



# U.S. Department of Energy

## Categorical Exclusion Determination Form

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Proposed Action Title:

Program or Field Office:

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

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Proposed Action Description:

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Categorical Exclusion(s) Applied:

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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:



# U.S. Department of Energy

## Categorical Exclusion Determination Form

Submit by E-mail

Proposed Action Title: Generating Electricity Managed by Intelligent Nuclear Assets (GEMINA) (FOA No. DE-FOA-0002174) Program

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

Location(s) (City/County/State): CA; CO; CT; ID; IL; MA; MD; MI; MO; NC; NY; TN; VA; WI

Proposed Action Description:

The GEMINA Program seeks to develop digital twin technology to reduce operations and maintenance (O&M) costs in the next generation of nuclear power plants by 10-times in order to make them more economical, flexible, and efficient. GEMINA teams will lower O&M costs by using diverse technologies such as artificial intelligence, advanced control systems, predictive maintenance, and model-based fault detection. The teams will also develop technologies that can facilitate integration into an electrical grid with a large fraction of intermittent generation resources. If successful, GEMINA teams will develop tools to introduce greater flexibility in reactor systems, increase autonomy in operations, and speed up design iteration, with a goal of reducing costs at advanced reactor power plants.

The GEMINA Program is composed of 9 small-scale research and development projects that will be conducted by universities, non-profit entities, for-profit entities, and federal laboratories. This Determination covers all of the 9 projects (listed in Attachment A). All 9 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: 2020.07.15 04:48:48 -05'00'

Date Determined:

**Attachment A: Projects in the GEMINA (FOA No. DE-FOA-0002174) Program**

<b>Prime Recipient (Control No.)</b>	<b>Project Title</b>	<b>Categorical Exclusion</b>
<b>Argonne National Laboratory (2174-1538)</b>	Maintenance of Advanced Reactor Sensors and Components (MARS)	A9; B3.6
<b>Electric Power Research Institute, Inc. (2174-1529)</b>	Build-to-Replace: A New Paradigm for Reducing Advanced Reactor O&M Costs	A9
<b>X Energy, LLC (2174- 1535)</b>	Advanced Operation & Maintenance Techniques implemented in the Xe-100 Plant Digital Twin to reduce Fixed O&M Cost	A9
<b>GE Research (2174- 1511)</b>	AI Enabled Predictive Maintenance Digital Twins for Advanced Nuclear Reactors	A9
<b>Framatome, Inc. (2174- 1541)</b>	Diagnose Performance and Reliability Problems with Metroscope	A9; B3.6
<b>Massachusetts Institute of Technology (2174-1542)</b>	High Fidelity Digital Twins for BWRX-300 Critical Systems	A9
<b>Moltex Energy USA, LLC (2174-1548)</b>	SSR APPLIED - Automated Power Plants: Intelligent, Efficient, and Digitised	A9; B3.6
<b>University of Michigan (2174-1557)</b>	PROJECT "SAFARI"- SECURE AUTOMATION FOR ADVANCED REACTOR INNOVATION	A9; B3.6
<b>Massachusetts Institute of Technology (2174-1568)</b>	Generation of Critical Irradiation Data to Enable Digital Twinning of Molten-Salt Reactors	A9; B3.6; B3.15