

ENVIRONMENTAL EFFECTS METADATA SURVEY FORM

Name of person updating the form

Ron Smith

Date submitted

April 20, 2012

Project name:

Planned

In Operation

Completed

Project description:

Project Developer: Verdant Power

Technology Developer: Verdant Power

Technology type: 3-bladed, horizontal axis turbine: Gen5 Kinetic Hydropower System (KHPS)

Resource (wave, tidal): Tidal

Project scale (test site, prototype, array, commercial): Demonstration array

Installed capacity (MW): 1.05 MW

Project Website: <http://www.theriteproject.com/>

Launch Date: December 2006

Additional Description: The RITE Project, licensed under FERC P-12611, builds on the successful RITE demonstration that was developed from 2005-08. The RITE Project will consist of:

1. A Project boundary of approximately 21 acres, including shoreline lands for interconnection;
2. Project works consisting of:
 1. Thirty 35-kW, 5-meter diameter axial flow Kinetic Hydropower Systems (KHPS) turbines;
 2. Ten triframe mounts, each of which will support 3 KHPS turbines;
 3. 480-volt underwater cables from each turbine to the shoreline switchgear vaults that will interconnect to a control room and interconnection points, and
 4. Appurtenant facilities for navigation and operation.

In accordance with the FERC Pilot Project License, the RITE Project will be installed in stages with commensurate environmental monitoring as follows: Install A: (performed under existing FERC Verdant Order and existing permits):

- Install two Gen5 Turbines on existing monopiles to verify machine performance targets and further environmental compatibility; Install B-1: Install a single triframe, consisting of three Gen5 turbines;
 - Install B-2: Install up to three additional triformes, consisting of up to nine Gen5 turbines;
 - Install C: Install up to six additional triformes, consisting of up to eighteen Gen5 turbines (for total installation of no more than 30 Gen5 turbines).
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Location: East Channel of East River - tidal strait connecting Long Island Sound to Atlantic Ocean through New York Harbor at New York, NY, USA. Turbines were at 10 meters depth.

Coordinates: 40.77056°, -73.94°

Process status:

Current status of the project implementation and future developments

Expected operation date (if project is under way please indicate the start date)

Licensing information (brief description): Permitting for the RITE Project can be separated into two parts - the RITE demonstration (a grid-connected demonstration of a 6-turbine KHPS at RITE site) and the 1.05 MW RITE Project described here (RITE Pilot). The RITE demonstration took place under the FERC Verdant Order, a joint Section 10/404/401 Water Quality Certification issued by NYSDEC and USACE and an underwater lands lease issued by NYSOGS. The consent process for the RITE demonstration started in 2002 and work began in late 2006. The RITE Pilot will take place under a FERC Hydrokinetic Pilot Project License as well as a Section 10/404.401 Water Quality Certification permit issued by NYSDEC and USACE, an underwater lands lease issued by NYSOGS, and CZMA concurrence issued by NYSDOS. The RITE Pilot consent process started the end of 2008 and the FERC license was issued January 2012. Throughout the RITE consent process the following key organizations have been involved: NYSDEC, NYSDOS, USACE, USEPA, NMFS/NOAA, USCG, NYSOGS, and others. Public involvement included stakeholder meetings, work groups, public meetings and notice and comment periods. The service list contains over 200 entries during the nine-year process. The following is a brief procedural history:

- 2002: FERC Issues Preliminary Permit for the RITE Project
- 2002-04: Initial Consultation Document, Stakeholder and Scoping Meetings
- 2006: FERC Verdant Order, NYSDEC/USACE Section 10/404/401 Permit for the RITE demonstration
- 2006-08: RITE demonstration and environmental monitoring
- November 25, 2008: FERC Draft License Application filed for RITE Pilot
- May 1, 2009: Notice and Letter issued granting waivers for use of Pilot Procedures
- December 29, 2010: FERC Final License Application filed for RITE Pilot
- January, 2011: NYSDEC, USACE Section 10/404/401 Permit Applications filed and CZMA filed
- February 2, 2011: REA Notice issued; June 6, 2011: Comments filed
- August 2011: NYSDEC WQC (401/404) public comment; October 2011: Comments filed
- December 13, 2011: NYSDEC grants 10-year Water Quality Certification (WQC) (301/404)
- January 23, 2012: FERC 10-year Hydrokinetic Pilot Project License issued, incorporating WQC terms
- USACE Section 10/404 Permit: pending at time of writing

Key Environmental issues: Working with local and federal natural resource agencies, Verdant Power will execute a comprehensive set of environmental monitoring and safeguard plans to ensure the safe operation of the RITE Project. These efforts include a set of environmental monitoring plans - the RITE Monitoring of Environmental Effects (RMEE) plans - that will be conducted throughout the phased development of the project to observe the interaction of aquatic species with the natural environment, particularly as the project grows to include larger arrays of operating turbines. These plans are extensions of prior RITE monitoring efforts, which showed no evidence of negative impact to the local environment in the project area.

Aquatic Life - The East River supports a variety of resident and migrating aquatic species, including winter flounder, Atlantic tomcod, striped bass, bay anchovy and American eel. The two relatively common fish species are the Atlantic silverside and the northern pipefish.

Terrestrial Resources - A variety of birds inhabit the area, with some using the East River for feeding or resting. Dominant species include the double-crested cormorant and a variety of gulls.

