

Summary of 2012 Environmental Monitoring



Introduction

ORPC Maine, LLC, a wholly-owned subsidiary of Ocean Renewable Power Company, LLC (collectively ORPC), submitted its 2012 Environmental Monitoring Report for the Cobscook Bay Tidal Energy Project (Project) on March 26, 2013 in compliance with ORPC's Federal Energy Regulatory Commission (FERC) pilot project license, P-12711. The report represents a significant achievement for the Project and the Adaptive Management Plan. As the first annual environmental monitoring report in North America for an operational tidal energy device, it documents how knowledge was obtained and utilized for the installation and operation of ORPC's TidGen™ Power System and the interaction of the system with the marine environment.

Project Installation and Operation

ORPC received its pilot project license on February 12, 2012. After receiving approval of the installation plan by FERC's Division of Dam Safety and Inspection on March 6, 2012, the Project installation commenced on March 20, 2012 and concluded with the installation of the turbine generator unit (TGU) on August 14, 2012. The Project start-up included interconnection with the Bangor Hydro Electric Co. (BHE) distribution system. The electricity generated by the Project is delivered to the on-shore station in Lubec, Maine, via an underwater power cable. First power was delivered to BHE on September 5, 2012 and the Project was officially approved for delivery of power to the grid by BHE on September 13, 2012. The Project is the first federally licensed, grid-connected tidal energy project (excluding a dam) in the Americas.

Adaptive Management Plan for Environmental Monitoring

ORPC developed an Adaptive Management Plan as required by the FERC pilot project license. Federal and state resource agencies participate with ORPC on the Adaptive Management Team (AMT) and provide oversight on the Plan. The Plan is an integral part of ORPC's implementation of the Project and provides a strategy for evaluating monitoring data and making informed, science-based decisions to modify monitoring as necessary. The Plan was designed to be modified within the Project timeline and acknowledges that elements of the Plan, such as key environmental uncertainties, applied studies and institutional structure, may evolve over time. ORPC thanks the resource agency members of the AMT for their guidance and collaboration in helping to make the Plan a success.

2012 Environmental Monitoring Results

Acoustic Monitoring

ORPC's acoustic consultant, Scientific Solutions, Inc. (SSI), developed a NOAA-sanctioned methodology using a drifting spar buoy for pre-deployment acoustic monitoring at the high velocity deployment site. SSI conducted acoustic monitoring using the same methodology and equipment during Phase I pile driving in March and April 2012. Results confirmed that pile driving source levels were within acceptable ranges, provided that sound absorption devices were used and best practices were implemented. ORPC will implement these best practices if pile driving is used during subsequent Project installations, which will occur at the same project area, with similar environmental and geological conditions as the initial phase. Acoustic monitoring around the installed TidGen™ device was completed in April 2013.

Benthic and Biofouling Monitoring

MER Associates review of ORPC's November 9, 2013 benthic survey of the cable route concluded that exposed sections of the cable are causing minimal disturbance to the seabed and are not adversely impacting the surrounding habitat or benthic epifauna. In addition, the buried portion of the cable is stationary and is not expected to cause any disturbance impacts. Unburied sections of the cable are pinned in position and have not been observed to move. ORPC is continuing to improve methods and quality of data collected for the benthic survey. Review of dive video and visual inspection following retrievals of the TidGen™ indicate minimal biofouling of the TidGen™ device.

Fisheries and Marine Life Interaction Monitoring

The University of Maine's School of Marine Sciences (UMaine) continued performing fisheries surveys in 2012 using a vessel mounted down-looking sonar to determine total water column fish biomass at both the installation and control sites. Survey results indicate March had the lowest fish biomass and May had the highest. In addition, UMaine continued trawl and intertidal surveys in the Cobscook Bay to provide species verification and to characterize the fish community.

ORPC installed a seabed-mounted side-looking sonar on an environmental monitoring tower to monitor marine life interaction with the TidGen™ device. UMaine analyzed an acoustic data subset from the system and detected a total of 13,643 fish tracks; 3,191 of these were detected during flood tides and 10,452 detected during ebb tides. UMaine's analysis resulted in a determination of fish target strength (relative size), density, and direction of movement in the vicinity of the TidGen™ device.

Hydraulic Monitoring

Sandia National Laboratories utilized their SNL-EFDC model to simulate flow in Cobscook Bay, which reproduces available data sets for three water-level locations and an Acoustic Doppler Current Profiler (ADCP) measurement. The results of the modeling demonstrated that there will be no significant changes in tidal range, flow rate, or velocity upon operation of five ORPC tidal energy devices. Tidal changes of less than 10 millimeters of tidal height were predicted in some local areas. Scour monitoring performed to date indicates there is no significant change in seabed elevation around the ten foundation piles, except at pile #6, where the bottom support frame skirt was embedded upon deployment.

Marine Mammal Monitoring Plan

ORPC collaborated with Dr. Moira Brown, senior scientist at the New England Aquarium, to design and implement a plan to minimize marine mammal exposure to noise-generating activities during pile driving. This plan resulted in an observer training program, and established requirements regarding observer equipment needed, observation methods, data collection, management and reporting protocols. Dr. Brown trained ORPC staff and qualified candidates from the local community who performed observation during pile driving, as well as during deployment and retrieval activities and incidental sightings. Marine mammal observations made by trained personnel in 2012, including during periods of construction, operation, and maintenance, did not indicate changes in marine mammal presence or behavior. There is no evidence of any marine mammal strikes with system components during deployment, retrieval or operation.

Bird Monitoring Plan

The Center for Ecological Research (CER) conducted monthly surveys at the TidGen™ deployment site in North Lubec, Maine between November 2011 and May 2012 to monitor wintering seabirds and waterfowl. Preliminary results from November and December 2012, following the initial I installation, show the same general number of seabirds as was observed in the previous two winters. In addition, CER conducted surveys during the pile driving period and found that the responses of seabirds to the vibratory hammer noises were generally minimal or of short duration. No obvious seabird response was observed during brief periods when the louder diesel impact hammer was operated.

For further information:

To view the entire ORPC 2012 Environmental Monitoring Report for the Cobscook Bay Tidal Energy Project, visit at the following link on our website: http://www.orpc.co/permitting_doc/environmentalreport_Mar2013.pdf . For any additional information, contact Nathan Johnson, Director of Environmental Affairs, at njohnson@orpc.co or (207)-221-6254.