

ENVIRONMENTAL EFFECTS METADATA SURVEY FORM

Name of person updating the form

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Project name: Western Passage Tidal Energy Project

Planned In Operation Completed

Project description:

Project Developer: ORPC Maine, LLC

Technology Developer: Ocean Renewable Power Company

Technology type: Advanced design cross flow turbine (Turbine Generator Unit – TGU)

Resource (wave, tidal): Tidal

Project scale (test site, prototype, array, commercial): OCGen™ Power System

Installed capacity (MW): Up to 5 MW

Project Website: <http://www.orpc.co/>

Launch Date: TBD

Additional Description: The Project will deploy and operate an OCGen™ Power System consisting of 7 OCGen™ modules comprised of 24 OCGen™ turbine generator units (TGU) with a rated capacity of up to 5 megawatts (MW) in Western Passage, a marine waterway in the northern Atlantic Ocean, northeast of Eastport, Maine. The complete OCGen™ Power System includes the OCGen™ modules, a tensioned anchoring system for each module, a bundled underwater power and data (P&D) feeder cable from the modules to an underwater junction box (where the feeder cable is aggregated), a bundled underwater P&D cable from the underwater junction box to the on-shore station, and an on-shore station containing all needed supervisory control and data acquisition (SCADA) and electrical interconnection equipment.

The core component of the OCGen™ Power System is ORPC's patented turbine generator unit (TGU), which is the core component of all of ORPC's power systems, including the TidGen™ Power System recently installed in the nearby Cobscook Bay Tidal Energy Project. The TGU utilizes four advanced design cross flow (ADCF) turbines to drive a permanent magnet generator mounted between the turbines on a common driveshaft. The ADCF turbines rotate in the same direction regardless of tidal flow direction; rotational speed of the turbines is directly related to water flow speed.

Each OCGen™ module will be comprised of TGUs that have a rated capacity of up to 200 kilowatts (kW) each. The seven-module OCGen™ Power System will have a rated capacity of up to 5 MW. The power generated will be transmitted to shore using up to a 15 kilovolt (kV) DC subsea P&D cable. The total proposed cable length is approximately 4,200 feet (3,700 feet from the OCGen™ Power System to the shore at Harris Point in Eastport, Maine, and approximately 500 feet from shore to an on-shore station). The power generated by the OCGen™ Power System will be conditioned for grid compatibility at an on-shore station and delivered to Bangor Hydro Electric Company's power grid activities under the pilot project license will be phased between 2014 and 2016. Together, the Cobscook project and the Western Passage project comprise the "Maine Tidal Energy Project." The Cobscook Bay project is the first grid-connected marine hydrokinetic energy project in the Western Hemisphere. It has received a 20-year Power Purchase Agreement from the Maine Public Utilities Commission and the same agreement will apply to Western Passage after it is licensed by FERC and the Maine Department of Environmental Protection.

Location:

Ocean/Water body: Marine waterway of Western Passage of the northern Atlantic Ocean

Closest city: Northeast of Eastport, Maine

Country: The United States

Coordinates (please use Mercator): 44°55'13.688" N, 66°59'13.815" W

Depth:

Process status: Current status of the project implementation and future developments: Fulfilling the requirements of the Preliminary Permit; Implementation of the pre-deployment environmental monitoring plans, developed collaboratively with jurisdictional federal and state agencies, have begun; Site characterization and engineering activities continue.

Expected operation date: 2014 (Phase I)

Licensing information (brief description):

- Federal Energy Regulatory Commission, Preliminary Permit, P-12680 – Final pilot license application anticipated to be submitted by end of 2013.
- Maine General Permit, anticipated 2014
- NEPA FONSI, anticipated 2014
- State of Maine Submerged Lands Lease, anticipated 2014
- U.S. Coast Guard approved PATON, anticipated 2014

Key Environmental issues: ORPC's environmentally responsible and scientifically based approach to the Western Passage Project's pre-deployment study plans builds on lessons learned from the nearby Cobscook Bay Tidal Energy Project. The adaptive management approach that is being successfully implemented at the Cobscook Bay site is essential to this approach to maintain levels of environmental monitoring that are appropriate for the project risk. Key components of our approach to pre-deployment studies include the following:

