



U.S. Department of Energy

Categorical Exclusion Determination Form

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Proposed Action Title: Stony Brook University - ENHANCED Shield: A Critical Materials Technology Enabling Compact Superconducting Tokamaks

Program or Field Office: Advanced Research Projects Agency - Energy

Location(s) (City/County/State): Cambridge, Massachusetts; Stony Brook, New York; Knoxville, Tennessee

Proposed Action Description:

SECOND AMENDED NEPA DETERMINATION: (See attached original Determination, dated October, 27 2020 and first Amended Determination dated January 19, 2021). This Amended Determination follows the approval of additional funds and period of performance to support the project team's small-scale, research and development activities of radiation shielding materials for use in compact fusion devices. Specifically, the project team will conduct additional material analysis and testing of composite shield materials for high-temperature superconductor (HTS) magnets. If successful, this project could facilitate safe, large-scale fusion power plants, reducing the combustion of fossil fuels and greenhouse gas emissions.

Project activities will be conducted at existing facilities at Stony Brook University (Stony Brook, NY), Massachusetts Institute of Technology (Cambridge, MA), and University of Tennessee, Knoxville (Knoxville, TN). 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. No modifications will be made to the existing facilities to accommodate the proposed work.

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: 2023.12.07 14:26:42 -05'00'

Date Determined:



U.S. Department of Energy Categorical Exclusion Determination Form

Submit by E-mail

Proposed Action Title: Galvanizing Advances in Market-aligned fusion for an Overabundance of Watts (GAMOW) (FOA No. DE-FOA-0002)
Program

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

Location(s) (City/County/State): CA; CO; IA; ID; MA; MI; NC; NY; PA; SC; TN; WA

Proposed Action Description:

The GAMOW Program seeks to develop fusion-specific technologies necessary to connect a net-energy-gain "fusion core," once it is ready, to a deployable, commercially attractive fusion system. GAMOW teams will address one or more research and development (R&D) categories, including (1) technologies, materials, and superconducting-magnet and fuel-cycle subsystems between the fusion plasma and balance of plant, (2) cost-effective, high-efficiency, high-duty-cycle, electrical-driver technologies, and (3) cross-cutting areas such as novel fusion materials and advanced and additive manufacturing for fusion-relevant materials, components, and their cost-effective scale-up. If successful, GAMOW teams will develop enabling fusion materials and subsystem technologies, with a focus on the timely future commercialization and deployment of fusion energy generation

The GAMOW Program is composed of 14 small-scale research and development projects that will be conducted by universities, non-profit entities, for-profit entities, and federal laboratories. This Determination covers 7 of the 14 projects (listed in Attachment A). All 7 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: 2020.10.27 04:50:52 -04'00'

Date Determined:



U.S. Department of Energy

Categorical Exclusion Determination Form

Submit by E-mail

Proposed Action Title: Galvanizing Advances in Market-aligned fusion for an Overabundance of Watts (GAMOW) (FOA No. DE-FOA-0002) Program

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

Location(s) (City/County/State): CA; CO; IA; ID; MA; MI; NC; NJ; NY; PA; SC; TN; TX; WA; WI

Proposed Action Description:

AMENDED NEPA DETERMINATION (See the attached original Programmatic Determination, dated October 27, 2020)
This Amended Determination follows ARPA-E's receipt of required information and certifications from seven (7) Prime Recipients (See Attachment A, in bold) that were not covered under the original Determination. These projects fit within the class of actions identified under the DOE Categorical Exclusion(s) 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 projects. 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.

The GAMOW Program is composed of 14 small-scale research and development projects that will be conducted by universities, non-profit entities, for-profit entities, and federal laboratories. This Amended Determination and the original Programmatic Determination, cover all 14 projects (listed in Attachment A). All 14 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.

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 12:41:14 -05'00'

Date Determined:

Attachment A: Projects in the Galvanizing Advances in Market-aligned Fusion for an Overabundance of Watts (GAMOW): Enabling Technologies for Commercially Attractive Fusion Energy (FOA No. DE-FOA-0002288) Program

Control Number	Lead Organization	Project Title	Categorical Exclusion
2288-1503	Colorado School of Mines	Interfacial-Engineered Membranes for Efficient Tritium Extraction	A9; B3.6
2288-1507	Oak Ridge National Laboratory	Fusion Energy Reactor Models Integrator (FERMI)	A9
2288-1509	Oak Ridge National Laboratory	Plasma Facing Component Innovations by Advanced Manufacturing and Design	A9; B3.6
2288-1517	Oak Ridge National Laboratory	Advance Castable Nanostructured Alloys for First-Wall/Blanket Applications	B3.6
2288-1520	Princeton Fusion Systems	WIDE BAND GAP SEMICONDUCTOR AMPLIFIERS FOR PLASMA HEATING AND CONTROL}	A9; B3.6
2288-1524	University of California: San Diego	Renewable low-Z wall for fusion reactors with built-in tritium recovery	A9; B3.6
2288-1526	University of Houston	Advanced HTS Conductors Customized for Fusion	A9; B3.6
2288-1547	Savannah River National Laboratory	Dirrect LiT Electrolysis Process Modeling & Scale up	A9; B3.6
2288-1554	Savannah River National Laboratory	EM-ENHANCED HyPOR LOOP FOR FAST FUSION FUEL CYCLES	A9; B3.6; B3.15
2288-1568	Phoenix LLC	ULTRA HIGH FLUX DT NEUTRON SOURCE FOR ACCELERATED TESTING OF FUSION MATERIALS AND SUBSYSTEMS TO REACTOR-RELEVANT DPA LEVELS	A9; B3.6
2288-1580	University of California: Los Angeles	AMPERE - Advanced Materials for Plasma-Exposed Robust Electrodes	A9; B3.6
2288-1585	Pacific Northwest National Laboratory	Microstructure Optimization and Novel Processing Development of ODS Steels for Fusion Environments (MONDO-FE)	B3.6
2288-1590	Bridge 12 Technologies, Inc.	High Efficiency, Megawatt Class Gyrotrons for Instability Control of Burning Plasma Machines	A9; B3.6
2288-1615	Stony Brook University	ENHANCED Shield: A Critical Materials Technology Enabling Compact Superconducting Tokamaks	B3.6