



U.S. Department of Energy

Categorical Exclusion Determination Form

Proposed Action Title:

Program or Field Office:

Location(s) (City/County/State):

Proposed Action Description:

Categorical Exclusion(s) Applied:

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:

Date Determined:

**Attachment A: Projects in the ULTRAFast (FOA Nos. DE-FOA-0002998 and DE-FOA-0002999)
Program**

Prime Recipient (Control No.)	Project Title	Categorical Exclusion
SUNY-University at Buffalo (2998-1535)	Optically Cascoded Ultrahigh Voltage Gallium Oxide Devices for Modular Multi-Converter	A9, B3.6
Great Lakes Crystal Technologies (2999-1513)	High Power Diamond Transistors with Electrical and Optical Gate Control	A9, B3.6
University of Tennessee, Knoxville (2998-1518)	A UNIVERSAL (Ultrafast, Noise-Immune, Versatile, Efficient, Reliable, Scalable, and Accurate Light-Controlled) Switch Module	A9, B3.6
University of Illinois at Urbana-Champaign (2998-1549)	Diamond PCSS: DIAMOND PhotoConductive Semiconductor Switches	A9, B3.6
RTX Technology Research Center (2998-1509)	TRIGGER: Timed RF Integrated Gating for Energy Regulation	A9, B3.6
University of Pennsylvania (2998-1513)	All-Optical Control of Isolated High Voltage Power Systems Using Integrated Electronic, Photonic, and Microfabricated Sensing and Breaker Technology	A9, B3.6
University of Arkansas (2998-1526)	Heterogeneously Integrated Power Modules	A9, B3.6
Georgia Institute of Technology (2998-1561)	Scalable Wide-Bandgap III-Nitride Switch (SWiNS)	A9, B3.6
GaNify LLC (2999-1511)	Medium-Voltage Optoelectronic Power IC Building Block	A9, B3.6
Lawrence Livermore National Laboratory (2998-1521)	Diamond Optically Gated Junction Field Effect Transistor	A9, B3.6
University of California, Santa Barbara (2998-1538)	Optically Controlled 20 kV Gallium Oxide Power Switches for Grid Resiliency	A9, B3.6
University of Wisconsin – Madison (2998-1544)	Optically Triggered Ultrawide-Bandgap (UWBG) Power Electronics	A9, B3.6

**Attachment A: Projects in the ULTRAFast (FOA Nos. DE-FOA-0002998 and DE-FOA-0002999)
Program**

Prime Recipient (Control No.)	Project Title	Categorical Exclusion
Texas Tech University (2998-1514)	Ultrawide-Bandgap Semiconductors for Extrinsic Photoconductive Switching Devices	A9, B3.6
Sandia National Laboratories (2998-1505)	E1-Arrester for Improved EMP Protection	A9, B3.6, B3.15
Opcondys, Inc. (2999-1503)	Ultrafast, Autonomous Grid Protection Using Linear Photonic Switching	A9, B3.6

Bold text indicates the 1 project included in the Third Amended CX.



U.S. Department of Energy

Categorical Exclusion Determination Form

Submit by E-mail

Proposed Action Title: Unlocking Lasting Transformative Resiliency Advances by Faster Actuation of power Semiconductor Technologies Program -- ULTRAFast and ULTRAFast SBIR/STTR (FOA Nos. DE-FOA-0002998 and DE-FOA-0002999)

Program or Field Office: Advanced Research Projects Agency - Energy

Location(s) (City/County/State): AR, CA, CO, CT, GA, IL, MI, NC, NM, NY, OH, PA, SC, TN, TX, VA, WA, WI

Proposed Action Description:

SECOND AMENDED PROGRAMMATIC NEPA DETERMINATION (See attached original and First Programmatic Determinations, dated January 17, 2024 and February 21, 2024). The Unlocking Lasting Transformative Resiliency Advances by Faster Actuation of power Semiconductor Technologies (ULTRAFast) program seeks to develop next-generation ultra-fast power semiconductors for advanced system-level power electronics converters. Specifically, ULTRAFast projects will create faster-switching, higher-rated device and power module technologies that enable realization of transformative power management, protection, and control not only for the grid, but also for future green autonomous power distribution systems such as those for electric vehicles and all-electric aviation. If successful, the ULTRAFast program will provide power electronics technology innovations that will enable a more secure and reliable grid, while also allowing it to meet higher demands for electricity in pursuit of decarbonization goals and greenhouse gas emission reductions.

