MAGALLANES RENOVABLES S.L.
Floating energy generation platform – ATIR

Initial Decommissioning Programme

ocean_2G

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Document History

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Glossary

BEIS	Department of Business, Energy & Industrial Strategy
DECC	Department of Energy & Climate Change
EMEC	European Marine Energy Centre
HIRA	Hazard Identification and Risk Assessment
HSE	Health, Safety and Environment
HSEQ	Health, Safety, Environmental & Quality
IMS	Integrated Management System
MOC	Management Of Change
QC	Quality Control
ROV	Remotely Operated Vehicle
SAC	Special Area of Conservation
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
SMWWC	Scottish Marine Wildlife Watching Code

1 Executive summary

Magallanes Renovables S.L. is a company that, since its inception in 2007, has focused its activity on the development of a high stability floating platform for obtaining electrical power from tidal currents. Magallanes Renovables S.L. aims to deploy and test a platform with a power capacity up to 2 MW at the European Marine Energy Centre (EMEC) Fall of Warness test site, off the island of Eday, Orkney Islands, Scotland.

The present document outlines a decommissioning programme for the platform in question and is submitted for approval in accordance with the requirements of the Energy Act 2004.

The platform consists of a full-scale prototype with an overall length of around 45 m, an extreme moulded breadth of 6 m, approx., and an operational draught of 23.4 m, approx. It is divided into three blocks:

- Upper block: is the visible block of the platform, as part of it is above the waterline. It houses most of electrical equipment and the devices for pumping the fluids all over the platform.
- Vertical block or mast: is a hollow space that fixes the lower block to the upper block and through which cables and pipes connect the different equipments of the platform.
- Lower block or nacelle: is devoted to the mechanical system comprising the shafts, ball bearings, gear boxes and generators, among others.

The programme that has been proposed for the decommissioning of the device is explained in more detail in subsequent chapters of this document; however, a summary of the procedure is outlined below:

- Vessel mobilisation;
- Lifting of EMEC subsea cable and disconnection from the platform’s umbilical cable;
- Laying back of the subsea cable to the seabed;
- Detaching of the platform from the mooring lines and towing from tidal test site;
- Temporary mooring of the platform in a site with more benign sea conditions;
- Disassembly of blades from the platform;
- Detaching of mooring lines from the mooring structure; Removal of mooring structure, if appropriate; Post-decommissioning survey.

The site where the platform is intended to be deployed is characterised by its strong tidal streams, whose speed can be higher than 3.5 m/s in spring, in a water depth of 49 m (LAT) approx. Concerning the seabed conditions, surveys undertaken confirm scoured bedrock ridges and platforms with occasional boulders.

Regarding navigation activity, cruise ships are the most common type of vessel in the area, although they usually transit only in the summer period. Fishing vessel traffic and recreational boating are occasional across the test site. Nevertheless, it should be noted that the Fall of Warness test site has been established since 2005 and its boundaries defined on navigation charts. It would therefore be expected that vessels navigating the area should be aware of the test site and the presence of test devices.

From the environmental perspective, several assessments of the site have already been carried out. Environmental statement, environmental description, environmental sensitivity

table together with environmental appraisal have been conducted in support a site-wide section 36 consent, obtained by EMEC in 2016, for Fall of Warness test site under the Electricity Act 1989.

2 Introduction

The present document outlines a decommissioning programme for a floating energy generation platform, which harnesses the energy of tidal currents and converts it into electrical energy.

The platform is intended to be deployed at the EMEC Fall of Warness test site, off the island of Eday, Orkney.

This document is submitted for approval in accordance with the requirements of the Energy Act 2004 and has been prepared in line with the *Decommissioning of offshore renewable energy installations under the Energy Act 2004. Guidance notes for industry* (DECC[1], 2011).This decommissioning programme is a live document which will be revisited over the life of the project to ensure the planned methodologies for removal and disposal remain safe and current.

2.1 Magallanes Renovables S.L.

Magallanes Renovables S.L. is a limited company registered in Spain that started its business activity in 2007 and, since then, has focused its activity on the development of a floating platform for obtaining electrical power from tidal currents. Magallanes Renovables S.L. is supported by its holding company Sagres S.L., as sole shareholder.

Magallanes Renovables S.L. is the company who will own and operate the platform and the items necessary to connect the platform to the subsea cable owned by EMEC.

[1] Since July 2016, DECC is part of BEIS.

3 Background information

3.1 Device location

The platform is intended to be deployed at the EMEC Fall of Warness test site, off the island of Eday, Orkney, in the allocated berth.

Figure 1 and Figure 2 illustrate the area of EMEC test site at Fall of Warness, together with the position of berths. It has been proposed to use Berth 1 to deploy the platform.

