomic nature. DOE does not anticipate impacts on these resources which would be considered significant or require DOE to consult with other agencies or stakeholders.

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:

Hydrogen and Fuel Cell Technologies Office (HFTO)
NEPA review completed by Alex Colling on 03/07/2024.

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: _____



Andrew Montano

NEPA Compliance Officer

Date: 3/12/2024

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: _____

Field Office Manager

Date: _____