

PROFORMA FOR RECORDING MARINE SCOTLAND'S CONSIDERATION OF A PROPOSAL AFFECTING A POTENTIAL/DESIGNATED SAC OR SPA

**SITE: Scotrenewables Tidal Power Ltd, Tidal energy device Falls of Warness EMEC.
FILE REF: FKB/Z229**

1a. Name of Natura site affected & current status available from:

http://gateway.snh.gov.uk/portal/page?_pageid=53,910284,53_920284&_dad=portal&_schema=PORTAL

1. Faray and Holm of Faray Special Area of Conservation	2. Sanday SAC
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1b. Name of component SSSI if relevant

1. Faray and Holm of Faray SSSI	2. N/A
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1c. European qualifying interests & whether priority/non-priority:

<p>1. Faray and Holm of Faray Special Area of Conservation</p> <ul style="list-style-type: none"> <i>Halichoerus grypus (grey seal)</i> 	<p>2. Sanday SAC</p> <ul style="list-style-type: none"> Mudflats and sandflats not covered by seawater at low tide (Intertidal mudflats and sandflats) <i>Phoca vitulina</i> (Common/ harbour seal) Reefs Sandbanks which are slightly covered by sea water all the time (Subtidal sandbanks)
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1d. Conservation objectives for qualifying interests:

Annex 1 Habitats Conservation Objectives

<p>1. Faray and Holm of Faray</p> <p>N/A</p>	<p>2. Sanday SAC</p> <p>To avoid deterioration of the qualifying habitats thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable conservation status for each of the qualifying features; and</p> <p>To ensure for the qualifying habitats that the following are maintained in the long term:</p> <ul style="list-style-type: none"> Extent of the habitat on site Distribution of the habitat within site Structure and function of the habitat Processes supporting the habitat Distribution of typical species of the habitat Viability of typical species as components of the habitat <p>No significant disturbance of typical species of the habitat</p>
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Annex II Species Conservation Objectives	
<p>To avoid deterioration of the habitats of the qualifying species (grey seal) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable conservation status for each of the qualifying features; and To ensure for the qualifying species that the following are maintained in the long term:</p> <ul style="list-style-type: none"> • Population of the species as a viable component of the site • Distribution of the species within site • Distribution and extent of habitats supporting the species • Structure, function and supporting processes of habitats supporting the species • No significant disturbance of the species 	<p>To avoid deterioration of the habitats of the qualifying species (harbour seal) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable conservation status for each of the qualifying features; and To ensure for the qualifying species that the following are maintained in the long term:</p> <ul style="list-style-type: none"> • Population of the species as a viable component of the site • Distribution of the species within site • Distribution and extent of habitats supporting the species • Structure, function and supporting processes of habitats supporting the species • No significant disturbance of the species

PROPOSAL DETAILS

2a. Proposal title & name of consultee (i.e. applicant or competent authority)	
Deployment of the SR250 tidal renewable energy device at the EMEC test facility, Falls of Warness, Eday, Orkney	Marine Scotland
2b. Date of Consultation: SNH response to FEPA consultation received on the 2 nd December 2010	
2c. Type of Case: Tidal – commercial prototype device, temporary deployment at EMEC test facility, Falls of Warness, Eday Orkney	

2d. Details of proposed operation (inc. location, timing, methods):

Background

The proposal is for installation, operation and decommissioning of the Scotrenewables - SR250 tidal stream device, which has a maximum capacity of 250 kW, The device will be installed by March 2011 with the mooring system being installed between January and February 2011, it will be grid connected via the EMEC substation with a newly installed cable at the EMEC test site. This is a prototype device that differs in design from other turbines and as such has not previously been deployed and / or monitored to identify any environmental impacts it may have, however it will be deployed very close to an area that is an established test site for tidal turbines. The SR250 is designed for deployment in water depths >20m and with mean spring tidal velocities of 2.5m/s to >5m/s.

The first phase of the installation is the mooring system for the SR250 device it involves a multi-cat work vessel installing 8 gravity anchors, synthetic and chain mooring lines positioned in an X configuration, which then connect to a turret. The seabed footprint of the mooring system is 310m x 180m. During the first stage of installation approximately 3 km of new armoured cable will be installed using the same multi-cat vessel. The cable will be pulled through the EMEC installed duct and connected to the onshore infrastructure. The cable will be secured to the seabed using chain sinkers every 50m and connected to the turret.

The second phase of the deployment is due to commence in March 2011 and it involves the connection of the full-scale SR250 prototype to the turret on the mooring system. The SR250 consists of a 34m long floating steel tube with a 2.2m diameter. The rotors are each suspended from separate retractable rotor legs attached to the buoyancy tube, which raise and lower the rotors from transport to operation modes. The rotors will be 8m in diameter and the maximum rotor rotation speed will be 24 RPM. The clearance above the rotor sweep is 4m to the sea surface. Once the sea trials have been completed the SR250 will be towed to the site using a multi-cat work vessel and connected to the turret. Scotrenewables will be testing the connection and release mechanisms of the SR250 device prior to connecting the device to the grid. Once Scotrenewables have proven the attachment methodology the device will be installed for numerous short-term test periods gradually increasing to a continuous three-month grid connected deployment during 2012.