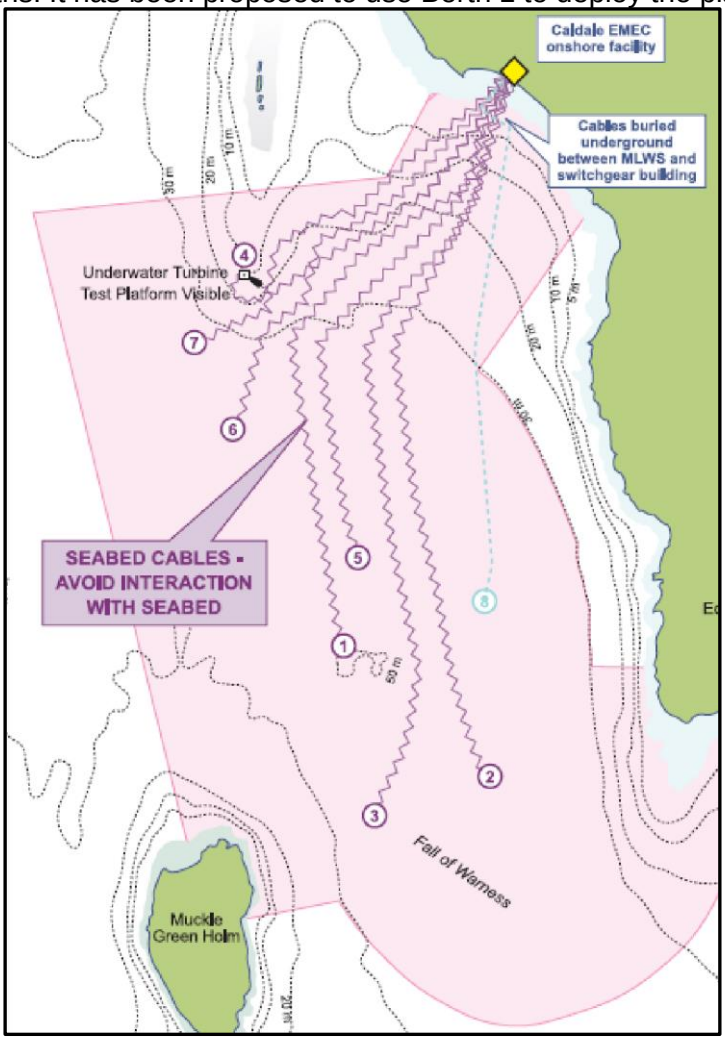


Figure 1. Chart showing the area of EMEC Fall of Warness test site

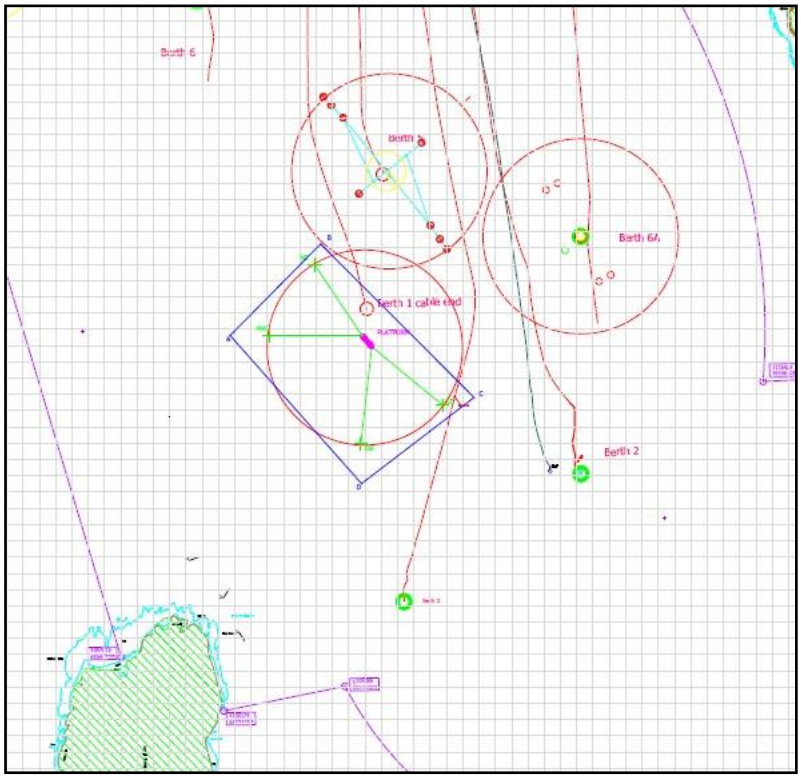


Figure 2. Proposed test berth for deploying the platform

The deployment will be in the vicinity of the berth location and within the boundary coordinates provided in Table 1.

Table 1. Deployment location at EMEC's Fall of Warness test site

Test berth	Latitude (WGS84)	Longitude (WGS84)
Berth 1	59° 08.484'N	02° 49.037'W
Points along platform deployment boundary	59° 08.441'N 59° 08.593'N 59° 08.337'N 59° 08.195'N	02° 49.477'W 02° 49.185'W 02° 48.692'W 02° 49.054'W

3.2 Type and status of any other adjacent facilities

During decommissioning, any facilities adjacent to the berth will need to be taken into consideration. As the EMEC test site is available for use by other developers, other installations on the site and EMEC-owned infrastructure, must be considered during decommissioning activities. All operations at EMEC's test site must comply with EMEC's Standard Operating Procedures, Emergency Operating Procedures and Health, Safety and Environment requirements. Before activities begin, there should be a review of other planned work due to be carried out at the site with potential to coincide with the decommissioning works. Site access permits will only be issued if the site is safe for the intended work or may be issued subject to a set of conditions.

The relative proximity of the development to other devices and berths at the site will be considered when updating the decommissioning methodology closer to the time of decommissioning.

3.3 Layout of the facilities to be decommissioned

The platform (see Figure 3) consists of a full-scale prototype with the following indicative overall dimensions:

- Overall length: 45 m.
- Extreme moulded breadth: 6 m. Operational draught: 23.4 m.

The platform has two open-bladed rotors and the maximum output power amounts to 2 MW. It is divided into three blocks: upper block, mast or vertical block, and nacelle or lower block.

The upper block is the visible block of the platform. It is the block through which the platform is accessible for maintenance. The upper block is allocated for accommodating the pumps, transformers, converters, switchgears and electrical panels, among others.

The vertical block fixes the lower block to the upper block. It is a hollow space through which the communication and low-voltage cables connect the equipment housed in the lower block with the parts of the systems within the upper block.

The lower block is devoted to the mechanical system comprising the shafts, ball bearings, gear boxes and generators, among others.

