

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



RECIPIENT: Palo Alto Research Center Incorporated

STATE: CA

PROJECT TITLE : DEtection system Comprising Inexpensive Printed sensor arrays for Hydrogen gas Emission monitoring and Reporting (DECIPHER)

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0002792	DE-EE0010745	GFO-0010745-001	GO10745

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).

B5.15 Small-scale renewable energy research and development and pilot projects

Small-scale renewable energy research and development projects and small-scale pilot projects, provided that the projects are located within a previously disturbed or developed area. Covered actions would be in accordance with applicable requirements (such as local land use and zoning requirements) in the proposed project area and would incorporate appropriate control technologies and best management practices.

Rationale for determination:

The U.S. Department of Energy (DOE) is proposing to provide funding to Palo Alto Research Center LLC (PARC) to create a gas detection system comprised of a distributed network of low-cost sensor arrays printed with functionalized carbon nanotubes (CNTs), i.e., DECIPHER. The award aims to also create an analytical platform for monitoring hydrogen (H₂) gas emissions in outdoor applications.

Award activities include computer modeling, data analysis, laboratory research, and field testing. The award would consist of three budget periods (BPs). BP1 would focus on the fabrication of sensors to achieve target performance metrics in controlled lab experiments as well as the creation of an analytical model for high selectivity. BP2 would involve advancement of the sensor technology, the creation of an analytical platform to quantify H₂ gas concentration, and the performance of Field Test 1. BP3 would aim to further advance the analytical models using field test data, test the DECIPHER system in Field Test 2, and complete a techno-economic analysis of the DECIPHER technology.

PARC (Stanford Research Park in Palo Alto, CA) would be responsible for synthesizing CNT-based gas sensing materials in chemistry labs, fabricating gas sensors using cleanroom techniques, functional tests of gas sensors in dedicated labs, building of gas sensor modules with electronics, and performing data analysis and modeling activities. Pacific Gas and Electric Company's (PG&E; Lodi, CA) future H₂ blending test facility, i.e., Hydrogen-to-Infinity, would be the site of Field Tests 1 and 2.

PG&E's Hydrogen-to-Infinity facility is currently under construction and is being permitted through a separate effort by

PG&E. Field Test 1 would test capabilities of the DECIPHER system and collect data for the analytical models. Field Test 2 would test the capabilities of the improved DECIPHER system. Both field tests would occur outdoors and last approximately one week. All facilities are preexisting purpose-built facilities for the type of work to be conducted for this award. Facility modifications would not be required.

Award activities would involve the use and handling of hazardous materials, including industrial solvents and corrosive materials. The handling and use of all such materials would occur by trained personnel in fume hoods of an equipped chemistry laboratory. PARC is committed to proper chemical handling and disposal practices. All hazardous materials would be managed in accordance with federal, state, and local environmental regulations. Established corporate health and safety policies and procedures would be followed, including employee training, engineering controls, environmental monitoring, administrative controls, environmental health & safety surveillance, internal assessments, and proper personal protective equipment (PPE). At PG&E's Hydrogen-to Infinity facility, environmental, health and safety guidelines set by the City of Lodi and PG&E would be strictly followed including supervision of trained personnel from PG&E during field testing. The award would also involve the use and handling of nanoscale materials, i.e., single walled CNTs. CNTs would be used in small quantities and in a laboratory fume hood to control exposure. PPE such as gloves, safety goggles and/or face shield, respirators, and lab coats would be used while handling CNTs. When not being used, containers would be kept closed and stored in a dry storage cabinet. All personnel would be trained in usage and handling of such materials, and work areas would be periodically inspected by qualified safety and health professionals. 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.

NEPA PROVISION

DOE has made a final NEPA determination.

Notes:

Hydrogen and Fuel Cell Technologies Office
NEPA review completed by Corrin MacLuckie, 08/31/2023.

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: Andrew Montano

Date: 8/31/2023

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: _____
Field Office Manager

Date: _____