The ULTRAFast program is composed of 15 small-scale research and development projects that will be conducted by universities, non-profit and for-profit entities, small businesses, and federal laboratories. This Second Amended Determination covers 3 of the 15 projects (listed in Attachment A). These projects fit 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 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: 2024.04.19 13:35:30 -04'00'

Date Determined:

**Attachment A: Projects in the ULTRAFast (FOA Nos. DE-FOA-0002998 and DE-FOA-0002999)
Program**

Prime Recipient (Control No.)	Project Title	Categorical Exclusion
Great Lakes Crystal Technologies (2999-1513)	High Power Diamond Transistors with Electrical and Optical Gate Control	A9, B3.6
University of Tennessee, Knoxville (2998-1518)	A UNIVERSAL (Ultrafast, Noise-Immune, Versatile, Efficient, Reliable, Scalable, and Accurate Light-Controlled) Switch Module	A9, B3.6
University of Illinois at Urbana-Champaign (2998-1549)	Diamond PCSS: DIAMOND PhotoConductive Semiconductor Switches	A9, B3.6
RTX Technology Research Center (2998-1509)	TRIGGER: Timed RF Integrated Gating for Energy Regulation	A9, B3.6
University of Pennsylvania (2998-1513)	All-Optical Control of Isolated High Voltage Power Systems Using Integrated Electronic, Photonic, and Microfabricated Sensing and Breaker Technology	A9, B3.6
University of Arkansas (2998-1526)	Heterogeneously Integrated Power Modules	A9, B3.6
Georgia Institute of Technology (2998-1561)	Scalable Wide-Bandgap III-Nitride Switch (SWiNS)	A9, B3.6
GaNify LLC (2999-1511)	Medium-Voltage Optoelectronic Power IC Building Block	A9, B3.6
Lawrence Livermore National Laboratory (2998-1521)	Diamond Optically Gated Junction Field Effect Transistor	A9, B3.6
University of California, Santa Barbara (2998-1538)	Optically Controlled 20 kV Gallium Oxide Power Switches for Grid Resiliency	A9, B3.6
University of Wisconsin – Madison (2998-1544)	Optically Triggered Ultrawide-Bandgap (UWBG) Power Electronics	A9, B3.6
Texas Tech University (2998-1514)	Ultrawide-Bandgap Semiconductors for Extrinsic Photoconductive Switching Devices	A9, B3.6

**Attachment A: Projects in the ULTRAFast (FOA Nos. DE-FOA-0002998 and DE-FOA-0002999)
Program**

Prime Recipient (Control No.)	Project Title	Categorical Exclusion
Sandia National Laboratories (2998-1505)	E1-Arrester for Improved EMP Protection	A9, B3.6, B3.15
Opcondys, Inc. (2999-1503)	Ultrafast, Autonomous Grid Protection Using Linear Photonic Switching	A9, B3.6

Bold text indicates the 3 projects included in the Second Amended CX.



U.S. Department of Energy

Categorical Exclusion Determination Form

Submit by E-mail

Proposed Action Title: Unlocking Lasting Transformative Resiliency Advances by Faster Actuation of power Semiconductor Technologies Program -- ULTRAFast and ULTRAFast SBIR/STTR (FOA Nos. DE-FOA-0002998 and DE-FOA-0002999)

Program or Field Office: Advanced Research Projects Agency - Energy

Location(s) (City/County/State): AR, CA, CO, CT, GA, IL, NC, NM, NY, OH, PA, SC, TN, TX, VA, WI

Proposed Action Description:

FIRST AMENDED PROGRAMMATIC NEPA DETERMINATION (See attached original Programmatic Determination, dated January 17, 2024). The Unlocking Lasting Transformative Resiliency Advances by Faster Actuation of power Semiconductor Technologies (ULTRAFast) program seeks to develop next-generation ultra-fast power semiconductors for advanced system-level power electronics converters. Specifically, ULTRAFast projects will create faster-switching, higher-rated device and power module technologies that enable realization of transformative power management, protection, and control not only for the grid, but also for future green autonomous power distribution systems such as those for electric vehicles and all-electric aviation. If successful, the ULTRAFast program will provide power electronics technology innovations that will enable a more secure and reliable grid, while also allowing it to meet higher demands for electricity in pursuit of decarbonization goals and greenhouse gas emission reductions.

