

PMC-ND

(1.08.09.13)

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

**RECIPIENT:** Littoral Power Systems Inc.**STATE:** MA

**PROJECT TITLE:** XCT System for Harvesting In-Current Hydrokinetic Energy from Low-Velocity Sites

<b>Funding Opportunity Announcement Number</b>	<b>Procurement Instrument Number</b>	<b>NEPA Control Number</b>	<b>CID Number</b>
DE-FOA-0001837	DE-EE0008628	GFO-0008628-002	G08628

**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 funding to Littoral Power Systems Inc. (LPS) to develop a novel turbine system for energy generation in slow-moving water currents. The project would seek to mature the design of major system components within the turbine system. As part of the project, a laboratory scale test article (LSTA) would be fabricated and tested in laboratory settings to validate the system's performance capabilities. The LSTA would serve as a proof of concept, before fabricating a proportional prototype for in-water testing.

A NEPA Determination (GFO-0008628-001; CX's A9, B3.6) was completed previously for this award which reviewed BP1 Tasks 1-6 and 9. BP1 Tasks 7 and 8 were restricted at that time. Since completion of that NEPA Determination, LPS has requested to modify its Statement of Project Objectives (SOPO). The new SOPO that has been negotiated with DOE is substantially different from the SOPO that was originally reviewed. New task work has been added and existing tasks have been modified in such a way that a new review is merited.

This NEPA Determination will be applicable to all BP1 tasks. BP2 tasks would include fabrication and field-testing of a prototype XCT system. Test design and site-selection would be dependent on completion of task work under BP1. Accordingly, all BP2 tasks are restricted. These tasks will be reviewed at a later date, once all relevant information has been submitted to the DOE for review.

Proposed project activities for BP1 would focus on the fabrication of the LSTA and performance testing using the device. As noted above, the LSTA would be used as a proof of concept and would be differentiated from the prototype that would be developed in BP2 in that the LSTA would not be a proportional representation of a commercial device, but rather would be used to test specific systems/components.

Specific activities to be performed during BP1 are as follows:

**Task 1- Risk Assessment:** This task would consist of the completion of a risk Pareto analysis and associated reporting.

**Task 2 - Design, Analyze and Test the LSTA:** This task would consist of work activities associated with the development, fabrication, and testing of the LSTA. These would include design specifications development, testing criteria development, computer modeling, component fabrication/assembly, and laboratory testing of the assembled LSTA.

Specialized component fabrication would be performed by LPS's project partners and qualified vendors, with Turbo Solutions Engineering (TSE) overseeing the device assembly process and GE Global Research (GE) overseeing work relating to the electrical systems within the device. Additional information regarding partner roles and responsibilities is discussed below. Turbine components to be utilized would include propellers, blades, bearings, housing components, a nose cone, generator, transformer, and mounting attachments. The device, once fabricated, would measure 2m in diameter and would weigh approximately 500 – 600 lbs.

Performance testing would be performed at the testing facility of project partner Alden Research Laboratory (Alden) in Holden, MA. This facility performs turbine testing as part of its regular course of business. Testing would be performed using an existing indoor large recirculating flume. The flume channel has a width of 20-ft and would have a depth in the test section of between 8 and 9 ft. This would allow for current speeds of up to approximately 1 m/s during turbine testing. Test fixtures would be fabricated and assembled in order to secure the device to the flume for testing. An existing crane would be used to position the LSTA and tethers/cables would be used to secure it into place.

Approximately 250,000 gallons of water would be used for testing the test article at Alden's laboratory facility. This water would be discharged back into the waterway that passes through the facility. Alden is permitted through the Environmental Protection Agency, via a National Pollutant Discharge Elimination System (NPDES) permit to carry out this action and would perform water discharge in accordance with permit requirements.

**Task 3 - Develop Critical Prototype Design for XCT-1:** This task would consist of design specifications development for a scaled prototype (approximately 1/10 scale) that could be used for in-water testing in BP2. A site for pilot testing would also be selected. In-water testing would not be performed until BP2, after an additional NEPA review has been conducted.

**Task 4 - Assess Progress toward LCOE Goals with Respect to XCT-1:** This task would consist of the completion of techno-economic analyses and levelized cost of energy analyses.

**Task 5 - Develop Plans for Testing the XCT-1:** This task would consist of the development of a preliminary testing plan for in-water testing of the pilot device, to be performed in BP2. The testing plan would consider installation and mooring, operations, instrumentation and measuring, risk management, decommissioning, and permitting plans. In-water testing would not be performed until BP2, after an additional NEPA review has been conducted.

**Task 6 – Develop Fabrication Plan for the XCT-1:** This task would consist of the development of a fabrication plan for the pilot device. The plan would consider fabrication, assembly, shipping, and quality control testing. Pilot device fabrication would not be performed until BP2, after an additional NEPA review has been conducted.

All project activities would be coordinated by LPS. LPS would perform project management, conceptual design work, and computer modeling at its office space in Bedford, MA. Various project partners would contribute to the design, fabrication, and testing of components to be integrated into the test article. GE would contribute to component design and development. Component fabrication and testing would be performed at research facilities at its campus in Niskayuna, NY. Endeavor Technologies would perform motor winding encapsulation at its commercial facility in Charles, IL. TSE would perform design work and computer modeling at its office facility in East Thetford, VT. Barbour Stockwell and Test Devices Inc. would each perform machine balancing on the test article at their facilities in Woburn, MA and Hudson, MA, respectively. Mountain Base Manufacturing would fabricate and test turbine generator components at its machining facility in Easthampton, MA. Alden would perform engineering design, computer modeling, component fabrication, and component testing at its laboratory facility in Holden, MA. No change in the use, mission or operation of existing facilities would be required as part of this project. Likewise, no additional permits or authorizations would be required.

Project activities would involve the use and handling of industrial chemicals and solvents, as well as heavy machinery and powered equipment. Potential hazards associated with this handling would be mitigated through adherence to established corporate health and safety policies and procedures, including personnel training, regular safety reviews/checks and engineering controls. LPS and its project partners would observe all applicable Federal, state, and local health, safety, and environmental regulations.

## NEPA PROVISION

DOE has made a conditional NEPA determination.

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

All Budget Period 1 Tasks

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

All Budget Period 2 Tasks

Notes:

Water Power Technologies Office  
This NEPA determination requires a tailored NEPA provision.  
Review completed by Jonathan Hartman, 07/21/2020

**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:  Roak Parker Date: 7/22/2020  
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: \_\_\_\_\_ Date: \_\_\_\_\_  
Field Office Manager