

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



RECIPIENT: University of Missouri System

STATE: MO

PROJECT TITLE: Durable Coating for Wind Turbine Pitch Bearing Produced via Hybrid Manufacturing

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0002864	DE-EE0011024	GFO-0011024-001	

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:

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| 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 the Missouri University of Science and Technology (MST) to develop a durable external coating for wind turbine pitch bearings produced by means of hybrid manufacturing. The award would be limited to intellectual and laboratory-scale activities.

Directed energy deposition (DED) coatings would be developed using high entropy alloy, metal matrix composites and functional graded coatings followed by DED coating testing and evaluation at MST, located in Rolla, Missouri. Lifting of a hybrid-manufactured raceway, hybrid manufacturing of linear raceways and linear roller rig testing of raceways would also occur at the MST site. Linear Rig testing of subcomponent raceways and lifting model establishment would occur at Argonne National Laboratory in Argonne, Illinois. Thermal spray additive manufacturing (TSAM) compositions and processes and laboratory scale coupons would be developed at General Electric in Niskayuna, New York. Microstructures would be evaluated and a lifting model would also be established at this site. Support deposition and miniature tensile test of DED and TSAM samples would be conducted at Product Innovation and Engineering, LLC in James, Missouri. Development of models to predict the structure, properties and chemical interactions for DED and TSAM to provide process development would occur at Questek in Evanston, Illinois.

The project would involve the use and handling of metal feedstock to melt in an arc melter, acids for etching during metallography and wire arc melting to produce samples. At Solvus Global they would produce the designed alloys. Feedstock wire and powder to be used for wire arc additive manufacturing and cold spray, respectively. The amount of metal to be used would be less than 2 kilograms. Handling of all hazardous materials would occur in-laboratories and all parties would perform proper hazardous material handling and disposal practices that are in accordance with federal, state, and local environmental regulations. Proper employee training, protective equipment, use and use monitoring, and internal assessments would be conducted throughout the project. The other three work locations (UCI, MIT and Questek Innovations) would be limited to modeling and experimental efforts and would not utilize or produce hazardous materials in association with this award.

There are no emissions expected as a result of the wire arc additive manufacturing or during cold spray activities. The chambers where these activities would occur are enclosed and pollutants would not be emitted into the ambient air. Any metallographic etching would be completed in a fume hood and would not be released into the ambient air. There are no emissions expected as a result of computational alloy design and modeling of thermal management analyses work.

All project work would be performed at laboratory facilities at Solvus Global, with no modification of the existing facilities, ground disturbances, changes in use of facilities or outdoor equipment installations. No additional permits, licenses, or authorizations would be required. DOE does not anticipate any impacts to resources of concern due to the proposed award activities.

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:

Advanced Materials and Manufacturing Technologies Office
NEPA review completed by Chris Akios, 06/10/2024

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: 6/18/2024

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: _____