

# 1 ENVIRONMENTAL EFFECTS METADATA SURVEY FORM

Name of person filing the form (can opt to omit from on-line form)

Date submitted

Ron Smith

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**Project name: The Roosevelt Island Tidal Energy (RITE) Project**

Project description:

*Project Developer:* Verdant Power

*Technologytype:* 3-bladed, horizontal axis turbine: Gen5 Kinetic Hydropower System (KHPS)

*Resource (wave, tidal, wind):* Tidal

*Project scale (test site, prototype, array, commercial):* Commercial array

*Installed capacity (MW):* 1.05 MW

*Additional Description*

The RITE Project, licensed under FERC P-12611, builds on the successful RITE demonstration that was under development 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:
  - a) Thirty 35-kW, 5-meter diameter axial flow Kinetic Hydropower Systems (KHPS) turbines;
  - b) Ten triframe mounts, each of which will support 3 KHPS turbines;
  - c) 480-volt underwater cables from each turbine to the shoreline switchgear vaults that will interconnect to a control room and interconnection points, and
  - d) 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).

*Project Website:* [www.theriteproject.com](http://www.theriteproject.com)

Location:

*Ocean/Water body:* East Channel of East River - tidal strait connecting Long Island Sound to Atlantic Ocean through New York Harbor

*Closest city:* New York, NY

*Country:* USA

*Coordinates (please use Mercator):* 998822.7293 E, 217600.2742 N

*Depth:* 10 meters

Process status:

10-year FERC Pilot Project License (P-12611) issued January 2012

Install A operation planned for 2013, Install B-1 planned for 2013-2014

Licensing information (brief description):

*Please provide a brief description listing the organizations involved, licenses needed and duration of consent process. One paragraph should suffice.*

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 the 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, USFWS, 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) (401/404)

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: *brief description on the most important environmental issues raised by the project (e.g. Sensitive species/habitats/areas that were of particular concern and/or received special protection) and how they were addressed.*

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 during system demonstrations. The following provides a summary of the natural 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 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 ridley 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). You can also include here the contacts for the project environmental issues.*

All environmental documentation related to the RITE Project can be found on the project website at [www.theriteproject.com](http://www.theriteproject.com) - FERC Final License Application Volumes 2 and 4.

## RITE Demonstration Environmental Monitoring Studies:

**General description** Environmental studies on project effects were conducted during the RITE demonstration (2005-08) as the basis for the RITE Pilot.

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	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 2007
	Velocity Measurements	Stationary ADCPs within field Mobile ADCP surveys	Establish the water velocity profiles for the project	Ongoing, Stationary ADCPs required for turbine operation
	Hydrodynamic Analysis	Analysis by field data, and models in micro, meso and macro scale	<i>De-minimis</i> effects of water levels changes in field	Completed 2010. Water levels to be monitored during RITE Pilot
	Underwater Sound	Pre- and post-turbine deployment sound measurements	Ambient and turbine noise would not cause behavioural reactions or injury	Completed 2007. Underwater sound for multiple turbines will be studied during RITE Pilot
	Water Quality Sampling	Video grab samples	No sediment observed.	Completed 2007
Fish and fisheries	Fixed Hydroacoustic Array	24 split-beam transducers (SBT) pre and post deployment of turbines	Number of targets, general target size, zonal distribution, seasonal distribution of targets. No species identification. Greatest abundance observed in-shore in non-	Completed 2007-09. Hydroacoustics will be used in RITE Pilot to study effects of multiple turbines.

			impact zones	
	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 2007. Discontinued by mutual agency concurrence as ineffectual
	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 2007. Will be used during RITE Pilot for seasonal observations
	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 behaviour around an operating turbine	Completed Fall 2008. Technique verified and useful but limited to boat presence
	Mobile Netting	Transects using a small net mounted on a vessel	Very little data collected	Completed 2006-discontinued due to safety concerns
	Stationary Netting	Fixed vessel with netting gear	Fish likely affected due to vessel presence. Some concurrence on species.	Completed 2006. Follow-up studies to be performed during RITE Pilot
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 behaviour during turbine operation	Completed 2006-08. Follow-up studies to be performed during RITE Pilot for observation of multiple turbines
Other	Rare Threatened and Endangered (RTE) species assessment	Observations of RTE species in the form of the studies listed above.	No RTE species observed during Demonstration	None observed A tagged species detection study (for tagged sturgeon) will be performed during RITE Pilot
<b>Reports or papers</b>	-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			
<b>Research</b>	-Environmental Evaluation supported by the New York State Energy Research			

**projects**

and Development Authority (NYSERDA);2006-13  
 -Gen5 rotor development supported under US DOE Advanced Water Power Project; 2008-12.

**RITE Pilot –Monitoring and Adaptive Management**

**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	<b>Monitoring program description including question and/or objective</b> (several can be listed per receptor)	<b>Design and methods</b> (brief description)	<b>Results</b> (brief description)	<b>Status</b> (planned, underway, completed, with dates)
Fish and Fisheries - MesoScale Monitoring (abundance and spatial/temporal distribution in turbine array area)	RMEE-1: Seasonal Fixed Hydroacoustics Monitoring	Split-beam transducers within turbine array (90 days between Sep. 15 and Dec. 15)	-	During Install B2 and Install C
Fish and fisheries - Micro Scale Monitoring (fish Interaction with KHPS)	RMEE-2: Seasonal DIDSON Observation Monitoring	DIDSON deployed in stationary position aimed at operating KHPS turbine (3 weeks between Sep. 15 and Dec. 1)	-	During Installs A, B-1 and B-2 as evaluated
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	-	Installs A, B-1, B-2 and C as evaluated
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 pre-installations, Installs A and B1. Continued during Install B2 and C if appropriate
Birds/Fish and fisheries	RMEE-5: Seasonal Bird Monitoring and Evaluation	Bird observations during Spring and Fall	-	Installs B-1 and B-2
Physical environment	RMEE-6: Underwater	Underwater hydrophones – near	-	Install B-1 and Install C

	Noise Monitoring and Evaluation	operating KHPS and far field measurements		
Recreational Uses	RMEE-7: Recreational Monitoring	Localized observations of recreational use in the area	--	Ongoing through Pilot project at years 1,2,4 and 5
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, buoys increase as project expands
<b>Reports or papers</b>	None as of April 2012			
<b>Research projects</b>	None as of April 2012			