The ULTRAFast program is composed of 15 small-scale research and development projects that will be conducted by universities, non-profit and for-profit entities, small businesses, and federal laboratories. This First Amended Determination covers 9 of the 15 projects (listed in Attachment A). These projects fit 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 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: 2024.02.21 09:51:42 -05'00'

Date Determined:

**Attachment A: Projects in the ULTRAFast (FOA Nos. DE-FOA-0002998 and DE-FOA-0002999)
Program**

Prime Recipient (Control No.)	Project Title	Categorical Exclusion
RTX Technology Research Center (2998-1509)	TRIGGER: Timed RF Integrated Gating for Energy Regulation	A9, B3.6
University of Pennsylvania (2998-1513)	All-Optical Control of Isolated High Voltage Power Systems Using Integrated Electronic, Photonic, and Microfabricated Sensing and Breaker Technology	A9, B3.6
University of Arkansas (2998-1526)	Heterogeneously Integrated Power Modules	A9, B3.6
Georgia Institute of Technology (2998-1561)	Scalable Wide-Bandgap III-Nitride Switch (SWiNS)	A9, B3.6
GaNify LLC (2999-1511)	Medium-Voltage Optoelectronic Power IC Building Block	A9, B3.6
Lawrence Livermore National Laboratory (2998-1521)	Diamond Optically Gated Junction Field Effect Transistor	A9, B3.6
University of California, Santa Barbara (2998-1538)	Optically Controlled 20 kV Gallium Oxide Power Switches for Grid Resiliency	A9, B3.6
University of Wisconsin – Madison (2998-1544)	Optically Triggered Ultrawide-Bandgap (UWBG) Power Electronics	A9, B3.6
Texas Tech University (2998-1514)	Ultrawide-Bandgap Semiconductors for Extrinsic Photoconductive Switching Devices	A9, B3.6
Sandia National Laboratories (2998-1505)	E1-Arrester for Improved EMP Protection	A9, B3.6, B3.15
Opcondys, Inc. (2999-1503)	Ultrafast, Autonomous Grid Protection Using Linear Photonic Switching	A9, B3.6

Bold text indicates the 9 projects included in the First Amended CX.



U.S. Department of Energy

Categorical Exclusion Determination Form

Submit by E-mail

Proposed Action Title: Unlocking Lasting Transformative Resiliency Advances by Faster Actuation of power Semiconductor Technologies Program -- ULTRAFAST and ULTRAFAST SBIR/STTR (FOA Nos. DE-FOA-0002998 and DE-FOA-0002999)

Program or Field Office: Advanced Research Projects Agency - Energy

Location(s) (City/County/State): CA, GA, IL, NM, NY, VA

Proposed Action Description:

The Unlocking Lasting Transformative Resiliency Advances by Faster Actuation of power Semiconductor Technologies (ULTRAFAST) program seeks to develop next-generation ultra-fast power semiconductors for advanced system-level power electronics converters. Specifically, ULTRAFAST projects will create faster-switching, higher-rated device and power module technologies that enable realization of transformative power management, protection, and control not only for the grid, but also for future green autonomous power distribution systems such as those for electric vehicles and all-electric aviation. If successful, the ULTRAFAST program will provide power electronics technology innovations that will enable a more secure and reliable grid, while also allowing it to meet higher demands for electricity in pursuit of decarbonization goals and greenhouse gas emission reduction.

The ULTRAFAST program is composed of 15 small-scale research and development projects that will be conducted by universities, non-profit and for-profit entities, small businesses, and federal laboratories. This Determination covers 2 of the 15 projects (listed in Attachment A). The 2 projects fit 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 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: 2024.01.16 12:26:47 -05'00'

Date Determined:

**Attachment A: Projects in the ULTRAFast (FOA Nos. DE-FOA-0002998 and DE-FOA-0002999)
Program**

Prime Recipient (Control No.)	Project Title	Categorical Exclusion
Sandia National Laboratories (2998-1505)	E1-Arrester for Improved EMP Protection	A9, B3.6, B3.15
Opcondys, Inc. (2999-1503)	Ultrafast, Autonomous Grid Protection Using Linear Photonic Switching	A9, B3.6