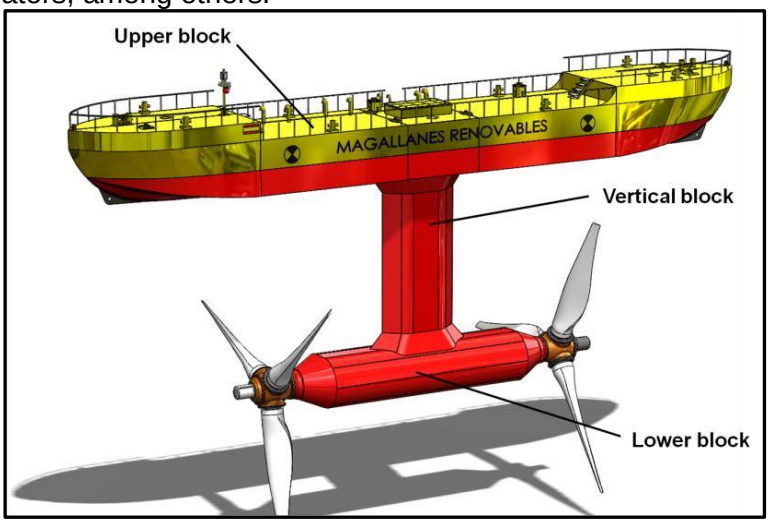


Figure 3. Device layout

The platform is expected to be fixed to the seabed with four anchor points, two located at the bow of the platform and the other two at the stern, as it can be seen in Figure 4.

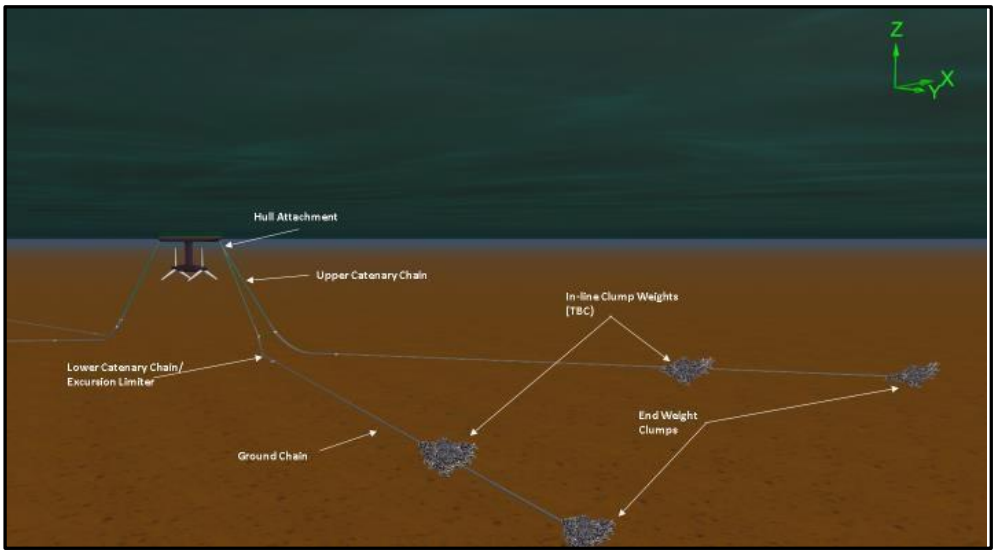


Figure 4. Scheme of mooring system

3.4 Site conditions

3.4.1 Prevailing weather

As described in the Environmental Statement undertaken by Aurora for EMEC tidal test facility Fall of Warness, strong winds and gales are very common in Orkney, predominately from the west to the southeastern. In the spring and early summer there is a marked increase in the frequency of easterly winds, and in May south-easterly winds are more frequent than winds from any other direction.

3.4.2 Sea water temperatures

Pursuant to sea surface temperatures collected by EMEC from various sources around Orkney and other sources of sea temperature data available from Marine Scotland, satellite, modelled data and The Crown Estate, among others, it can be concluded that temperature ranges from 6.5 ºC to 13.5 ºC in an annual cycle, with maximum temperatures recorded around August and September and minimum temperatures around February.

3.4.3 Seascape

The Environmental Description developed by EMEC for Fall of Warness tidal test site reveals that the majority of the Orkney Islands are composed of sedimentary rocks of Devonian age (360-410 million years ago). Older metamorphic rocks and younger dykes are found in a few places. The shores around the south west coast of Eday follow the typical pattern of habitats and communities associated with exposed to moderately exposed rocky shores.

3.4.4 Currents

The Fall of Warness area is subject to strong tidal streams, with peak spring tide speeds in excess of 3.5 m/s. The significant tide speeds along the year is one of the reasons for Magallanes Renovables' intention of deploying the platform at Fall of Warness.

3.4.5 Seabed conditions

The swathe bathymetry, geophysical, ROV and dive surveys undertaken by Aquatera (Aquatera 2005) reveal that bedrock is exposed throughout most of the test bay area, with occasional boulders but is swept of any potentially mobile sands or gravels.

3.4.6 Water depths

The chart depth readings decrease steadily from 1 m at the coast to between 34 and 51 m in the main channel where the tidal devices are to be deployed.

3.5 Navigation activity

It is worth mentioning that Fall of Warness test site has been established since 2006 and its selection was made based on the local traffic features. In addition, its boundaries are defined on navigational charts; this allows vessels to plan their passage taking into account the test site. In fact, local vessels in the area, such as inter-island ferries, have good awareness of test site location.

