PMC-ND
(1.08.09.13)

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

RECIPIENT: Wright State University **STATE:** OH

PROJECT TITLE: Accelerating Additive Manufacturing Process design for energy Conversion Materials using In-situ Sensing and Machine Learning

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0001980	DE-EE0009097	GFO-0009097-001	

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 Wright State University for the research and development of a machine learning (ML) approach to accelerate the additive manufacturing process development of thermoelectric materials. The project would include the fabrication and characterization of thermoelectric material. Work would be completed over two Budget Periods (BP). BP1 activities would include experimentation to adjust in-situ sensing for the manufacturing of the thermoelectric material and to determine the range of processing parameters. Training data would be collected on: manufacturing parameters, in-situ sensor response, and material characterization. Signal processing of model inputs and formation of a baseline ML model would also occur in BP1. BP 2 activities would focus on collecting additional data and investigation of more sophisticated ML models. This NEPA determination is applicable to both BPs.

Proposed activities at each location would include:

Wright State University, Dayton, Ohio
• X-ray diffraction and scanning electron microscopy for material characterization, with computer modeling and data analysis

The George Washington University, Washington, DC
• Thermoelectric property characterization, and micro- and nano-structure characterization via microscopy and diffraction

Universal Technology Company, Beavercreek, Ohio
• Thermoelectric material fabrication using laser powder bed fusion (LPBF) additive manufacturing and collection of sensor data

The project would involve handling of hazardous materials, including bismuth telluride (BiTe) powders and Argon

gas. Nanoscale particles may exist in the BiTe powder. The BiTe powder would be used in a LPBF machine where it would be melted and transformed into solid material. The BiTe powder would be shipped in Argon. Argon would be used in LPBF machines and powder sifting chambers, as well in the vacuum for cleaning up the BiTe powder.

All project work would occur in a laboratory setting. All hazardous materials would be managed in accordance with federal, state and local environmental regulations. Standard practices for handling and working with powder would be implemented with storage occurring in fireproof cabinets separated from potential reactants. Personal protection equipment including respirators and gloves would be utilized. The hazardous materials would be removed by a contractor that specializes in hazardous waste removal. No modifications, new permits or change in the use, mission, or operation of any facility would be required

NEPA PROVISION

DOE has made a final NEPA determination.

Notes:

Advanced Manufacturing Office
This NEPA determination does not require a tailored NEPA Provision
NEPA review completed by Diana Heyder, 5/11/2020

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: Casey Strickland Date: 5/12/2020

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