

OPENHYDRO EMEC PROJECT

Name of person filing the form

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Date submitted

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Project name: OpenHydro EMEC Project

Project description:

Project Developer: OpenHydro

Technology type: Axial-flow turbine

Resource: MHK (tidal)

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

Installed capacity (MW): 250 kW

Additional Description: The test rig consists of two steel monopoles grouted into sockets drilled into the seabed, with a platform suspended from the piles to provide a working area. The turbine, which is six metres in diameter, is fixed to the piles using two steel collars, which allow the unit to be lowered into the sea using two 15 tonne hydraulic winches. The test rig allows for the turbine to be raised out of the water easily, reducing the cost and time for testing, maintaining and updating the device.

The turbine is composed of 16 ducted fins and an open center to allow marine life to pass through. No lubricating fluids are necessary as there is only one moving part and no seals, as electricity is generated with a permanent magnet instead of a gearbox. The design is scalable to create larger turbines in the future.

FERC Document Number:

Launch Date: May 26th, 2008

Project Website: <http://www.openhydro.com/devEMEC.html>

Location: European Marine Energy Centre (EMEC) off the Fall of Warness (Orkney), Scotland. There are strong tides of up to 8.5 knots and an extreme weather climate to test the device.

Coordinates: 58°57'51"N, 3°17'57"W

Process status: Established in 2005, Dublin-based OpenHydro designs and manufactures marine turbines to generate renewable energy from tidal streams. OpenHydro was the first developer to use

the tidal test site at the Fall of Warness off the island of Eday when its test rig and 250kW open centered turbine were installed in 2006. The device was the first tidal turbine to be grid connected in Scotland and subsequently the first to successfully generate electricity to the national grid in the UK.

Though the original turbine is no longer in testing, OpenHydro continues to bring subsequent generations of their device for testing on their test rig.

Licensing information (brief description): The European Marine Energy Centre (EMEC) was established in 2003 by Highlands and Islands Enterprise (HIE) and funding partners, and gained their United Kingdom Accreditation Service (UKAS) in 2005. Accreditation by UKAS demonstrates the competence, impartiality and performance capability of these evaluators. UKAS is a non-profit-distributing private company, limited by guarantee. UKAS is independent of Government but is appointed as the national accreditation body by the [Accreditation Regulations 2009 \(SI No 3155/2009\)](#) and operates under a [Memorandum of Understanding with the Government through the Secretary of State for Business, Innovation and Skills](#).

Key Environmental issues: For the impact assessment process, all possible interactions were first identified and then screened to establish the likely areas of significant effects. Orkney is recognized as an important area for a number of marine species, with various conservation and protected sites in the areas surrounding the tidal test site.

The key issues to consider for all marine mammals and diving birds relate to concerns over the potential for damage to wildlife that may occur as a direct or indirect result of collision between the animal and moving underwater device parts. There are also concerns about the potential for disturbance or harm to marine wildlife species that may be caused by waterborne noise associated with construction, operation, and decommissioning processes, or disturbance that may lead to species being deterred or displaced from their habitual breeding and/or feeding grounds.

Environmental webpage:

http://www.aquatera.co.uk/search/result_bykeyword.asp?key=OpenHydro&Submit=go!

Baseline and project effects studies:				
General description: Studies and collection of data prior to installation of the turbines.				
Receptor	Study description including question and/or objective	Design and methods (brief description)	Results (brief description)	Status (planned, underway, completed, with dates)
Marine Mammals	Otters.	Visual Surveys: Evidence of otter activity where suitable habitat is	Where suitable habitat is present along south west Eday coastline, otter resting sites, feeding areas and potential	Completed