3.5.1 Shipping activity

Transiting vessels on the key NW-SE route (between Westray Firths and Stronsay) tend to already pass to the western side of the test site. Besides, prudent mariners will only navigate via the Fall of Warness in appropriate conditions and cruise ships (the most common type of vessel), which transit the area for sight-seeing opportunities, are unlikely to expose their passengers to very severe sea states if it can be avoided. It is noted that cruise ships are only expected to transit the area during summer months when waves are lower.

The regular inter-island ferries run past the test site to the West and close to the site on the South, however they are well aware of the activity in the area.

3.5.2 Fishing vessel activity

Fishing vessel traffic within the test site is occasional throughout the year and mainly transiting NW-SE between the Westray Firth and Stronsay Firth. Fall of Warness is a transit route for pelagic trawlers en route to and from fishing grounds, e.g., West of Shetland.

The most common gear type was potter/creeler. Creelers operating off Eday tend to be small craft of typically less than 12 metres in length and draughts below 3 m. Demersal trawlers were the next most common type.

3.5.3 Recreational vessel activity

Fall of Warness test site is located within the general sailing area around Orkney. There are no cruising routes passing through the test site, although there are two light-use cruising routes passing to the east and west as follows:

- Route passing east of Eday, transiting between Kirkwall and islands to the north (e.g., Sanday, Stronsay and Westray) via Eday Sound.
- Route passing west of Muckle Green Holm, transiting between Kirkwall and Westray via the Sound of Faray.

Recreational boating, both under sail and power is highly seasonal and highly diurnal. Nevertheless, due to the strong tides, the Fall of Warness area is not popular with recreational users; in fact, nautical almanacs and sailing directions recommended small recreational vessels avoid the area in general.

3.6 Conservation areas

It is worth mentioning that within the boundaries of Fall of Warness test site, no area is catalogued as Special Area of Conservation (SAC) under the Habitats Directive, or as Special

Protection Area (SPA) under the Birds Directive. Nevertheless, there are protected sites in the surroundings, listed in Table 2.

Table 2. Protected areas in the surroundings of Fall of Warness test site

Site Code	Site Name	Designation
8254	Faray and Holm of Faray	SAC
1683	Faray and Holm of Faray	SSSI
8372	Sanday	SAC
1205	Muckle and Little Green Holm	SSSI

3.6.1 Faray and Holm of Faray SAC and SSSI

This site is approximately 15 km from the Fall of Warness, with grey seal (*Halichoerus grypus*) as a qualifying interest.

3.6.2 Sanday SAC

The site is approximately 4 km from the Fall of Warness. The qualifying interests of the site are the harbour seal (*Phoca vitulina*), intertidal mudflats and sandflats, reefs and subtidal sandbanks.

3.6.3 Muckle and Little Green Holm SSSI

It is immediately adjacent to southern part of the test site, comprising two neighbouring uninhabited islands (Muckle Green Holm and Little Green Holm). The qualifying species of this site is the grey seal (*Halichoerus grypus*).

4 Description of items to be decommissioned

The items which are subject of decommissioning are listed below:

- The floating platform, comprising the upper block, vertical block and lower block, in which all equipment and devices are housed.
- The mooring lines, which fix the floating platform by bow and stern to the seabed.
- The umbilical cable, which connects the power converter housed in the floating platform to the existing subsea cable connector owned by EMEC.
- The anchoring system, to which the mooring lines are attached and which ensures that the position of the floating platform is maintained.

The floating platform together with the mooring lines is shown in Figure 5 below.

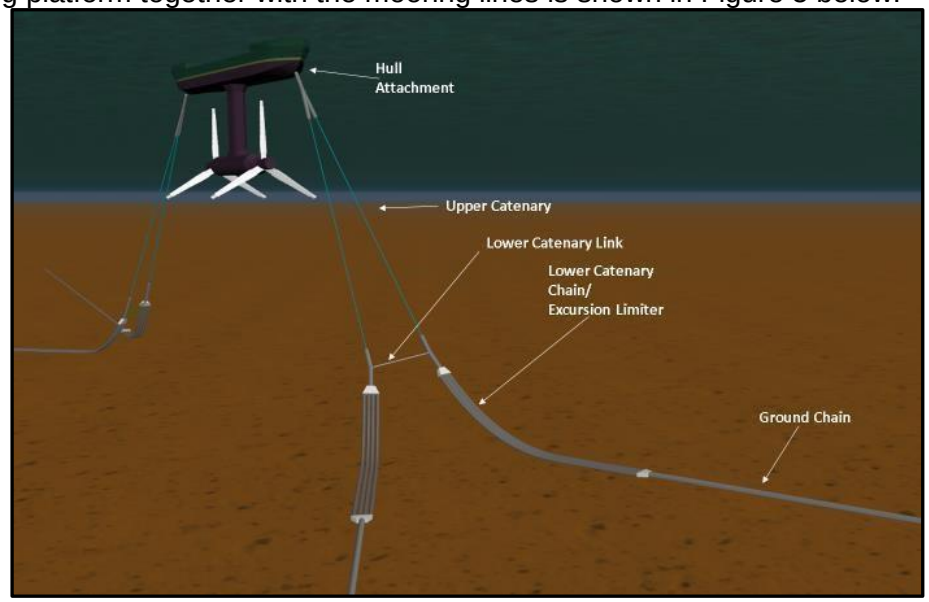


Figure 5. Simulation of floating platform and mooring lines

The floating platform comprises (i) an upper block with compartments allocated to pumps, transformers, converters, switchgears and electrical panels; (ii) a vertical block that fixes the lower block to the upper block; and (iii) a lower block or nacelle devoted to the mechanical system (shafts, ball bearings, gear boxes and generators, among others) which incorporates at either end a hub with three blades assembled, constituting the rotor.

