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(1.08.09.13)

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

RECIPIENT: Vortex Hydro Energy **STATE:** MI

PROJECT TITLE : Current Energy Harnessing using Synergistic Kinematics of Schools of Fish-Shaped Bodies

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DNFA	DE-EE0006780	GFO-0006780-002	GO6780

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

CX, EA, EIS APPENDIX AND NUMBER:
Description:

B5.25 Small-scale renewable energy research and development and pilot projects in aquatic environments	Small-scale renewable energy research and development projects and small-scale pilot projects located in aquatic environments. Activities would be in accordance with, where applicable, an approved spill prevention, control, and response plan, and would incorporate appropriate control technologies and best management practices. Covered actions would not occur (1) within areas of hazardous natural bottom conditions or (2) within the boundary of an established marine sanctuary or wildlife refuge, a governmentally proposed marine sanctuary or wildlife refuge, or a governmentally recognized area of high biological sensitivity, unless authorized by the agency responsible for such refuge, sanctuary, or area (or after consultation with the responsible agency, if no authorization is required). If the proposed activities would occur outside such refuge, sanctuary, or area and if the activities would have the potential to cause impacts within such refuge, sanctuary, or area, then the responsible agency shall be consulted in order to determine whether authorization is required and whether such activities would have the potential to cause significant impacts on such refuge, sanctuary, or area. Areas of high biological sensitivity include, but are not limited to, areas of known ecological importance, whale and marine mammal mating and calving/pupping areas, and fish and invertebrate spawning and nursery areas recognized as being limited or unique and vulnerable to perturbation; these areas can occur in bays, estuaries, near shore, and far offshore, and may vary seasonally. No permanent facilities or devices would be constructed or installed. Covered actions do not include drilling of resource exploration or extraction wells, use of large-scale vibratory coring techniques, or seismic activities other than passive techniques.
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.)

Rationale for determination:

The U.S. Department of Energy (DOE) is proposing to provide federal funding to Vortex Hydro Energy (Vortex) to design, model–test, build, deploy, and field-test the Oscylator marine hydrokinetic energy converter. DOE previously completed a NEPA determination for Task 1.1 and 2.1 as outlined in the original Statement of Projective Objectives (SOPO) of the project (GFO-0006780-001, 12.11.2014). Those tasks included design, fabrication, model testing, analysis and reporting. Not reviewed were tasks 1.2, 2.2, 3.1, 3.2, and 4. Since the previous determination Vortex has modified, and DOE has approved the modification of, the SOPO for this proposed project. The modified SOPO adds new subtasks 2.1.8 and 2.1.9, and eliminates tasks 3.1 and 3.2.1-3.2.6, but keeps subtask 3.2.7. Thus, this determination is for all remaining tasks, which are: subtasks 2.1.8 and 2.1.9; all tasks under 1.2 and 2.2; subtask 3.2.7; and, task 4.

Under task 1.2 Vortex would test the efficiency in marine hydro kinetic energy conversion of oscylator cylinders in tandem and staggered. The tests would occur at the University of Michigan marine renewable energy lab (MRELab). The MRELab is a purpose built facility that includes an approximate 3 foot by 3 foot water test loop designed to test equipment such as the cylinders. The tests would include testing 2, 3, and 4 cylinder arrangements. Task 1.2 is a continuation of task 1.1 which tested cylinder arrangements at the test lab in tandem. Task 1.2 would test the same cylinders in tandem and staggered.

Under subtasks 2.1.8 and 2.1.9 Vortex would test assemble the Oscillator 4 device. The device components would be manufactured in Ann Arbor, Michigan and Manchester, Michigan (manufacturing of components was reviewed in the

previous NEPA determination). After manufacturing, Vortex would assemble the components in a test assembly of the device to insure that all components fit as designed and no components need to be re-machined. If any components need re-work they would be returned to the fabricator in Ann Arbor or Manchester. Once all components are assembled and it is confirmed that the assembly is correct, the device would be disassembled so that the components could be transported by truck to Port Huron, Michigan.

