

PMC-ND

(1.08.09.13)

**U.S. DEPARTMENT OF ENERGY**  
**OFFICE OF ENERGY EFFICIENCY AND RENEWABLE ENERGY**  
**NEPA DETERMINATION**

RECIPIENT: [North Carolina State University](#)

STATE: NC

**PROJECT TITLE:** [Device Design and Robust Periodic Motion Control of an Ocean Kite System for Hydrokinetic Energy Harvesting](#)

<b>Funding Opportunity Announcement Number</b>	<b>Procurement Instrument Number</b>	<b>NEPA Control Number</b>	<b>CID Number</b>
<a href="#">DE-FOA-0001837</a>	<a href="#">DE-EE0008635</a>	<a href="#">GFO-0008635-001</a>	<a href="#">GO8635</a>

**Based on my review of the information concerning the proposed action, as NEPA Compliance Officer (authorized under DOE Policy 451.1), I have made the following determination:**

**CX, EA, EIS APPENDIX AND NUMBER:**

Description:

**A9 Information gathering, analysis, and dissemination** Information gathering (including, but not limited to, literature surveys, inventories, site visits, and audits), data analysis (including, but not limited to, computer modeling), document preparation (including, but not limited to, conceptual design, feasibility studies, and analytical energy supply and demand studies), and information dissemination (including, but not limited to, document publication and distribution, and classroom training and informational programs), but not including site characterization or environmental monitoring. (See also B3.1 of appendix B to this subpart.)

**B3.6 Small-scale research and development, laboratory operations, and pilot projects** Siting, construction, modification, operation, and decommissioning of facilities for smallscale research and development projects; conventional laboratory operations (such as preparation of chemical standards and sample analysis); and small-scale pilot projects (generally less than 2 years) frequently conducted to verify a concept before demonstration actions, provided that construction or modification would be within or contiguous to a previously disturbed or developed area (where active utilities and currently used roads are readily accessible). Not included in this category are demonstration actions, meaning actions that are undertaken at a scale to show whether a technology would be viable on a larger scale and suitable for commercial deployment.

Rationale for determination:

The U.S. Department of Energy (DOE) is proposing to provide federal funding to North Carolina State University (NCSU) to design fabricate, and test an 1/10 scale ocean kite system for harvesting marine hydrokinetic energy through controlled periodic flight.

The proposed project has been divided into 11 Tasks. Tasks 1-4 involve information gathering and design including development of numerical models, component designs, power control strategies, and flight control estimators. All activities associated with Tasks 1-4 are information gathering and analysis and would take place at the NCSU Control and Optimization for Renewables and Energy Efficiency (CORE) Laboratory.

Task 5 would include the fabrication and laboratory testing of a 1/100th scale system. A model of the system, as designed in Tasks 1-4, would be 3D printed using the NCSU laboratory 3D printer. Component materials would be limited to plastic and resin used in the 3D printer. The 3D printed device would then be tank tested in the NCSU Water Channel. The NCSU Water Channel is a free standing laboratory scale water tank that allows controlled flow conditions through the tank. All work conducted under this task would occur in the CORE laboratory and would utilize pre-existing facilities and equipment designed for similar uses.

Task 6 would include development of plans for fabricating, testing, and addressing risk management for the 1/20th scale device based on the results of the bench testing of the 1/100th scale device. This work would be limited to data gathering and analysis and would take place at the CORE laboratory.

Tasks 7-10 would involve fabrication and testing of a 1/20th scale and 1/10th scale device. Specifics regarding fabrication and testing for those tasks are dependent upon the results of Tasks 1-6 and thus are not yet defined. As such, those tasks cannot be meaningfully evaluated at this time.

Task 11 would include analysis of the potential technology to market application of the device. This task would be

limited to data gathering and analysis.

## NEPA PROVISION

DOE has made a conditional NEPA determination.

The NEPA Determination applies to the following Topic Areas, Budget Periods, and/or tasks:

Task 1: Development and Refinement of Numerical Modeling Tool

Task 2: Development and Refinement of Component Designs

Task 3: Development and Refinement of Robust Power Maximizing Control Strategies

Task 4: Development of Computing, Sensing, and Estimation Tools for Flight Controls

Task 5: Component-level Testing

Task 6: Development of Prototype Fabrication, Testing, and Risk Management Plans

Task 11: Technology-to-Market Pipeline Development

The NEPA Determination does not apply to the following Topic Area, Budget Periods, and/or tasks:

Task 7: Tow Testing in Controlled Environment

Task 8: Analysis, Reporting and Design Refinement from Tow Testing

Task 9: Prototype Component Procurement/Fabrication, Assembly and Commissioning

Task 10: Prototype Testing, Decommissioning and Performance Assessment

Notes:

Water power Technology Office

This NEPA determination requires a tailored NEPA provision.

NEPA review completed by Roak Parker 3.19.2019

## FOR CATEGORICAL EXCLUSION DETERMINATIONS

The proposed action (or the part of the proposal defined in the Rationale above) 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 proposed action that may affect the significance of the environmental effects of the proposal.

The proposed action 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.

A portion of the proposed action is categorically excluded from further NEPA review. The NEPA Provision identifies Topic Areas, Budget Periods, tasks, and/or subtasks that are subject to additional NEPA review.

## SIGNATURE OF THIS MEMORANDUM CONSTITUTES A RECORD OF THIS DECISION.

NEPA Compliance Officer Signature: \_\_\_\_\_

 Electronically Signed By: Kristin Kerwin

Date: 3/20/2019

NEPA Compliance Officer

**FIELD OFFICE MANAGER DETERMINATION**

- Field Office Manager review not required
- Field Office Manager review required

**BASED ON MY REVIEW I CONCUR WITH THE DETERMINATION OF THE NCO :**

Field Office Manager's Signature: \_\_\_\_\_

Field Office Manager

Date: \_\_\_\_\_