Each blade has a length of ca. 8.5 m and the hub is around 2 m across, so the rotor diameter will amount to 19 m. The rotor is an open-bladed one and has at least 2.5 m clearance from sea surface.

The mooring lines are mainly made of steel and have a length of 300 m approx. Attached to the floating platform by bow and stern, the mooring lines ensure that the position of the platform within the berth is maintained.

Concerning the umbilical cable, the electricity generated by the platform is transmitted first through it and then through EMEC's subsea cables to EMEC's shore-based substation. Umbilical cable is expected to have a length no greater than 400 m.

The anchor point consists of a chain clump weights that secures the device to the seabed. The ends of the mooring lines are attached to the chain clump anchor and to the floating platform.

Subsea cable is owned by EMEC and, thus, is not going to be decommissioned.

The following Figure 6 outlines the indicative overall dimensions of the platform, in meters.

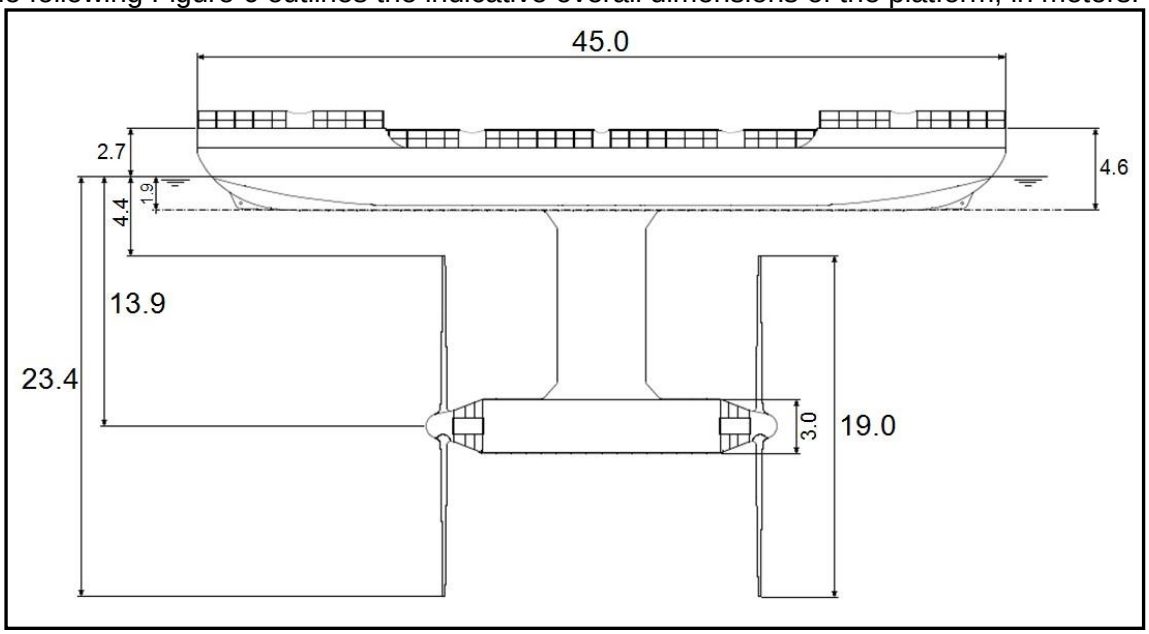


Figure 6. Indicative overall dimensions of the platform

Table 3 summarises the main specifications of the platform.

Table 3. Main specifications of the platform

Item	Specification
Scale of the device	Full-scale
Overall length	45 m
Extreme moulded breadth	6 m
Operational draught	23.4 m
Maximum output power	Up to 2 MW
Number of rotors	2
Type of rotor	Open-bladed rotor
Rotor diameter	19 m
Rotor depth	At least 2.5 m clearance from sea surface
Blade/rotor design	Blades with counter-rotating mechanism

5 Description of proposed decommissioning measures

5.1 Introduction

This section aims at describing the proposed measures to be taken for decommissioning the installation. It has to be considered that the level of detail provided may be improved upon over time, although it is understood that the programme is detailed enough to demonstrate that the decommissioning has been fully considered and factored into design decisions.

5.2 Proposed method of removal

5.2.1 Cable disconnection

As a first step, the platform will be disconnected from the EMEC subsea cable. In order to undertake such disconnection, EMEC's subsea cable end will be lifted by a deck crane from the seabed to the deck of one of the vessels, umbilical cable will be then disconnected from the EMEC cable and, finally, the EMEC cable will be laid back to the seabed in the condition in which it was first taken over.

5.2.2 Floating platform decommissioning

Afterwards, the platform will be detached from the mooring lines with the help of a multicat workboat and towed by a tug vessel from Fall of Warness test site to Shapinsay Sound, where it will be temporary moored. At Shapinsay Sound the blades will be disassembled from the platform by a dive team supported by a multicat workboat with a deck crane.

5.2.3 Mooring lines decommissioning

If necessary, a dive team will also detach the steel mooring lines from the chain clump anchors, so that the mooring lines can be lifted by the crane of one of the vessels participating in the decommissioning of the platform.

5.2.4 Anchoring system decommissioning

The following chain clump anchors will be lifted from the seabed by the Leask Marine multicat vessels.

- NW – 80-170 Te chain clump
- NE – 80-170 Te chain clump
- SE – 80-170 Te chain clump
- SW – 80-170 Te chain clump

These clumps will be returned to Hatston quay and lifted onshore by a shore crane for storage.

5.3 Health and safety considerations

Leask Marine are at all levels responsible for ensuring that the offshore and dive operations to achieve the decommissioning scope, are conducted in accordance with the HSEQ Policy and that, as a minimum, the Leask Marine Management System is applied on all vessels and sites the operations, where Leask Marine take responsibility for employees and subcontractors.

