PMC-ND
(1.08.09.13)

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

RECIPIENT: Northrop Grumman Aeronautics Systems, Aerospace Structures Business Unit (ASBU) **STATE:** UT

PROJECT TITLE: Automated Manufacturing of High Throughput and Low Cost Ceramic Matrix Composites

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0002252	DE-EE0009406	GFO-0009406-001	GO9406

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 Northrop Grumman Aeronautics Systems, Aerospace Structures Business Unit (Northrop Grumman) to develop a novel process for the synthesis of ceramic matrix composite (CMC) materials for aircraft manufacturing applications. As part of the project, Northrop Grumman would optimize an automated CMC synthesis process and verify use cases through the fabrication of component test articles. The project would be completed over two Budget Periods (BPs), with a Go/No-Go Decision Point in between each BP.

Proposed project activities would include conceptual design work, test sample synthesis, component fabrication, material characterization, performance testing, and computer modeling. Test sample synthesis would consist of the in-factory production of CMC sample coupons and small-scale CMC test panels (i.e., approximately 2-ft by 2-ft and 1-ft by 1-ft). Component fabrication would consist of the in-factory fabrication of three production-quality aircraft turbofan engine components to demonstrate use-cases for the synthesis process developed. Tools for component fabrication would be produced in-factory via additive manufacturing processes. All component fabrication would be performed utilizing industry standard machining processes.

All project activities would be coordinated by Northrop Grumman. Northrop Grumman would perform conceptual design work, computer modeling, material characterization, component fabrication, and performance testing at its manufacturing/laboratory facilities in Clearfield, UT, Beavercreek, OH, Redondo Beach, CA, and El Segundo, CA. Material synthesis would be performed at laboratory scale, with approximately 200 lbs. of CMC materials used as inputs. Environmental testing of the fabricated components would be performed at the Air Force Research Lab test facility located at Wright-Patterson Air Force Base near Dayton, OH. Environmental testing would include assessments in vibration, acoustic, and thermal environments. Mechanical properties testing would be performed by project partner Element Materials Technology, at its facility in Duarte, CA. COI Ceramics would perform sintering of test articles at its production facility in Salt Lake City, UT. Existing equipment at Northrop Grumman's facilities would be modified and calibrated to handle CMC material inputs. However, no physical modifications to existing facilities, ground disturbance, or changes to the use, mission, or operation of existing facilities operated by Northrop Grumman or its project partners would be required. No additional permits or authorizations would be required.

Project work would involve the use and handling of chemicals, solvents, and powered equipment operating at high

temperatures. All such handling would be performed in controlled laboratory and manufacturing environments that routinely work with these materials as part of their regular course of business. Northrup Grumman regularly manufactures aerospace equipment at the facilities where fabrication would be performed. Potential hazards would be mitigated through adherence to established institutional health and safety policies and procedures. Protocols would include personnel training, the use of personal protective equipment, adherence to chemical hygiene plans, and engineering controls. Chemicals would be stored in appropriate containment areas (e.g., flammable cabinets). All waste materials would be handled and disposed of in accordance with institutional waste management protocols. Northrop Grumman and its project partners 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, 04/26/2021

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: Electronically Signed By: Casey Strickland Date: 4/28/2021

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