

ENVIRONMENTAL EFFECTS METADATA SURVEY FORM

Name

Tom Clements

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Project name: EMEC Scapa Flow Non Grid-Connected Wave Test Site

Planned In Operation Completed

Project description:

Project Developer: European Marine Energy Centre Ltd.

Technology Developer:

Technology type: Multiple

Resource (wave, tidal): Wave

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

Installed capacity (MW): Non-grid connected test site. A purpose-built Test Support Buoy moored on site acts as a power sink to allow load-dumping of any electricity generated as heat dissipated to air.

Project Website: <http://www.emec.org.uk/facilities/scale-test-sites/>

Launch Date: September 2011

Additional Description: In addition to the grid connected wave test site at Billia Croo, EMEC also have a wave test site that is not connected to the grid aimed at providing less challenging conditions for scale prototypes. The site provides a more flexible seaspace acting as a stepping stone between the test tank and real sea conditions. The site is located in Scapa Flow, to the south of Kirkwall, and was chosen for its relatively benign waters which reach almost 0.35m significant wave height. The area is 0.4km across and approximately 0.9km in length situated in water depths of 21-25m with a predominant westerly wave regime.

At the site EMEC offers developers the use of a bespoke test support buoy. If required, the device under test will be connected to the test support buoy via two umbilical cables: one for power transmission and the other for control and communications. The buoy can relay data by wireless technology allowing developers to monitor performance remotely, as well as dissipating electricity generated by the device. The buoy is also equipped to supply the marine energy devices on test with power and act as navigational aids.

Each test site comprises one berth with pre-laid foundation and attachment points, and adjacent 'blank' test area. The pre-laid foundations comprise 5m x 5m x 2m gravity-base frames loaded with densecrete

blocks for equipment moorings. An area of seabed is also available for rehearsal or deployment of other tools and techniques.

Export Cables: As the site is not grid connected, no export cable is present.

Onshore Infrastructure: N/A

Vessel Spread:

Vessel type	Activity	Comment
Workboat	Used to install anchors and test support buoy	Exact vessel used unknown

Location: The EMEC Scapa Flow nursery wave test site is situated in the natural harbour of Scapa Flow south of Kirkwall in the Orkney Islands, Scotland. The two test berths on site range from 21-25m water depth.

Coordinates: 58.887376°, -2.945962°

Process status: Site selection surveys and environmental studies were carried out in 2009-10. Construction of the EMEC Scapa Flow nursery wave test site was completed in 2011 and EMEC welcomed their first client on site in 2012. EMEC hold a valid consent for the installation of an additional set of foundations which gives the potential for two serviced berths to become available in future. The EMEC nursery wave test site at Scapa Flow is expected to continue to be operational so long as there is a need for testing in the benign real-sea regime the site enjoys. The following is a list of EMEC clients:

- Energy Bag Device, University of Nottingham - installed 2012

Licensing Information:

EMEC holds an overarching site licence, simplifying the consent process within an agreed envelope of activity. Two consents are required for installation of marine energy converter devices at the scale test sites:

- Marine Licence issued by the Regulator, Marine Scotland; and
- Harbour Works Licence issued by Orkney Islands Council (OIC).

A developer wishing to deploy a device at the test site must provide an outline of the proposed project. This document must also identify any potential device-specific environmental or navigational risks, as well as any proposed mitigation measures. This information will be submitted alongside EMECs

application to update their generic Marine Licence, a process which must be carried out for every new development at the site. MS-LOT typically requires 6-8 weeks from receipt of application to issue a licence amendment. EMEC is also required to give OIC at least 21 days' notice of each new developer wishing to install at its scale sites.