Under task 2.2 Vortex would field deploy an Oscylator-4 in the St. Clair River, near Port Huron, Michigan Deployment would occur as soon as ice is off the river in the spring of 2016 (May). Vortex would assemble the device at the dock of Malcolm Marine, in Port Huron, Michigan. The device would be approximately 11 feet wide, 11 feet tall, and 6 feet deep. The device would be fabricated from approximately 2 tons of steel, 2.5 tons of aluminum, and 6 tons of concrete. The device would have four steel columns that oscillate back and forth within the device. The device would contain a circuit board control system, which would include a small quantity of lead. The circuit board would not come in contact with the water. No hazardous materials would be used in the device. Once assembled, the device would be placed on a barge and transported up river to the deployment site, which would be located in the St. Clair River just offshore from the Dunn Paper facility at 218 Riverview St., Port Huron, Michigan. This is a distance of approximately 5 miles. The device would then be lowered into place using a crane on the barge. Professional divers would aid in the placement of the device onto the riverbed. A safety protocol would be in place, and best management practices would be used. Deployment of the device would be completed by Malcolm Marine, a commercial company that completes this kind of work. In addition, Malcolm Marine has deployed two previous Vortex devices at this location. Those deployments were also DOE funded projects which received NEPA determinations (GFO-0003644-001, 2.23.2011). A power cable would be run from the device across the floor of the river, and up to a small building at the site host, Dunn Paper. No modifications to the existing building would be required and no trenching or other earth work would be conducted. Vortex would leave the device in place for up to three months during which time they would test the device and would analyze results.

At the end of the testing period Vortex would recover and decommission the device. Recovery and decommissioning would be completed by Malcolm Marine, again with the aid of professional divers. Recovery of the device would be a reverse of the deployment process. Malcolm Marine would lift the device out of the water with their crane, then barge the device down river to the Malcom Marine dock.

After decommissioning Vortex would analyze data received from the device.

An analysis using IPaC identified no threatened or endangered species in the project area. DOE has determined that this project will have no effect on threatened and endangered species. However, to ensure compliance with Section 7 of the Endangered Species Act, DOE contacted the United States Fish and Wildlife Service (USFWS) regarding the proposed deployment. The USFWS contact (Burr Fisher) stated that he did not need to consult with DOE, and that he had the opportunity to provide input through the Michigan Department of Environmental Quality (DEQ) and/or US Army Corp (USACE) permitting process which was occurring at that time. Permits for the proposed deployment have now been issued by both DEQ and USACE. Prior to issuing a permit DEQ required a public notice and consultation process. Through that process Vortex coordinated with the Lake Carrier's Association to identify a specific deployment location that would not interfere with shipping lanes. Vortex also addressed public comments regarding public concerns for safety of both fish and waterfowl. USFWS did not identify any concerns for fish or waterfowl. In addition, a permit has been issued by the Federal Energy Regulatory Commission (FERC).

Under subtask 3.2.7 Vortex would submit a report and summary of the data collected. Task 4 involves project management. These tasks would be information gathering, analysis and dissemination.

Based on review of the project information and the above analysis, DOE has determined that the project would not have a significant individual or cumulative impact to human health and/or environment. DOE has determined that the above identified tasks are consistent with actions contained in DOE categorical exclusion A9 "information gathering, analysis and dissemination", and B5.25 "small scale renewable energy research and development and pilot projects in aquatic environments," and is categorically excluded from further NEPA review.

NEPA PROVISION

DOE has made a final NEPA determination for this award

Insert the following language in the award:

If the Recipient intends to make changes to the scope or objective of this project, the Recipient is required to contact the Project Officer, identified in Block 15 of the Assistance Agreement before proceeding. The Recipient must receive notification of approval from the DOE Contracting Officer prior to commencing with work beyond that currently approved. If the Recipient moves forward with activities that are not authorized for Federal funding by the DOE Contracting Officer in advance of a final NEPA decision, the Recipient is doing so at risk of not receiving Federal funding and such costs may not be recognized as allowable cost share.

Note to Specialist :

This NEPA determination does not require a tailored provision.
Water Power Program.
Review completed by Roak Parker 2/23/16

SIGNATURE OF THIS MEMORANDUM CONSTITUTES A RECORD OF THIS DECISION.

NEPA Compliance Officer Signature: _____ Date: 3/3/2016
NEPA Compliance Officer

FIELD OFFICE MANAGER DETERMINATION

☐ Field Office Manager review required

NCO REQUESTS THE FIELD OFFICE MANAGER REVIEW FOR THE FOLLOWING REASON:

☐ Proposed action fits within a categorical exclusion but involves a high profile or controversial issue that warrants Field Office Manager's attention.
☐ Proposed action falls within an EA or EIS category and therefore requires Field Office Manager's review and determination.

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

Field Office Manager's Signature: _____ Date: _____
Field Office Manager