HSEQ Responsibilities are clearly defined in the HSEQ section within the Leask Marine IMS as detailed below.

Leask Marine will develop and implement HSEQ Management Plans and or as appropriate HSEQ Bridging Documents as required for the project. By doing so Leask Marine will ensure operations in accordance with contractual requirements but also ensure that neither Magallanes Renovables nor Leask Marine HSEQ Standards are compromised whilst undertaking activities.

5.3.1 Health, Safety and Environment (HSE)

- All work will be carried out in accordance with the “Project HSE Plan”.
- All Risk Assessments will be performed in accordance with the “Project HSE Plan”.
- Risk Assessments will be performed for all tasks detailed in this procedure.
- Risk Assessment Report / Task Risk Assessments should be read prior to carrying out the tasks in order to make sure that hazards, risks and mitigating actions have been identified and understood. As a minimum, Toolbox Talk are to be carried out to convey this.

5.3.2 Quality Control (QC)

- Activities will be monitored in accordance with the Quality Plan and applicable sections of the Inspection & Test Plan.
- The Project Engineer and work site Supervisors are responsible for monitoring the progress of the work and recording pertinent information as dictated in the task plan. Each task should be signed off as the work progresses.
- Where required, the Project Engineer and Worksite Supervisors shall provide Magallanes Renovables with sufficient notification of the activities taking place.
- On completion of the works, the Project Engineer must collate the completed task plans and the related Task Completion Certificates (where identified for permanent works).
- Tasks Completion Certificates form will be filled and gathered offshore by the Project Engineer to be part of the As-Built dossier / Mechanical Completion Certificate.

5.3.3 Worksite changes to approved procedure

In the event of any unplanned operation or required change to the procedure offshore which has not been subject to an onshore HIRA, reference should be made to MOC procedures.

The Shift Supervisor responsibility to ensure that Management of Change is clearly communicated to all on shift personnel. During shift handover, minutes should be taken and documented to identify that all parties have understood and agreed to continue operations after handover of responsibility is completed.

5.4 Proposed waste management solutions

Waste management will be carried out in accordance with all relevant legislation at the time of decommissioning. Furthermore, particular regard shall be had to the waste hierarchy (reuse, recycle, incinerate, disposal).

<u>Floating platform</u>

It will be removed from the site and checked in detail in order to know its general condition and in order to analyse how the initial design can be enhanced. Afterwards, two different alternatives are being assessed:

a) The platform will be re-deployed or towed to another location, so as to carry out further research about the platform behaviour in a real environment, and in order to keep working on the optimisation of costs associated with the installation, operation, maintenance and decommissioning of the platform.
b) The platform will be returned to shore and all its components disassembled and managed in accordance with the waste hierarchy abovementioned. In this sense, lubricants, coolants and greases will be disposed of according to the relevant legislation. Blades, which are basically made of composite, if not reused, will be recycled or disposed of as per regulation. Metal components and equipment will be reused and recycled when appropriate.

Mooring lines

Essentially, mooring lines are made of steel and acquire the form of a chain or a cable. Therefore, they will likely be reused, or sold in order to be reused.

Umbilical cable

It is expected that the umbilical cable will be reused; nevertheless, if it is found that the cable is not suitable for a new use, it will be handled in accordance with the relevant legislation on waste management.

Anchoring system

Chain clump anchors will be returned to Hatston quay in order to be reused.

5.5 Details of any items which may be left in situ following decommissioning

Components which constitute the platform mooring system at the berth will be dismantled. There will be no components left *in situ* relating to the device anchoring systems.

5.6 Predicted degradation, movement and stability of any remains

No item will be left *in situ*, therefore no degradation or movement of remains is predicted.

6 Environmental Impact Assessment

With regard to environmental considerations, various assessments have already been undertaken of the site and documentation produced.

The test site has been well documented including an in-depth description of the receptors at the site and their sensitivities in the *EMEC Tidal Test Facility Fall of Warness Environmental Statement (AURORA 2005)*, *Environmental Description for the EMEC Tidal Test Site Fall of Warness (EMEC 2009) and Fall of Warness Environmental Sensitivity Table (EMEC 2010).* Recently an environmental appraisal of the site, *EMEC Fall of Warness Test Site Environmental Appraisal (EMEC 2014)* has been conducted. The appraisal identifies the potential receptors and sources of risk to the environment, together with mitigation measures for minimising impacts. The environmental appraisal will be submitted in support of the marine licence application.

A project-specific Environmental Monitoring Plan has been developed which encompasses the decommissioning phase of the project. Appropriate mitigation measures have been

identified as part of the plan and will be reported to the regulator and relevant stakeholders in line with the Reporting Schedules, outlined in the PEMP. During installation and decommissioning of the platform, there is the possibility of disturbance to marine species due to vessel traffic. For that reason, special effort will be made so that those operational activities will be accomplished in the shortest time possible. In addition, all vessel activities onsite and to and from site will be conducted as far as possible in line with the Scottish Marine Wildlife Watching Code (SMWWC).

The materials used for construction of the platform and connections have been chosen for their suitability for use at sea, both in terms of durability and their impact on the environment. Except for the diesel oil (deposit quantity of less than 1 ton and only for emergency purposes), the materials are all non-toxic. Environmental acceptable lubricants will be used and all hydraulic fluids used within the platform will be certified as suitable for marine environment.

7 Consultations with interested parties

An initial consultation with the Northern Lighthouse Board has been undertaken to gain an early indication of the marking and lighting requirements for the operational phase of the project.