		present along the south west Eday coastline.	holts have been identified. Otters normally cub in the winter months in Orkney, although they can breed at any time of the year. Due to lack of evidence it is not possible to identify a seasonal sensitivity for the otter, but due to this European protected status any disturbance of these species would receive a high sensitivity ranking.	
	Harbor (Common) Seals.	Visual Surveys: Haul out sites on Muckle Green Holm and Little Green Holm (SSSI sites), and Seal Skerry. Movements of seals through the Fall of Warness area are unknown.	Common seals pup in early June and July, and this is followed by a moulting period in late July and early August. The closest haulout sites to the proposed facility are at Seal Skerry, The Graand (on the south coast of Eday), and on Muckle and Little Green Holms. The moderate sensitivity refers to the risk of pup abandonment due to disturbance, which can increase the mortality rate.	Completed
	Grey Seals.	Visual Surveys: Haul out sites and breeding colonies on Muckle Green Holm and Little Green Holm (SSSI sites) and Faray and Holm of Faray (SSSI and marine SAC). Haulout site on Seal Skerry and The Graand. Movements of seals through the Fall of Warness area are unknown.	The grey seal breeding season is from early October to late November. The moulting period follows in January to March (females), and March to May (males). Grey seal breeding colonies are located on Muckle and Little Green Holms, and Faray and Holm of Faray (approximately 4 km north of Seal Skerry). The moderate sensitivity refers to the risk of pup abandonment due to disturbance, which can increase the mortality rate.	Completed
	Cetaceans.	Visual Surveys: Harbour porpoise are regularly observed in Eday waters. Other species that have also been recorded in the area include: minke whale, killer whale,	Minke whale, killer whale, pilot whale, harbour porpoise and white-sided and common dolphins have all been recorded in the Fall of Warness, but there has been no systematic watching of cetaceans in this area.	Completed

		pilot whale and white-sided and common dolphins.		
Birds	Shore birds – ringed plover, meadow pipit and rock pipit.	Visual Surveys: Nest on beach below Cauldale.	Ringed plover, meadow pipit and rock pipit use the stretch of coast below Cauldale for nesting from May to the end of July.	Completed
	Cormorants.	Visual Surveys: Important breeding colony on Little Green Holm.	There is an important cormorant breeding colony on Little Green Holm (April-June). If the birds are disturbed there is a risk that gulls will steal the eggs.	Completed
Human Environment	Vessel traffic.	Survey of locals.	The Fall of Warness is used for passage by cruise liners and pelagic fishing boats, creel fishermen regularly fish the inshore shell fishing grounds, and the inter-island ferries use a number of routes through the channel which vary in response to tidal and weather conditions.	Completed
	Archaeological significance.	Survey of locals.	No Scheduled Ancient Monuments, Listed Buildings or designated landscapes within the Cauldale area. Cauldale itself is however considered of local importance as an example of a 19th Century croft, a diminishing and under-protected part of the cultural resource, and features including a stone footbridge were identified within the area of the proposed construction site. In addition a horizon of flagged stones was identified on the dune edge, which could be the remains of a steading, or date back as far as the first millennium AD. A number of ships are known to have wrecked in the Fall of Warness in the last 300 years, and a Spitfire went down during World War II 'off Eday'.	Completed
Reports	<ul style="list-style-type: none"> Aurora Environment (2005) EMEC Tidal Test Facility Fall of Warness Eday, Orkney - 			

and papers	<p>Environmental Statement. http://www.emec.org.uk/download/Fall_of_Warress_ES_Aurora_2005.pdf</p> <ul style="list-style-type: none"> Norris, J. (2009) European Marine Energy Centre: the development of a targeted environmental monitoring strategy and the streamlining of marine renewables consents in Scotland. http://www.see.ed.ac.uk/~shs/Wave%20Energy/EWTEC%202009/EWTEC%2009%20%28D%29/papers/137.pdf Project specific reports conducted by Aquatera (unreleased)
Research Projects	N/A

Monitoring and adaptive management				
General description: Monitoring studies completed after the installation of the turbines.				
Receptor	Monitoring program description	Design and methods	Results	Status
N/A	N/A	N/A	N/A	N/A
Reports and papers	<ul style="list-style-type: none"> OpenHydro is currently writing an environmental report 			
Research Projects	N/A			