Rare, Threatened and Endangered Species - two federally-listed endangered fish species, the shortnose sturgeon and the Atlantic sturgeon, are known to traverse the area. The threatened green turtle and loggerhead turtle, and the endangered Kemp's ridlet turtle and leatherback turtle may be present in the area. The Biological Assessment for the RITE Project rated the probability for interaction with these species to be low. However, as part of its monitoring, Verdant Power will continue to observe and report any interaction between these species and the project during operation.

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

Demonstration Environmental Monitoring Studies: The Roosevelt Tidal Energy Project				
General description	Environmental studies on project effects were conducted during the RITE demonstration (2005-08) as the basis for the RITE Pilot.			
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	Geotechnical Seabed and Substrate Composition Surveys.	Used for detailed bathymetric data, substrate characterization and evaluation of aquatic habitat. Side scan SONAR, sub-bottom SONAR, video grab samples.	No sediment deposition due to high tidal velocities and aquatic habitat limited to transient use.	Completed
	Velocity measurements.	Stationary ADCPs within field Mobile ADCP surveys.	Establish the water velocity profiles for the project.	Ongoing
	Hydrodynamic Analysis.	Analysis by field data, and models in micro, meso and macro scale.	De-minimis effects of water level changes in field.	Completed
	Underwater Sound.	Pre- and post- turbine deployment sound measurements.	Ambient and turbine noise would not cause behavioural reactions or injury.	Completed
	Water Quality Sampling.	Video grab samples.	No sediment observed.	Completed
Fish and Fisheries	Fixed Hydroacoustic Array.	24 split-beam transducers (SBT) pre and post deployment of turbines.	24 split-beam transducers (SBT) pre and post deployment of turbines.	Completed
	Mobile Hydroacoustic Survey.	1 split-beam transducer on a vessel - day and night transects.	Fish likely affected by vessel presence, very little relevant data collected.	Completed
	Stationary DIDSON.	Deployed from the shoreline for evaluation of technique.	Fish observed in-shore in non-impact zones. Limited observations due to bio-fouling.	Completed
	Mobile DIDSON/SBT Surveys.	Paired DIDSON and split-beam transducer mounted on a vessel for observations during turbine operations.	Observed fish interactions that suggested avoidance behavior around an operating turbine.	Completed

	Mobile Netting.	Transects using a small net mounted on a vessel.	Very little data collected.	Completed
	Stationary Netting.	Fixed vessel with netting gear.	Fish likely affected due to vessel presence. Some concurrence on species.	Completed
Birds/Fish and Fisheries	Bird Observation Study.	Shoreline observations during daylight hours pre and post-deployment of turbines.	Cormorants (diving birds) observed feeding during or close to slack tide when turbines were not rotating. No changes seen in number and-or behavior during turbine operation.	Completed
Other	Rare Threatened and Endangered (RITE) species assessment.	Observations of RITE species in the form of the studies listed above.	No RITE species observed during demonstration.	N/A
Reports or Papers	<ul style="list-style-type: none"> • Verdant Power, Inc.; Initial Consultation Document (ICD) for the Roosevelt Island Tidal Energy Project • FERC Project Number 12178; October 2003. • Verdant Power, Inc.; Final Pilot License Application for the Roosevelt Island Tidal Energy Project • FERC Project Number 12611; December 2012. • Verdant Power, Inc.; NYSERDA Report • Contract 18785; March 2012 			
Research Projects	<ul style="list-style-type: none"> • Environmental Evaluation supported by the New York State Energy Research and Development Authority (NYSERDA); 2006-13 • Gen5 rotor development supported under US DOE Advanced Water Power Project; 2008-12 			

Monitoring and adaptive management: The Roosevelt Tidal Energy Project

General description RITE Pilot environmental monitoring plans: RITE Monitoring of Environmental Effects (RMEE) plans as approved January 2012.

All RMEE plans are subject to the adaptive management process throughout the term of the pilot license.

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)
Fish and Fisheries – Meso Scale Monitoring (abundance and spatial/temporal distribution in turbine array area)	RMEE-1: Seasonal Fixed Hydroacoustics Monitoring.	Split deam transducers within turbine array (90 days between Sept. 15 and Dec. 15).	N/A	Underway
Fish and fisheries - Micro Scale	RNEE-2: Seasonal DIDSON Observation	DIDSON deployed in stationary position	N/A	Underway

Monitoring (fish Interaction with KHPS)	Monitoring.	aimed at operating KHPS turbine (3 weeks between Sept. 15 and Dec. 1).		
Fish and fisheries – Meso/Macro Scale Monitoring (fish species characterization)	RMEE-3: Seasonal Species Characterization - Netting.	Netting during slack tide - May/June, July/August and 6 days between Sept. 15 - Dec. 15.	N/A	Underway
ESA Species – Macro Scale Monitoring	RMEE-4: Tagged Species Detection.	VEMCO receivers deployed in the east and west channels of the East River.	2 Atlantic sturgeon detected in 2011.	Underway
Birds/Fish and Fisheries	RMEE-5: Seasonal Bird Monitoring and Evaluation.	Bird Observations during Spring and Fall.	N/A	Underway
Physical Environment	RMEE-6: Underwater Noise Monitoring and Evaluation.	Underwater hydrophones - near operating KHPS and far field measurements.	N/A	Underway
Recreational Uses	RMEE-7: Recreational Monitoring.	Localized observations of recreational use in the area.	N/A	Ongoing
Navigation	Safeguard Plans	In coordination with the US Coast Guard maintain lighted PATON buoys delineating RITE Pilot Project Boundary.	3 buoys and 2 danger signs in place.	Ongoing
Reports or Papers	None as of April 2012			
Research Projects	None as of April 2012			