

ENVIRONMENTAL EFFECTS METADATA SURVEY FORM

Name of person updating the form

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Date submitted

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Project name: Cobscook Bat 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): From a single device TidGen™ Power System to an array consisting of 3-device power system.

Installed capacity (MW): The total generating capacity of the project at the completion of Phase 2 will be approximately 450 kW (see phases in the additional description below)

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

Launch Date: September 13, 2012

Additional Description: The Cobscook Bay Tidal Energy Project consists of the following phases:

Phase 1 – A single-device TidGen™ Power System with a rated capacity of 150 kW was secured to a bottom support frame, which was attached to the seafloor. Subsea power and data cables were deployed on the seafloor and connected to the TidGen™ device. Electricity generated by the TidGen™ Power System was delivered by an underwater power cable to an On-shore Station in Lubec, Maine, where it was power-conditioned and connected to the Bangor Hydro Electric Company (BHE) utility grid on September 13, 2012.

Phase 2 – Two additional devices with a rated capacity of 150 kW will be added to form a commercial-scale, multi-device power system. The underwater power and control cables from the turbine devices will be connected to an underwater consolidation box, and a single underwater power and control cable will connect this box to an electrical substation onshore. The complete system will be interconnected to the BHE grid.

Location:

Ocean/Water body: Cobscook Bay on State of Maine submerged lands

Closest city: Eastport and Lubec, Maine

Country: The United States

Coordinates (please use Mercator): 44°54'35.28" N, 67° 2'44.28" W

Depth:

Process status: Current status of the project implementation and future developments:

The installation and start-up of the single-device TidGen™ Power System (Phase 1) is 100% complete. This is first grid-connected marine hydrokinetic project in the Western Hemisphere. It has received a 20-year Power Purchase Agreement from the Maine Public Utilities Commission. Detailed testing and monitoring of the nearby environment, as well as all device components and subsystems and initial operations is ongoing.

Engineering enhancements for the multi-device power system has begun.

Expected operation date:

The single-device TidGen™ Power System began operation on September 13, 2012. Completion of the construction, installation, and deployment of the Cobscook Bay Tidal Energy Project is scheduled for late 2013 to early 2014.

Licensing information (brief description):

- Federal Energy Regulatory Commission, Pilot Project License, P-12711, February 27, 2012 (8 years)
- Maine General Permit, 2012
- NEPA FONSI, 2012
- NOAA/NMFS Incidental Harassment Authorization for pile driving, 2012
- State of Maine Submerged Lands Lease, February 29, 2012
- U.S. Coast Guard approved PATON, 2012

Key Environmental issues:

Federally listed threatened and endangered species with potential to occur in proposed project area (Source: application, as modified by FERC staff).

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

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

ORPC has designed and is carrying out the following monitoring plans to ascertain the Project’s environmental effects:

- Acoustic
- Fisheries and Marine Life Interaction
- Marine Mammals
- Sea and Shore Birds
- Benthic and Biofouling
- Hydraulic

In addition, as required by ORPC’s FERC License, an Adaptive Management Plan has been implemented that describes and manages the process for evaluating environmental monitoring data and license modifications where appropriate. The Adaptive Management Team is comprised of the jurisdictional federal and state agencies and ORPC.

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

Baseline studies and project effects studies: Cobscook Bay Tidal Energy Project				
General description		Studies conducted in development of DLA.		
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.	Preliminary results led ORPC to change deployment strategy of turbines in Cobscook Bay primarily due to thickness of unconsolidated sediments.	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.	Completed
	Underwater	Drifting Noise	Beta turbine operation did	Completed

	acoustic survey.	Measurement System (DNMS) at project site and around ORPC's beta turbine.	not elevate underwater sound levels more than 10 dB above ambient levels and is not expected to cause harassment to marine mammals.	
Marine Mammals	Marine mammal presence and interactions.	Incidental visual observations; testing of active acoustic monitoring (AAM) system.	Visual observations recorded primarily harbor seals at the project site; AAM testing indicated positive results for detecting and tracking marine mammal sized targets.	Completed; additional AAM testing scheduled for spring 2013
Fisheries	Fisheries presence and turbine interactions.	Hydroacoustic and trawl surveys of project and control sites; interaction studies around ORPC's beta turbine.	Hydroacoustic and trawls surveys combined to detail fisheries presence (seasonality, vertical distribution, diurnal patterns, etc.) and speciation. Interaction studies demonstrated fish behavior.	Completed
Sea and Shorebirds	Species presence and behavior.	Visual observations.	Species presence, behavior, and seasonality documented.	Completed
Benthos	Species presence.	Benthic dive survey of deployment area and cable route.	Species presence and distribution documented.	Completed
Reports or Papers	Available upon request			
Research Projects	Available upon request			

Monitoring and adaptive management: Cobscook Bay Tidal Energy Project

General description	Post-License Monitoring Plans			
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	Acoustic Monitoring Plan.	Measurements made following Phase I and II installations by drifting noise measurement system (DNMS).	N/A	Ongoing
	Water temperature	Pre-deployment studies indicated	N/A	N/A

	variation.	water temperature variations from the project would be insignificant.		
	Hydraulic Monitoring Plan.	ADCP measurements made following Phase I and II installation, hydraulic circulation modeling to be modified based on measurements made in the field.	N/A	Ongoing
Benthos	Benthic and Biofouling Monitoring Plan.	Characterize benthic communities within project area and evaluate potential project effects on them. Determine if project structures have potential to allow biofouling accumulation that may alter the habitat within the deployment areas. Examine the recovery of benthic resources disturbed during the construction of the project.	N/A	Ongoing
Marine Mammals	Marine Mammal Monitoring Plan.	<ul style="list-style-type: none"> • Incidental observations; dedicated observers and hydroacoustic monitoring for Phase I pile driving. • Visual observations. 	See IHA Final Report.	Ongoing
Birds	Sea and Shorebird Monitoring Plan.		See IHA Final Report.	Ongoing
Other	Adaptive Management Plan.	Establishes team, process for evaluating environmental monitoring data and license modification.	N/A	Ongoing
Reports or Papers	<ul style="list-style-type: none"> • IHA Final Report; 2012 Environmental Report to be finalized early in 2013 (FERC requirement by March 1st) • Final Report on the Acoustic, Marine Mammal and Bird Monitoring Studies During Phase 1 Pile Driving Activities • Subtidal Benthic Video and Benthic Infauna Survey and Intertidal Cable Crossing Survey • Fish in a Tidally Dynamic Region in Main: Hydroacoustic Assessments in Relation to Tidal Power Development 			
Research Projects	Available upon request			