



U.S. Department of Energy

Categorical Exclusion Determination Form

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Proposed Action Title: University of Texas, Austin - Nanotechnology Enabled Transformer Life Extension

Program or Field Office: Advanced Research Projects Agency - Energy

Location(s) (City/County/State): Austin, Texas; College Park, Maryland; Madison, Wisconsin

Proposed Action Description:

AMENDED NEPA DETERMINATION: (See attached original Determination, dated January 19, 2021),

This Amended Determination follows the approval of additional funds to support the project team's small-scale, research and development activities to include additional development and testing of nano-paper for use in insulation of large power transformers (LPT) in order to increase the service life, reliability, efficiency and survivability of LPTs used in the power grid. Specifically, the project team will continue the development of the nanopaper to meet technical requirements and expand testing procedures to ensure the product supports enhanced transformer life. If successful, the technology will reduce cost, increase reliability of grid-supplied electricity, and double the median lifetime of a large power transformer from 40 years to 80 years.

Project activities will be conducted at existing facilities at University of Texas, Austin (Austin, TX), University of Maryland (College Park, MD), and U.S. Department of Agriculture (Madison, WI). Project tasks continue to fit within the class of actions identified under the DOE Categorical Exclusion identified below and do not involve any extraordinary circumstances that may affect the significance of the environmental effects of the project. This assessment was based on a review of the proposed scope of work and the potential environmental impact of the project. 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:

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

A9 - Information gathering, analysis, and dissemination

B3.15 - Small-scale indoor research and development projects using nanoscale materials

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: 2022.07.20 15:51:12 -04'00'

Date Determined:



U.S. Department of Energy

Categorical Exclusion Determination Form

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Proposed Action Title: Solicitation on Topics Informing New Program Areas Funding Opportunity Announcement (FOA), Topic L "Insulating Nanofluids and Solids to Upgrade our Large Aging Transformer Equipment" (INSULATE & INSULATE SBIR/STTR) (FOA Nos. DE-FOA-0001953 & DE-FOA-0001954) Programs

Program or Field Office: Advanced Research Projects Agency - Energy (ARPA-E)

Location(s) (City/County/State): MD; NY; TX; WI

Proposed Action Description:

The INSULATE Program seeks to support the development of technologies to advance the performance of transformer insulation and/or cooling components in order to increase the service life, reliability, efficiency, and survivability of Large Power Transformers (LPT) used on the power grid. In particular, INSULATE technologies aim to increase the life expectancy of LPTs by exploring solutions in (1) high-performance solid insulation materials; (2) advanced insulating fluids with improved dielectric strength, thermal conductivity, and ageing performance; and (3) kraft paper rejuvenating additives. If successful, INSULATE technologies will increase the transformer median service lifetime from a few decades to approximately 80 years and meet or exceed energy conservation regulatory standards.

The INSULATE Program is composed of 3 small-scale research and development projects that will be conducted by universities, non-profit entities, for-profit entities, and federal laboratories. This Determination covers 2 of the 3 projects (listed in Attachment A). These 2 projects fit within the class of actions identified under the DOE Categorical Exclusion identified below and do not involve any extraordinary circumstances that may affect the significance of the environmental effects of the projects. This assessment was based on a review of the proposed scope of work and the potential environmental impacts of each project. All 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

B3.15 - Small-scale indoor research and development projects using nanoscale materials

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: 2021.01.19 11:57:04 -05'00'

Date Determined:

Attachment A: Projects in the Solicitation on Topics Informing New Program Areas Funding Opportunity Announcement (FOA), Topic L "Insulating Nanofluids and Solids to Upgrade our Large Aging Transformer Equipment" (FOA Nos. DE-FOA-0001953 & DE-FOA-0001954) Programs

Control Number	Lead Organization	Project Title	Categorical Exclusion
1953-1744	GE Research	Ultra-high Performance nano-Liquid Insulation for upgrading Large Power Transformers (UPLIFT)	A9; B3.6; B3.15
1953-1836	University of Texas at Austin	Nanotechnology-Enabled Transformer Life Extension	A9; B3.6; B3.15