PMC-ND
(1.08.09.13)

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

RECIPIENT: Spirit AeroSystems Inc. **STATE:** KS

PROJECT TITLE: Continuous Fiber Silicon Carbide Ceramic Composite Manufacturing: A low cost polymer infiltration process, evaluation, and industrialization

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0002252	DE-EE0009408	GFO-0009408-001	

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.
B3.15 Small-scale indoor research and development projects using nanoscale materials	Siting, construction, modification, operation, and decommissioning of facilities for indoor small-scale research and development projects and small-scale pilot projects using nanoscale materials in accordance with applicable requirements (such as engineering, worker safety, procedural, and administrative regulations) necessary to ensure the containment of any hazardous materials. Construction and modification activities would be within or contiguous to a previously disturbed or developed area (where active utilities and currently used roads are readily accessible).

Rationale for determination:

The U.S. Department of Energy (DOE) is proposing to provide federal funding to Spirit AeroSystems, Inc. (Spirit) to reduce the cost of silicon carbide (SiC) ceramic matrix composites (CMCs) for high temperature applications by optimizing polymer infiltration and pyrolysis (PIP) processing. The project would be completed over three Budget Periods (BPs). This NEPA Determination is applicable to all three BPs.

Proposed project activities involve development and testing of a low-cost boron nitride (BN) paint system for SiC coating, improved SiC PIP densification process and testing on a thin and thick 2D layup, and validation of the low cost coating densification process on 3D prefroms. ZYP Coatings Inc. (Oak Ridge, TN) would develop the BN paint system and Starfire Systems Inc. (Glenville, NY) would provide SiC nanoparticle slurries. Manufacturing of lab scale coating equipment, demonstration of interface coating on 2D and 3D SiC preforms, and performance of low-cost infusion using an optimized PIP densification process on 2D preforms would be carried out at Spirit AeroSystems Inc. (Wichita, KS). Baseline SiC densification would be carried out by Oak Ridge National laboratory (Oak Ridge, TN). Fiber Materials Inc. (Biddeford, ME) would improve PIP infiltration efficiency improvement by using nanoparticle slurries and process optimization using 2D preforms and would also develop a 3D SiC preform billet. Material testing (density, porosity, thermal conductivity, flexural strength) would be carried out by National Institute for Aviation Research (Wichita, KS). 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.

Project activities would occur within existing facilities where no modifications or upgrades would be needed; therefore, no new permits, additional licenses and/or authorizations would be necessary. All facilities are approved for the work planned and have existing infrastructure and control requirements to meet all Federal, state, and local requirements for the proposed work. No ground disturbing activities, no changes in the operation of existing facilities, and no

installation of equipment outdoors would occur for project activities. Project work would involve the use and handling of various hazardous materials including industrial solvents. All such handling would be performed in controlled manufacturing and R&D facilities. In order to mitigate potential risks, Spirit and its project partners would adhere to established institutional health and safety policies and procedures and would implement additional policies and procedures as necessary as new health and safety risks are identified. Work at Starfire Systems Inc. would include the handling of nanoparticles which could pose an inhalation risk. These materials would be handled with appropriate personal protective equipment within closed facilities. All waste materials generated by the project would be disposed per state and federal requirements. Spirit and its project partners would observe all applicable Federal, state, and local health, safety, and environmental regulations. DOE does not anticipate any impacts to resources of concern due to the proposed activities of the project.

NEPA PROVISION

DOE has made a final NEPA determination.

Notes:

Advanced Manufacturing Office
This NEPA determination does not require a tailored NEPA provision.

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: 4/16/2021
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