

ENVIRONMENTAL EFFECTS METADATA SURVEY FORM

Name of person updating the form

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Date submitted

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Project name: Oyster 1

Planned In Operation Completed

Project description:

Project Developer: Aquamarine Power

Technology Developer: Aquamarine Power

Technology type: Oscillating Wave Surge Converter

Resource (wave, tidal): Wave

Project scale (test site, prototype, array, commercial): Single device

Installed capacity (MW): 350 kW

Project Website: <http://www.aquamarinepower.com/projects/oyster-1-orkney/>

Launch Date: November 2011

Additional Description: The Oyster™ 1 was essentially a wave energy converter located at a nominal water depth of 12m which in many locations is relatively close to the shoreline. The system comprised of a buoyant flap, 18m wide and 10m high, hinged at its base to a sub-frame which sat on 4 pre-installed piles with additional latching anchors into the rock seabed. The surge component in the waves forced the flap to oscillate which in turn compressed and extended two hydraulic cylinders mounted between the flap and the sub-frame to pump water at high pressure through a closed loop pipeline back to shore. On shore a hydro-electric plant consisting of a Pelton wheel turbine driving a variable speed electrical generator coupled to a flywheel. Power flow was regulated using a combination of hydraulic accumulators, an adjustable spear valve, a flywheel in the mechanical power train and rectification and inversion of the electrical output.

Location:

The device was installed at European Marine Energy Centre (EMEC) wave device test area in Billia Croo, Orkney.

Coordinates: 58.959105°, -3.376339°

Process status: Oyster 1 delivered over 6000 offshore operating hours, survived two winters at sea and performed in line with predictions made from our design model. Oyster 1 also achieved continuous 24 hour generation and successfully demonstrated the feasibility of using wave energy to pump high pressure water to an onshore hydro-electric turbine to create electricity. Oyster 1 generated significant operational experience, learning and data which has feed into the design of Oyster 800.

The Oyster 1 device was built with a two year design life and operated from 2009 until 2011. In March 2011, Orkney Towage & Leask Marine took advantage of calm weather conditions to decommission the device in preparation of the second generation design of Oyster 800.

Licensing information (brief description):

- Coastal Protection Act (CPA) licence
- Food and Environmental Protection Act (FEPA) licence
- Environmental Protected Species (EPS) licence
- Town and Country Planning Act Planning Permission

Key Environmental issues: Key issues considered in the Environmental Statement were:

- Seabed impacts (during construction)
- Wildlife Disturbance (during construction)
- Atmospheric Emissions (during construction)
- Fisheries impacts (during construction and operation)
- Navigational risks (during construction and operation)

All of the key environmental issues considered in the Environment statement were assessed as insignificant impacts.

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

Baseline studies and project effects studies: Oyster 1				
General description				
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				
Benthos				
Fish and fisheries				
Large vertebrates				
Birds				

Marine uses / users				
Other* (can be named)				
Reports or Papers	(Key papers on the areas addressed should be listed here; when possible the files themselves can be made available in downloadable PDF format, alternatively links to the files or project website can be provided when available e.g. SeaGen.)			
Research Projects	(past or on-going environmental research projects at the site)			

Monitoring and adaptive management: Oyster 1				
General description				
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				
Benthos				
Fish and fisheries				
Large vertebrates				
Birds				
Marine uses/ users				
Other* (can be named)				
Reports or Papers	(Key papers on the areas addressed should be listed here; when possible the files themselves can be made available in downloadable PDF format, alternatively links to the files or project website can be provided when available e.g. SeaGen.)			
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