U.S. Department of Energy
Categorical Exclusion Determination Form

Submit by E-mail

Proposed Action Title: RTX Technology Research Center -- Multi-Material Topology Optimization for High Performance Heat Exchangers

Program or Field Office: Advanced Research Projects Agency - Energy

Location(s) (City/County/State): East Hartford and Windsor Locks, Connecticut

Proposed Action Description:

Funding will support the project team's small-scale research and development to scale a multi-material and multi-physics topology optimization design framework to efficiently develop high temperature (capable of operations up to 800°C) and pressure (up to 25 megapascal) heat exchangers (HX) with superior power density and structural durability, which was originally developed under the TINA-TOPOLOGY FOA. Specifically, the project team will (1) develop, test, and validate material enhancements to meet fatigue requirements in the HX design; (2) produce larger scale HX components to validate repeatability of the manufacturing process; and (3) test and validate final HX design in a relevant environment. If successful, this project would enable power generation systems for hybrid aviation and ground power systems that can reduce energy consumption by more than one quad per year (293 billion kilowatt-hours), thereby reducing greenhouse gas emissions.

Project activities will be conducted at existing facilities at RTX Technology Research Center (East Hartford, CT) and Hamilton Sundstrand Corporation (part of Collins Aerospace) (Windsor Locks, CT) designed for the applicable activities. This project fits within the class of actions identified under the DOE Categorical Exclusions identified below. This assessment was based on a review of the proposed scope of work and the potential environmental impacts of the project. The project team has certified that project tasks will be conducted in accordance with established safety and materials/waste management protocols and pursuant to applicable Federal, State, and local regulatory requirements.

Categorical Exclusion(s) Applied:

A9 - Information gathering, analysis, and dissemination

B3.6 - Small-scale research and development, laboratory operations, and pilot projects

For the complete DOE National Environmental Policy Act regulations regarding categorical exclusions, including the full text of each categorical exclusion, see Subpart D of 10 CFR Part 1021.

Regulatory Requirements in 10 CFR 1021.410(b): (See full text in regulation)

☑ The proposal 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 proposal that may affect the significance of the environmental effects of the proposal.

☑ The proposal 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.

Based on my review of the proposed action, as NEPA Compliance Officer (as authorized under DOE Order 451.1B), I have determined that the proposed action fits within the specified class(es) of action, the other regulatory requirements set forth above are met, and the proposed action is hereby categorically excluded from further NEPA review.

NEPA Compliance Officer: GEOFFREY GOODE Digitally signed by GEOFFREY GOODE Date: 2024.09.10 14:04:48 -04'00' Date Determined:

(This form will be locked for editing upon signature)