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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-0006780-001	

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:

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 Vortex Hydro Energy (Vortex) to design, model-test, build, deploy, and field-test the Oscylator-33, a marine hydrokinetic (MHK) energy converter.

Project Tasks for Phase 1 are as follows:

Phase 1.0 OPTIMAL SPACING AND DEPLOYMENT OF SINGLE-CYLINDER OSCYLATOR-33

* Task 1.1. Testing & Analysis of Fish-School Spacing
Subtask 1.1.1: Conduct tests on 2 cylinders in tandem to measure synergistic FIM
Subtask 1.1.2: Conduct tests on 3 cylinders in tandem to measure synergistic FIM
Subtask 1.1.3: Conduct tests on 4 cylinders in tandem to measure synergistic FIM
Subtask 1.1.4: Analyze test results for 2, 3, and 4 cylinders in tandem to assess synergistic FIM

* Task 2.1: Fabricate and assemble single-cylinder Oscylator-33
Subtask 2.1.1: Power take-off fabrication and assembly: Increased PTO Generator Efficiency
Subtask 2.1.2: Power take-off fabrication and assembly: Increased mechanical transmission efficiency
Subtask 2.1.3: Electrical transmission fabrication and assembly: Implementation of a Regenerative Braking and Impulse Launch System
Subtask 2.1.4: Mechanical system fabrication and assembly: Reduced weight and cost from bearing reconfiguration
Subtask 2.1.5: Electrical transmission fabrication and assembly: Modifying the Impulse Launch and Regenerative Control
Subtask 2.1.6: Finalize test plan
Subtask 2.1.7: Power take-off assembly and dry bench testing

* Task 2.2. Test single-cylinder Oscylator-33 in the St. Clair River
Subtask 2.2.1: Transport single cylinder Oscylator-33 to staging site
Subtask 2.2.2: Assemble single-cylinder Oscylator-33 and test for functionality
Subtask 2.2.3: Install single-cylinder Oscylator-33 in St. Clair River
Subtask 2.2.4: Open water testing and monitoring
Subtask 2.2.5: Recovery and decommissioning
Subtask 2.2.6: Analysis and reporting

This NEPA review is being conducted for Tasks 1.1 through 2.1 (including all sub-tasks) of Phase 1.0 only. The remaining tasks in Phase 1.0 (sub-task 2.2) and all activities in Phase 2.0 involve testing Vortex's prototype devise in the St. Clair River and scaling up of activities being conducted in Phase 1.0. Detailed plans and potential impacts for these activities are not known; therefore a meaningful NEPA determination cannot be conducted for those tasks at this time.

Throughout Tasks 1.1 and 2.1 Vortex would utilize the University of Michigan's existing patented design and develop a full-scale version of the Oscylator-33 for commercial development. Once final research and development is completed on the full-scale model, a single-cylinder unit would be tested in the St. Clair River (Phase 1.0, Task 2.2) after which a four-cylinder unit would be deployed (Phase 2.0 tasks).

Various components would be tested in Vortex and University of Michigan facilities. These include:

1. Vortex office space and workshop in Ann Arbor, MI: Activities would include design work, electronics assembly, software development, dry testing, storage of models and components.

2. MRELab of the University of Michigan in Ann Arbor, MI: Activities would include hydrodynamic tests and measurements, fabrication of mechanical and electrical components, and software development.

3. University of Michigan tow tank in Ann Arbor, MI: Activities would include hydrodynamic tests and measurements to test and verify the integrated system.

Vortex and the University of Michigan have safety and health protocols in place that would cover all activities conducted at their facilities. No modifications to these facilities would be required for this project.

Throughout Task 1.1 and 2.1 Vortex would optimize the commercial-scale design and test the various components of the Oscylator-33. Lab-scale tests conducted in Tasks 1.1 and 2.1 would allow for validation and preliminary testing of the design prior to in-river testing. These activities demonstrate separate utility from the in-river work being conducted in Task 2.2.

Based on the above information, DOE has determined that Phase 1, Tasks 1.1 and 2.1 are consistent with actions covered under DOE CX A9 (Information gathering, analysis, and dissemination) and B3.6 (Small-scale research and development, laboratory operations, and pilot projects); and therefore are categorically excluded from further NEPA review.

NEPA PROVISION

DOE has made a conditional NEPA determination for this award, and funding for certain tasks under this award is contingent upon the final NEPA determination.

Insert the following language in the award:

You are restricted from taking any action using federal funds, which would have an adverse affect on the environment or limit the choice of reasonable alternatives prior to DOE/NNSA providing either a NEPA clearance or a final NEPA decision regarding the project.

Prohibited actions include:
Phase 1.0: Task 2.2 Test single-cylinder Oscylator-33 in the St. Clair River (all sub-tasks)
Phase 2.0: All tasks, sub-tasks, and activities

This restriction does not preclude you from:
* Task 1.1. Testing & Analysis of Fish-School Spacing (all sub-tasks)

* Task 2.1: Fabricate and assemble single-cylinder Oscylator-33 (all-sub-tasks)

* Activities necessary to complete NEPA compliance and permitting requirements.

If you move forward with activities that are not authorized for federal funding by the DOE Contracting Officer in advance of the final NEPA decision, you are doing so at risk of not receiving federal funding and such costs may not be recognized as allowable cost share.

Note to Specialist :

1. Water Power Program

2. *This NEPA Determination requires a tailored NEPA provision

3. NEPA review completed by Laura Margason on December 9, 2014

SIGNATURE OF THIS MEMORANDUM CONSTITUTES A RECORD OF THIS DECISION.

NEPA Compliance Officer Signature: _____ Date: 12/11/2014
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