EMEC undertakes routine consultation with statutory consultees and stakeholders, regarding the pipeline of testing activities at its test sites. Stakeholders were consulted by EMEC in relation to its Section 36 consent application for the Fall of Warness test site during 2015, this is based on an envelope of technology deployments that encompasses the Magallanes Renovables ATIR device. A list of stakeholders consulted during the application is provided below:

- Marine Scotland
- Scottish Government
- Orkney Islands Council
- The Crown Estate
- Former Department for Energy and Climate Change (superseded by the Department for Business, Energy and Industrial Strategy)
- Orkney Islands Council (including Marine Services)
- Scottish Natural Heritage
- Maritime and Coastguard Agency
- Northern Lighthouse Board
- Royal Yachting Association
- Scottish Environmental Protection Agency
- Royal Society for Protection of Birds
- Orkney Fisheries Association
- Orkney Sustainable Fisheries
- Orkney Dive Boat Owners' Association

8 Costs

The costs for the decommissioning are considered commercially sensitive data to Magallanes Renovables. As a result, the overall cost estimate of the proposed decommissioning measures are to be provided separately, in confidential Appendix 1 which will be made available to Marine Scotland.

9 Financial security

Financial security details are considered commercially sensitive data. As a result, those details are provided separately, in confidential Appendix 2 made available to Marine Scotland.

10 Schedule

The high-level Gantt chart below (Table 4) details key project dates (in months), considering as the reference month the one in which moorings at Fall of Warness test site are installed. It is expected that those moorings will be installed not later than August 2020.

Table 4. High-level Gantt chart with key project dates

	M1	M2	M3 – M15	M16	M17
Preparation and installation of moorings at Fall of Warness					
Installation of the platform at Fall of Warness					
Commissioning of the platform					
Test and demonstration for performance assessment					
Decommissioning of the platform					
Decommissioning of moorings					

Based on the information known so far, the most significant activities associated with the decommissioning operations, together with the anticipated frequency of trips, are listed below (Table 5).

Table 5. Operational activities associated with the decommissioning

Activity	Anticipated frequency of vessel movements
Decommissioning of the platform (including unmooring and subsea cable disconnection)	8-10 day trips (possibly over 2 x neap periods)
Towing of the platform from Fall of Warness to Shapinsay Sound	1 day trip
Disassembly of blades	6-8 day trips
Decommissioning of moorings	5-10 day trips

However, it has to be considered that all schedules might vary since, among other factors, they are subject to suitable environmental and tidal conditions and, therefore, adverse weather may delay or increase the forecasted duration of activities.

Final details of timing will be given towards the end of the life of the installation, when a review of the decommissioning programme will be undertaken in order to finalise the decommissioning measures proposed.

11 Project management and verification

Magallanes Renovables commits to submit a report within four months of the completion of the decommissioning works, detailing how the programme was carried out, providing verification to Government concerning progress and compliance.

12 Seabed clearance

During decommissioning operations it is not expected the generation of debris, since the platform together with its mooring lines will be removed completely.

Upon the completion of decommissioning, by means of the appropriate survey, it will be confirmed that the site has been cleared out. Such survey will enable identification and subsequent recovery of any debris (if any) located on the seabed which may have arisen from Magallanes Renovables' activities and which may pose a risk to navigation, other users of the sea or the marine environment. Survey will be undertaken in accordance with EMEC procedures and independent, third party will be involved when providing evidence that the site has been cleared.

13 Restoration of the site

Provided that it is only forecasted the deployment of a single device and that such device is a floating platform attached to the seabed only by means of four anchor points, it is not expected that there will be significant disturbance to the site during the decommissioning of the platform. Thus, it is not anticipated it will be necessary to implement a specific site restoration programme.

The removal of the components constituting the platform mooring system, if appropriate as referred to in previous sections, would only have influence in a quite limited zone (of several tens of square meters) and would not impact on areas to be conserved.

14 Post-decommissioning monitoring, maintenance and management of the site

Assuming the small potential area of impact on the seabed, the lack of generation of debris forecasted and the completely removal of the platform together with its mooring lines, no post-decommissioning monitoring, maintenance or management of the site is considered to be necessary.

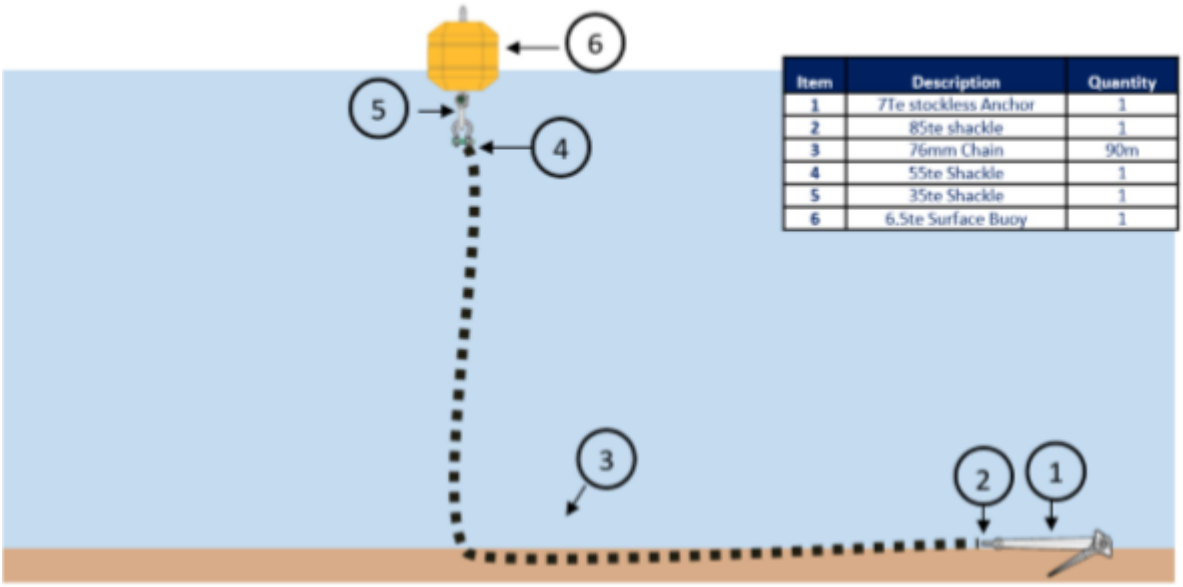
Following the decommissioning of the facilities a seabed survey will be undertaken so as to confirm that the dismantling has been done correctly. The survey will be carried out as per EMEC procedures and third party will be involved when providing evidence that the site has been cleared.

