

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



RECIPIENT: Free Form Fibers, LLC

STATE: NY

PROJECT TITLE : A new approach to manufacturing high purity, low environmental impact silicon carbide feedstock for high power semiconductor chip technology

Notice of Funding Opportunity Number
DE-FOA-0003155

Procurement Instrument Number
DE-EE0011723

NEPA Control Number
GFO-0011723-001

CID Number

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 federal funding to Free Form Fibers, LLC (FFF) to develop and test a new approach to manufacturing high purity, low environmental impact silicon carbide feedstock for high power semiconductor chip technology.

The design, construction and operation of a laser-driven chemical vapor deposition production tool and the synthesis of material for semiconductor analysis would occur at FFF headquarters and manufacturing facility in Saratoga Springs, NY. Processing of silicon carbide powder raw material into silicon carbide boule samples would occur at Pennsylvania State University's Millenium Science Complex in University Park, PA. Experimental evaluation of laser chemical vapor deposition (LCVD) process conditions using in-house LCVD systems and in-situ performance testing equipment would occur at Stony Brook University's Advanced Energy Research and Technology Center in Stony Brook, NY. Life cycle analysis computer modeling of the LCVD manufacturing process would occur at Argonne National Laboratory in Lemont, IL.

The proposed project would include the use of silane, a pyrophoric precursor gas material in producing the silicon carbide feedstock material. Established and vetted safety equipment and processes for working with silane would be implemented for this aspect of the project. The safety systems in place include the use of gas cabinets for storage and delivery of the precursor, gas detection monitors that can sense silane at the parts per billion level, and automatic system shut-off controls that activate upon silane detection. An external environmental health and safety consulting firm would provide external health and safety monitoring to ensure appropriate safety systems and protocols are used. Hazardous materials would be managed in accordance with federal, state, and local environmental regulations and all existing environmental, health, and safety policies and procedures that would be followed, including employee training, proper protective equipment, engineering controls, monitoring, and internal assessments. Additional policies

and procedures would be implemented as necessary as new health and safety risks are identified.

The project-dedicated production tool would be installed in the already established manufacturing space at FFF's headquarters in Saratoga Springs, NY. At Stony Brook University, the process optimization studies would be performed in already established and operational laboratory facilities. At Pennsylvania State University, the silicon carbide boule production efforts would be accomplished with equipment and facilities already in-use on campus. At Argonne National Laboratory, the efforts would be performed on computer resources that are already established on the lab site. None of the award activities occurring at any of the facilities would require new permits, licenses, or authorizations.

DOE has considered the scale, duration, and nature of proposed activities to determine potential impacts on resources, including those of an ecological, historical, cultural, and socioeconomic nature. DOE does not anticipate impacts on these resources that would be considered significant or require DOE to consult with other agencies or stakeholders.

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.

EERE is aware of the November 12, 2024, decision of *Marin Audubon Society v. FAA*, No. 23-1067 (D.C. Cir. Nov. 12, 2024). To the extent that a court may conclude that the Council on Environmental Quality (CEQ) regulations implementing NEPA are not judicially enforceable or binding on this agency action, EERE has nonetheless elected to follow those regulations at 40 C.F.R. Parts 1500-1508, in addition to DOE's procedures/regulations implementing NEPA at 10 C.F.R. Part 1021, to meet the agency's obligations under NEPA, 42 U.S.C. §§ 4321 et seq.

NEPA PROVISION

DOE has made a final NEPA determination.

Notes:

Advanced Materials and Manufacturing Technologies Office
NEPA review completed by Chris Akios, 02/04/2025

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: 3/10/2025

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: _____