Licencing conditions: N/A

Key Environmental issues: Although some seals have been recorded in the area of the site, SNH have commented that this area is not a site of concern. There have been sporadic sightings of cetaceans within the observation area, in particular Harbour Porpoise and Risso's Dolphin. Scapa Flow is an important wintering area for many species of marine bird. In relation to these species at the sensitive periods, the key issues to be addressed within the developer's environmental monitoring plan are:

- Displacement due to noise (during installation, maintenance, operation and decommissioning of device)
- Displacement due to physical presence of device
- Physical harm caused by collision
- Physical harm caused by entanglement in device moorings
- Physical harm caused by noise

Environmental webpage: <http://www.emec.org.uk/facilities/scale-test-sites/>

Mitigation measures: Where appropriate developers are required to implement their own mitigation measures should activities overlap with sensitive times of the year for marine wildlife.

Baseline studies and project effects studies: EMEC Tidal Test Site

General description				
The following field surveys were undertaken (or commissioned) by EMEC to inform baseline characterisation.				
Receptor	Study description	Design and methods (brief description)	Results (brief description)	Status (planned, underway, completed, with dates)
Physical environment	Initial site selection: Bathymetry commissioned by EMEC to Netsurvey Ltd.	Geophysical survey.	Water depths ranged from 15 to 30m across the site approximately 1 m deeper than charted depths.	Completed (2010)
Benthos	Initial site selection: determining biota and sediment particle size.	Grab sampling.	Moderately low energy site. "Sheltered Muddy Gravels" and "Subtidal Mixed Sediments". The infaunal community was composed largely of deposit feeding species (mainly polychaetes and bivalve molluscs), with only a few crustaceans present. Two common species were <i>Lumbrineris gracilis</i> and <i>Thyasira flexuosa</i> which made up approximately 10 - 20% of individuals at all stations	Completed (2009)

Marine mammals	Baseline Acoustic Characterisation.	Seabed-mounted hydrophone deployments.	Background noise levels were in line with that which could be expected for this type of shallow water site. Contributions over and above these conditions were then identified, with the major contribution being the natural sounds from wind/waves and precipitation. The major anthropogenic source was shipping noise from distant static and mobile sources. Local shipping traffic also contributed to the sound field, although this was only present for around 7% of the time. Other sounds identified included a thunderstorm, aircraft and various biological sources.	Completed (2013)
Reports or papers	<ul style="list-style-type: none"> • Moore, 2009. SNH commissioned report No. 319 • Scapa Flow Scale Site: Environmental Description. 2011. Available [Online] http://www.emec.org.uk/facilities/scale-test-sites/ Accessed 04/11/2014. • Harland, E.J. 2013. Scapa Flow Wave Test Site: Acoustic Characterisation. Available [Online] http://www.scotland.gov.uk/Topics/marine/science/MSInteractive/Themes/EMEC-Wildlife/Scale-Sites. Accessed 04/11/2014. 			

Monitoring and adaptive management:				
General description	The following measures were outlined in the Environmental Description.			
Receptor	Monitoring program description	Design and methods (brief description)	Results (brief description)	Status (planned, underway, completed, with dates)
Benthos	Benthic grab analysis	Survey samples sieved and analyzed regarding species and abundance	Study undertaken to assist in setting up the scale site, no further work deemed necessary unless additional or different types of infrastructure are proposed	Completed (2010)
Birds and mammals	Wildlife observations	Observations of birds and mammals by EMEC wildlife observers	Raw data is publically available, however no report published as of yet.	On-going
Reports or papers	<ul style="list-style-type: none"> Scapa Flow Scale Site: Environmental Description. 2011. Available [Online] http://www.emec.org.uk/facilities/scale-test-sites/ Accessed 04/11/2014. Raw wildlife observational data available at http://www.scotland.gov.uk/Topics/marine/science/MSInteractive/Themes/EMEC-Wildlife/Scale-Sites. Accessed 04/11/2014 Scapa Flow Wildlife Observations Methodology. 2010. Available [Online] http://77.68.107.10/EMEC_Wildlife/Scapa_Flow/Scapa%20Flow%20Observation%20Methodology%20v1.00.pdf Accessed 04/11/2014. 			
Research projects	<ul style="list-style-type: none"> Marinet 			