15 Temporary moorings

A temporary mooring site, either Deerness anchorage or Shapinsay Sound test site, will be used for installing and removing the blades before installation at Fall of Warness and after removal from Fall of Warness respectively. It is most likely that the Deerness anchorage site will be the most favourable due to water depth requirements.

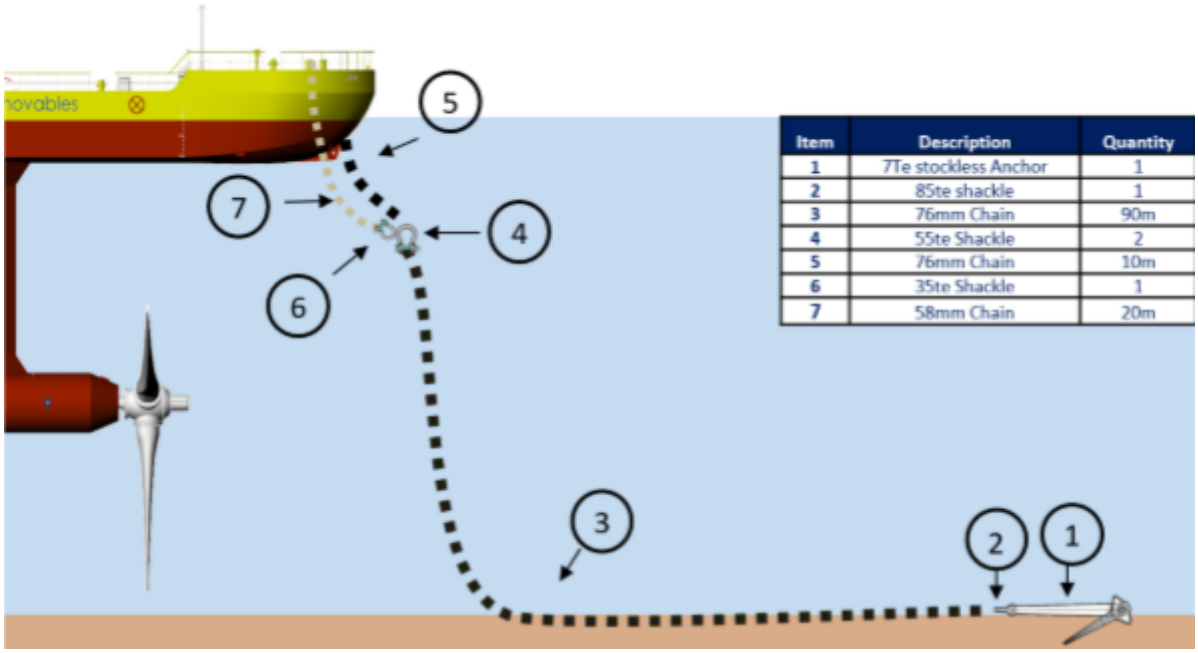
Details of Deerness anchorage and Shapinsay Sound sites can be found in Project Information Summary and Project Environmental Monitoring Plan.

The temporary mooring will be a single point mooring as shown in Figure 7 and Figure 8. A single point mooring will be used at the temporary deployment site due to less extreme environmental conditions and the temporary nature of the deployment.



Item	Description	Quantity
1	7Te stockless Anchor	1
2	85te shackle	1
3	76mm Chain	90m
4	55te Shackle	1
5	35te Shackle	1
6	6.5te Surface Buoy	1

Figure 7. Single Point Mooring System Schematic - prior to device installation



Item	Description	Quantity
1	7Te stockless Anchor	1
2	85te shackle	1
3	76mm Chain	90m
4	55te Shackle	2
5	76mm Chain	10m
6	35te Shackle	1
7	58mm Chain	20m

Figure 8. Single point mooring system schematic – with device

The decommissioning of this mooring will be as soon as possible after the removal of the device and as this mooring is temporary and the method of removal will be almost identical to the removal method from the Fall of Warness test site. The primary differences in methodology will be due to there being fewer mooring points and no cable connection at the temporary site.

16 Supporting studies

Supporting studies and documents have been undertaken in connection with Fall of Warness tidal test site. Such documentation is listed below:

- EMEC Tidal Test Facility Fall of Warness Environmental Statement (AURORA 2005).
- Environmental Description for the EMEC Tidal Test Site Fall of Warness (EMEC 2009).
- Fall of Warness Environmental Sensitivity Table (EMEC 2010).
- EMEC Fall of Warness Test Site Environmental Appraisal (EMEC 2014)
- Navigation Risk Assessment of the Proposed Tidal Test Facility at the European Marine Energy Centre (ABBOTT 2005)
- Addendum to Navigation Risk Assessment of the Proposed Tidal Test Facility at the European Marine Energy Centre (ABBOTT 2005)
- Navigation Risk Assessment Update – Fall of Warness (ANATEC 2010) Project-specific Navigation Risk Assessment.
- Project-specific Environmental Monitoring Programme