- Building upon the methods, technology and knowledge gained from the Cobscook Bay Tidal Energy Project
- Drawing upon published environmental data from marine hydrokinetic projects installed elsewhere in the world as “best available science”
- Continued collaboration with state and federal resource agencies to evaluate and modify environmental monitoring through an adaptive management process

ORPC has prepared the following pre-deployment environmental monitoring plans for state and federal agency review:

- Fisheries
- Sea and Shorebirds
- Marine Mammals
- Acoustics
- Benthic environment
- Acoustics

Endangered and Threatened Species:

Federally listed threatened and endangered species with potential to occur in proposed project area

Species	Federal Status	State Status
Atlantic sturgeon (Gulf of Maine Distinct Population Segment (DPS)) (Acipenser oxyrinchus)	T	N/A
Atlantic salmon (Gulf of Maine DPS) (Salmo salar)	E	N/A
Leatherback sea turtle (Dermochelys coriacea)	E	E
Loggerhead sea turtle (Caretta caretta)	T	E
Sei whale (Balaenoptera borealis)	E	E
Fin whale (Balaenoptera physalus)	E	E
North Atlantic right whale (Eubalaena glacialis)	E	E
Humpback whale (Megaptera novaeangliae)	E	E

- E = Federal and/or state listed endangered
- T = Federal and/or state listed threatened
- P = Proposed for listing under ESA

Environmental webpage: *link to project official environmental webpage (if available)*

Baseline studies and project effects studies: Western Passage Tidal Energy Project				
General description				
Receptor	Study description including question and/or objective (several can be listed per receptor)	Design and methods (brief description)	Results (brief description)	Status (planned, underway, completed, with dates)

Physical Environment	Marine Geophysical Survey.	Detailed bathymetric mapping, side-scan sonar, sub-bottom profiling and magnetometer surveys. Data used to characterize the bottom and identify potential cultural resources and marine hazards.	Results of geophysical survey contributed to the siting of turbine devices and foundational considerations.	Completed
	Water Velocity Surveys.	Acoustic Doppler Current Profiler (ADCP) surveys. Hydraulic circulation modeling.	ADCP surveys and hydraulic modeling contributed to the selection of turbine deployment locations.	Ongoing
	Underwater acoustic survey.	Drifting Noise Measurement System (DNMS) at project site.	N/A	Scheduled for December 2012
Marine Mammals	Marine mammal presence and interactions.	Land based visual observations; evaluating passive acoustic monitoring (PAM).	Visual observations in November and December 2012 recorded the presence of harbor seals and harbor porpoises.	Ongoing
Fisheries	Fisheries presence and turbine interactions.	Hydroacoustic and trawl surveys of project and control sites; acoustic tag detection, turbine interaction data from Cobscook Bay Tidal Energy Project.	Turbine interaction data currently being collected from Cobscook Bay Tidal Energy Project.	Field surveys scheduled to commence in January 2013
Sea and Shorebirds	Species presence and behavior.	Land based visual observations.	Species presence, behavior, and seasonality documented.	Completed
Benthos	Species presence.	Benthic dive survey of deployment area and cable route.	Observations commenced in November 2012.	Ongoing
Reports or Papers	Available upon request			
Research Projects	Available upon request			

Monitoring and adaptive management: Western Passage Tidal Energy Project

General description

Receptor	Monitoring program description including question and/or objective (several can be listed per receptor)	Design and methods (brief description)	Results (brief description)	Status (planned, underway, completed, with dates)
Physical environment				
Benthos				
Fish and fisheries				
Large vertebrates				
Birds				
Marine uses/users				
Other* (can be named)				
Reports or Papers	(Key papers on the areas addressed should be listed here; when possible the files themselves can be made available in downloadable PDF format, alternatively links to the files or project website can be provided when available e.g. SeaGen.)			
Research Projects	(past or on-going environmental research projects at the site)			