



Hydro Green Energy

# NEWS RELEASE

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## FISH SURVIVAL STUDY ON HYDROKINETIC POWER TURBINE SHOWS DEVICE IS ULTRA FISH FRIENDLY

*Over 99 Percent Fish Survival Achieved at Nation's Only  
Licensed and Commercial Hydrokinetic Power Project*

**HOUSTON, TX** – Results of the first and only direct fish survival study performed on a hydrokinetic turbine show that the technology is extraordinarily fish friendly. The hydrokinetic power turbine utilized for the study was designed and manufactured by [Hydro Green Energy, LLC](#), which also operates the unit at U.S. Army Corps of Engineers Lock and Dam No. 2 in Hastings, MN. The 82-page study results were filed on December 23 at the Federal Energy Regulatory Commission, the federal agency that regulates the hydropower industry.

“The comprehensive study performed on our hydrokinetic turbine wholly confirms what we had modeled with a computer before the turbine was installed, as well as what we knew in our minds: our hydrokinetic turbine is an extremely environmentally friendly technology,” said Wayne F. Krouse, Chairman and CEO of Hydro Green Energy. “From the first day this project was envisioned, Hydro Green Energy committed itself to performing this study as a way to not only advance our technologies and projects, but to advance the global hydrokinetic power industry as a whole. While the study specifically validates our technology, it also validates our pre-installation computer modeling, which can be performed on other technologies with a high degree of confidence.”

The fish survival study was performed this summer at the only commercial, FERC-licensed hydrokinetic power plant in the United States. The Hastings project was approved by a 5-0 vote by FERC on December 13, 2008 and began operating in mid-2009. At the Hastings project, [Normandeau Associates](#), a highly regarded consulting firm with 40 years of experience in providing ecological, environmental and natural resources management services, evaluated the direct effects to fish of the first of two hydrokinetic units.

Normandeau conducted the fish survival study using their “HI-Z Turb N’ Tag” methodology. Normandeau’s patented methodology has been utilized at nearly 50 conventional hydropower projects and by the Department of Energy, but never on a hydrokinetic turbine. This methodology uses a controlled experiment approach and produces comprehensive, statistically reliable and verifiable results on injury and survival of fish passed through a turbine, spillway or over falls.

To accomplish this task, Normandeau deployed 502 balloon and radio tagged fish of a variety of species and sizes. 402 fish swam through HGE’s hydrokinetic turbine, which rotates at 21 revolutions per minute (21 RPM), and 100 were allowed to swim freely in the river near the turbine. Environmental scientists studied fish survival and injury rates of both groups after recapture of nearly all the tagged fish. Pre-installation

computer modeling performed by Hydro Green Energy, which relied on models created by the U.S. Army Corps of Engineers and the Department of Energy, indicated a 97 percent fish survival rating for the turbine.

Only one fish out of the 402 that were introduced into the hydrokinetic unit showed evidence of direct physical harm (0.002%), and this was almost certainly due to the fact that the fish was outfitted with a balloon tag, causing it rise to the surface to interact with the hydrokinetic device in a manner that otherwise would never occur. The study also found that the hydrokinetic turbine cannot inflict any pressure related or grinding injuries on fish. Additionally, no signs of increased predation were witnessed downstream from the hydrokinetic unit, which is at times an issue with conventional hydropower facilities.

Before being filed with FERC, the Hastings fish survival study was submitted for review and comment to the U.S. Fish and Wildlife Service, the U.S. National Park Service, the Minnesota Department of Natural Resources, the United States Army Corps of Engineers and the Minnesota Pollution Control Agency. Hydro Green Energy solely covered all costs associated with the extensive study. Despite having significant funding from Congressional appropriations and the American Recovery and Reinvestment Act for hydrokinetic technology and environmental research, the Department of Energy last year rejected an application from Hydro Green for funding assistance for the Hastings study.

“We strongly believe in educating all hydropower stakeholders by relying on sound, indisputable science and Normandeau’s exemplary staff provided us with an outstanding, comprehensive and thoroughly professional study. By disclosing the scientific data from the Hastings project, all stakeholders will better understand how this technology performs from an environmental standpoint and we’ve also bolstered our ability to rely more on modeling during project development,” said Krouse. “With everyone more educated about the environmental performance of hydrokinetic turbines, the industry will grow, future projects will be developed more quickly and cost effectively, and we’ll be able to bring more clean energy and new jobs to the United States of America. This, in turn, will ensure that new waterpower technologies can better contribute to achieving the energy, economic and environmental goals of the Obama administration.”

Hydro Green Energy, a privately held start-up company based in Houston, TX, closed its Series-A funding in April 2008 with a \$2.6 million investment from the Quercus Trust, a highly regarded venture capital firm that invests in clean energy companies with intellectual property. The company holds U.S. Patent # 6,955,049, four foreign patents and has multiples of dozens of additional U.S. and foreign patents pending on the company’s technologies.

Hydro Green is presently developing waterpower projects in Alabama, Iowa, Illinois, Kentucky, Louisiana, Minnesota, Missouri, Mississippi, North Carolina, Ohio, Oklahoma and Wisconsin. The company’s existing project pipeline will result in the development of nearly 500 MW of clean, domestic, renewable energy that is eligible for a variety of clean energy incentives adopted at the federal and state levels.

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