(1.08.09.13)

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



RECIPIENT: Purdue University

STATE: IN

PROJECT TITLE : MemDry: Hybrid Vapor-Selective MemDry Cycle for Efficient Passive and Active Convective Drying

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0002553	DE-EE0010199	GFO-0010199-001	

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 Purdue University to model, design, develop, fabricate, and test a membrane-based drying cycle for convective drying applications. The project would be completed over three Budget Periods (BPs) with a Go/No-Go decision point between each BP. This NEPA determination is applicable to all three BPs.

Project participants would fabricate a membrane, evaluate its properties, and design and test a water vapor compressor. A full scale prototype of the drying system would be designed, manufactured, and assembled. This would include piping, connections, and components relative to the membrane modules, heat pump cycle, and water vapor compressor. A convective drying process would be simulated by inducing a temperature drop and humidity rise within a humidity chamber. Results from these test runs would be used to inform an optimized compressor design which would be fabricated, tested, and integrated into the complete system to demonstrate the operation and performance of the novel drying cycle.

Proposed project activities by location are listed below:

Purdue University - West Lafayette, IN

Birck Nanotechnology Center

· System modeling, membrane fabrication, portions of the prototype design/development.

Herrick Labs

• System modeling, portions of the prototype design/development, and testing of the experimental system.

Inventherm – Baton Rouge, LA

• Design, development, manufacturing, and preliminary testing of water vapor compressor.

No changes in the use, mission, or operation of existing facilities would be required as part of this project and no additional permits would be required in order to conduct any of the work activities. Project activities would involve the use and handling of hazardous materials and machining equipment. Any risks associated with the handling of these materials and equipment would be mitigated through adherence to established health and safety policies and procedures. Nanomaterials may be used in membrane fabrication. Appropriate handling procedures would be

followed. All waste products would be disposed of by licensed waste management service providers. Purdue University and its project partner would observe all applicable Federal, state, and local health, safety, and environmental regulations.

NEPA PROVISION

DOE has made a final NEPA determination.

Notes:

Advanced Manufacturing Office Review completed by Shaina Aguilar on 8/1/22.

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 NEPA Compliance Officer

Date: 8/2/2022

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: