



# U.S. Department of Energy

## Categorical Exclusion Determination Form

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Proposed Action Title: National Renewable Energy Laboratory -- Marine Energy Generation and Load Optimized Design of Novel-turbines (MEGALODON)

Program or Field Office: Advanced Research Projects Agency - Energy

Location(s) (City/County/State): Golden and Fort Collins, Colorado; Champaign, Illinois; Albuquerque, New Mexico

Proposed Action Description:

SECOND AMENDED NEPA DETERMINATION: (See attached original and First Amended Determination dated July 15, 2021 and July 23, 2021 respectively). This Second Amended Determination follows the approval of a new project performer, additional funding, and extended period of performance for new milestones to support the project team's continued small-scale, research and development activities of their hydrokinetic turbine modeling, co-design, and control co-design modeling and analysis tools. Specifically, the project team will expand the modeling tools to encompass additional turbine designs, allowing for greater application among energy generation developers. If successful, the project team will develop open-source, publicly available modeling and analysis tools to aid in improving hydraulic energy performance, reducing the use of fossil fuel and CO2 emissions.

The proposed project activities under this award are limited exclusively to intellectual, academic, or analytical activities. The project team will not conduct physical experiments, prototype fabrication, demonstration projects, or similar activities under this award.

Categorical Exclusion(s) Applied:

A9 - Information gathering, analysis, and dissemination

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: 2023.12.04 12:31:39 -05'00'

Date Determined:



# U.S. Department of Energy Categorical Exclusion Determination Form

Submit by E-mail

Proposed Action Title: Submarine Hydrokinetic and Riverine Kilo-Megawatt Systems SHARKS (FOA No. DE-FOA-0002334) & SHARKS SBIR/STTR (FOA No. DE-FOA-0002335) Programs

Program or Field Office: Advanced Research Projects Agency - Energy

Location(s) (City/County/State): AK; CA; CO; GA; IL; MA; MD; ME; MI; NH; NJ; NM; NY; OR; PA; TN; TX; VA; WA; WI

Proposed Action Description:

AMENDED PROGRAMMATIC NEPA DETERMINATION (See the attached original Programmatic Determination, dated July 14, 2021). This Amended Determination follows ARPA-E's receipt of required information and certifications from two (2) additional Prime Recipients, SRI International (2334-1537) and Littoral Power Systems, Inc. (2335-1516) that were not covered under the original Programmatic Determination. Additionally, this determination follows ARPA-E's receipt of required permits from Prime Recipients, University of Alaska-Fairbanks (2334-1541) and Aquantis, Inc. (2334-1515). The SHARKS Program is composed of 11 small-scale research and development projects that will be conducted by universities, non-profit entities, for-profit entities, and federal laboratories. This Amended Determination, in addition to the original Programmatic Determination covers all 11 of the projects (listed in Attachment A). All 11 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. Some Prime Recipients (See Attachment A) have not obtained all necessary permits and approvals applicable to proposed actions and are prohibited from commencing applicable project work before (1) obtaining the necessary permits and approvals and (2) providing written assurances to ARPA-E of the same.

Categorical Exclusion(s) Applied:

A9 - Information gathering, analysis, and dissemination



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



B3.16 - Research activities in aquatic environments

B5.25 - Small-scale renewable energy research and development and pilot projects in aquatic environments

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: 2021.07.23 13:11:11 -04'00'

Date Determined:



# U.S. Department of Energy Categorical Exclusion Determination Form

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Proposed Action Title: Submarine Hydrokinetic and Riverine Kilo-Megawatt Systems SHARKS (FOA No. DE-FOA-0002334) & SHARKS SBIR/STTR (FOA No. DE-FOA-0002335) Programs

Program or Field Office: Advanced Research Projects Agency - Energy

Location(s) (City/County/State): AK; CA; CO; GA; IL; MA; MD; ME; MI; NH; NJ; NM; NY; OR; PA; TN; TX; VA; WA; WI

Proposed Action Description:

The SHARKS Program seeks to develop new technical pathways to design economically competitive Hydrokinetic Turbines (HKT) for tidal and riverine currents. SHARKS teams will (1) advance new holistic HKT designs to significantly reduce their levelized cost of energy (LCOE); (2) integrate control co-design (CCD), co-design (CD), and designing for operation and maintenance (DO) methodologies; and (3) minimize potential negative environmental effects while maximizing system reliability. If successful, SHARKS technologies will address industry-wide limitations to provide economical hydrokinetic power at micro-grid and utility-scale.

The SHARKS Program is composed of 11 small-scale research and development projects that will be conducted by universities, non-profit entities, for-profit entities, and federal laboratories. This Determination covers 9 of the 11 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. Some Prime Recipients (See Attachment A) have not obtained all necessary permits and approvals applicable to proposed actions and are prohibited from commencing applicable project work before (1) obtaining the necessary permits and approvals and (2) providing written assurances to ARPA-E of the same

Categorical Exclusion(s) Applied:

A9 - Information gathering, analysis, and dissemination



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



B3.16 - Research activities in aquatic environments

B5.25 - Small-scale renewable energy research and development and pilot projects in aquatic environments

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: 2021.07.15 11:23:32 -04'00'

Date Determined:

**Attachment A: Projects in the Submarine Hydrokinetic and Riverine Kilo-Megawatt Systems SHARKS (FOA No. DE-FOA-0002334) & SHARKS SBIR/STTR (FOA No. DE-FOA-0002335) Programs**

Full Application Control Number	Lead Organization	Project Title	Categorical Exclusions	Permit Status
2334-1511	National Renewable Energy Lab	Marine Energy Generation and Load Optimized Design Of Novel-turbines (MEGALODON)	A9	Not Applicable
2334-1513	University of Michigan	RAFT: RECONFIGURABLE ARRAY OF HIGH-EFFICIENCY DUCTED TURBINES FOR HYDROKINETIC ENERGY HARVESTING	A9; B3.6	Not Applicable
2334-1515	Aquantis, Inc.	TIDAL POWER TUG	A9; B3.6; B3.16; B5.25	Not Applicable
2334-1521	Westergaard Solutions, Inc	HydroMINE: Simple, Modular and Scalable	A9; B3.6	Not Applicable
2334-1523	University of Washington	Confinement-exploiting Cross-flow Turbine Arrays	A9; B3.6	Not Applicable
2334-1536	University of Virginia	Bio-Inspired Renewable Energy (BIRE) for Highly-efficient Low-cost Riverine Hydrokinetics	A9; B3.6; B3.16; B5.25	Prime Recipient has not obtained all necessary permits and approvals applicable to proposed actions.
2334-1537	SRI International	MANTA: RELIABLE AND SAFE KITE ENERGY SYSTEM	A9; B3.6; B3.16; B5.25	Prime Recipient has not obtained all necessary permits and approvals applicable to proposed actions.
2334-1541	University of Alaska Fairbanks	Material and Cost Efficient Modular Riverine Hydrokinetic Energy System	A9; B3.6; B3.16; B5.25	Not Applicable
2335-1512	Emrgy, Inc.	Performance Enhancement of Hydrokinetic Arrays Using Reliable, Low-Cost Dynamic Components	A9; B3.6; B3.16; B5.25	Prime Recipient has not obtained all necessary permits and approvals applicable to proposed actions.
2335-1515	Ocean Renewable Power Company	Optimized Hydrokinetic Systems	A9; B3.6; B3.16; B5.25	Prime Recipient has not obtained all necessary permits and approvals applicable to proposed actions.

**Attachment A: Projects in the Submarine Hydrokinetic and Riverine Kilo-Megawatt Systems SHARKS (FOA No. DE-FOA-0002334) & SHARKS SBIR/STTR (FOA No. DE-FOA-0002335) Programs**

2335-1516	Littoral Power Systems, Inc.	Control Co-Design and Co-Optimization of a Transformational Cost-Efficient Hydrokinetic Energy Turbine System	A9; B3.6; B3.16; B5.25	Prime Recipient has not obtained all necessary permits and approvals applicable to proposed actions.
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