

PMC-ND

(1.08.09.13)

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

**RECIPIENT:** Robocasting Enterprises**STATE:** NM

PROJECT TITLE: Reducing the Cost of CMC Fabrication via Continuous Fiber Additive Manufacturing and Advanced PIP

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0002252	DE-EE0009405	GFO-0009405-001	GO9405

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.)
- B1.31 Installation or relocation of machinery and equipment** Installation or relocation and operation of machinery and equipment (including, but not limited to, laboratory equipment, electronic hardware, manufacturing machinery, maintenance equipment, and health and safety equipment), provided that uses of the installed or relocated items are consistent with the general missions of the receiving structure. Covered actions include modifications to an existing building, within or contiguous to a previously disturbed or developed area, that are necessary for equipment installation and relocation. Such modifications would not appreciably increase the footprint or height of the existing building or have the potential to cause significant changes to the type and magnitude of environmental impacts.
- 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 Robocasting Enterprises to develop a novel additive manufacturing process for fiber-reinforced ceramic matrix composite (CMC) synthesis. Robocasting Enterprises would seek to optimize and automate steps in the manufacturing process that typically result in increased costs and processing times when production is performed using current technologies. For the project, an automated prototype additive manufacturing printer would be designed and fabricated, then used for process verification testing. The project would be completed over three Budget Periods, with a Go/No-Go Decision Point in between each BP. This review is applicable to all three BPs.

Proposed project activities would consist of conceptual design work, computer modeling, data analysis, equipment fabrication/modification, control software development, material synthesis and characterization (e.g., precursor polymers, catalysts, ceramics), and CMC processing (e.g., thermal densification, polymer infiltration and pyrolysis). Equipment fabrication/modification would consist of the retrofitting of an existing additive manufacturing printer (4 ft x 4 ft area footprint) with a new dispensing head, tow feed motors, sensors, and relays. Electrical wiring would also be modified in the printer to accommodate the new components. All components to be integrated into the printer would be manufactured by Robocasting Enterprises. Once assembled, the printer would be used for CMC synthesis to test its operational capabilities. Various test samples measuring approximately 50 x 50 x 5 mm and 200 x 75 x 10 mm would be synthesized as part of testing.

All project work would be coordinated by Robocasting Enterprises. Robocasting Enterprises would perform computer modeling, equipment modification, software development, additive manufacturing and thermal densification at its manufacturing facility in Albuquerque, NM. Polymer infiltration and pyrolysis development and material characterization would be performed by Oak Ridge National Laboratory (ORNL) at its facility in Oak Ridge, TN.

CMC processing at Robocasting Enterprises would utilize a 10W laser system, which would be installed at the facility for the purpose of this project. A dedicated space would be set up at Robocasting Enterprises for the installation of the system. Very minor facility modifications would be made to accommodate the installation of the system. These would consist of the installation of a "laser in use" sign, which would be activated by the system when operated, and the installation of an inside lock on the door of the room, to prevent unauthorized entry while the system is being operated. No other physical modifications to existing facilities, ground disturbance, or changes to the use, mission, or operation of existing facilities, for either Robocasting Enterprises or ORNL, would be required. No additional permits or authorizations would be required.

Project work would involve the use and handling of chemicals, solvents, nano-scale ceramic powders, and powered equipment utilizing laser lights. All such handling would be performed in controlled laboratory and manufacturing environments where additive manufacturing and associated processes are routinely performed. Potential hazards would be mitigated through adherence to established institutional health and safety policies and procedures. Fume hoods would be utilized to mitigate potential inhalation risks presented by the use of nano-scale powders. Robocasting Enterprises and ORNL would observe all applicable Federal, state, and local health, safety, and environmental regulations.

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 Manufacturing Office

This NEPA determination does not require a tailored NEPA Provision.

NEPA review completed by Jonathan Hartman, 05/18/2021

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:



Casey Strickland

NEPA Compliance Officer

Date:

5/20/2021

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: _____