Due to the risk of entanglement between the mooring lines and the cable, Scotrenewables have now amended the cable route, mooring system, and location of the device within the test site. However should an entanglement occur this will be detected as an unexpected change in mooring tension by the SR250 remote mooring system and a team will be deployed to investigate the problem.

No maintenance will be carried out at the EMEC test site, if maintenance is required the device will be removed from the mooring system and towed to a suitable harbour facility. All maintenance and the decommissioning at the end of the 5 year test period will be completed using a multi-cat vessel.

Timings and Methodology

The multi-cat vessel is due to arrive on site in Jan/Feb 2011 depending on vessel availability, phase 1 of the installation is scheduled to take 9 days. The installation will be split into 2 phases of work the mooring installation which will take 7 days followed by the cable laying.

Phase 2 involves the connection of the SR250 to the mooring system, the multi-cat vessel will tow the device out to the site and attach it to the turret as described in the Environmental scoping information document. The whole connection process is expected to take <1 day.

SNH advised that the deployment of the tidal stream device is not directly connected with or necessary to the management of the SACs listed above. Hence further consideration is required as detailed below:

The installation of the device will evaluate all of the monitoring proposals submitted by Scotrenewables and ensure that all of the proposed mitigation i.e. soft start, MMO onboard the multi-cat vessel for the duration of the works are adequate.

The operational appraisal will evaluate the collision monitoring proposal submitted and focus on the theoretical collision risk assessment model and include a review off the 2008 observation data acquired from the Falls of Warness site.

ASSESSMENT IN RELATION TO REGULATION 20 or 48

3a. Is the operation directly connected with or necessary to conservation management of the site? YES/NO If YES give details:

The operation is not connected with or necessary to conservation management of the site.

If yes and it can be demonstrated that the tests in 3b have been applied to all the interest features in a fully assessed and agreed management plan then consent can be issued but rationale must be provided, including reference to management objectives. If no, or if site has several European qualifying interests and operation is not directly connected with or necessary to the management of all of these then proceed to 3b.

3b. Is the operation likely to have a significant effect on the qualifying interest? Repeat for each interest on the site.

During the consultation phase of the FEPA licensing process, SNH advised that the proposed deployment of the tidal energy device is likely to have a significant effect on the qualifying interests of two Natura site(s). The primary concern was the potential for the physical interaction between the species qualifying interests - grey and common seals and the operation of the tidal energy device.

In relation to Sanday SAC, it is concluded there will be no likely significant effect on the qualifying habitats of this site; as the device will not be located within the SAC boundary.

In relation to both Faray and Holm of Faray and Sanday SACs, it is likely there will be significant effects on the species qualifying interests (grey seal – Faray and Holm of Faray SAC and common / harbour seal at Sanday SAC).

In particular the conservation objectives that require to be considered further include:

- Population of the species as a viable component of the site
- Distribution of the species within site
- No significant disturbance of the species

3c. Appropriate assessment of the implications for the site in view of the site's conservation objectives.

i) Describe for each European qualifying interest the potential impacts of the proposed operation detailing which aspects of the proposal could impact upon them.

ii) Evaluate the significance of the potential impacts, e.g. whether short/long term, reversible or irreversible, and in relation to the proportion/importance of the interest affected, and the overall effect on the site's conservation objectives. Record if additional survey information or specialist advice has been obtained.

Appraisal

Due to the proximity of the SAC's with respect to the location of the proposed tidal energy device, Marine Scotland have fully assessed the site conservation objectives identified in 3b in the light of potential impacts arising from the deployment and operation of the SR250 device on each of the qualifying species interest from the 2 Natura sites.

The testing of the SR250 prototype will involve installation of a mooring system and the connection of the device onto the mooring system, the device is a dual horizontal-axis with counter rotating rotors. The rotors will drive separate gear boxes and electrical generators and has sub surface nacelle heads. The noisy works associated with this project are temporary but the device will be on site for a period of up to 5 years.

Marine Scotland has developed a theoretical collision risk and a transit model which calculates the number of animals colliding with tidal turbines when transiting through the rotor area assuming there is no avoiding action. The model is based on the observations from the MMO over a 12 month period in 2008 within the survey and test facility at Falls of Warness and then the answer is defined further by the animals foraging behaviour.

The aim of the model is to estimate the number of animals colliding with the tidal turbine over a period of a year. The no avoidance risk is the rate of collision assuming that the seal swims as if the tidal turbine structures and rotors are not present. It is assumed that if the animal is hit then it is killed, whether immediately or through injury.

The theoretical collision model factors in the size, foraging behaviour and the estimated number of dives depending on the required assessment. The model was run for both Grey and Common seals with advice from SMRU regarding the parameters mentioned above. Using the observation data the number of seals recorded within quadrant D2 (proposed SR250 site) was 11 therefore it was assumed as a worst case scenario that there was 11 common seals and 11 grey seals in each model. The model was also run to estimate the collision rate of Basking sharks within the vicinity of the test site as none were recorded within quadrant D2.

The theoretical model then produces 2 results; the first result is worked out assuming that there is no avoidance of the device and the second answer produced takes into consideration the percentage of time that the rotors are in operation and the estimated natural avoidance rate of seals from information related to the MCT device deployed in Strangford Loch.

Grey Seal – Holm of Faray and Faray SAC

The EMEC test site hosts two uninhabited islands in the northern part of Orkney which supports a well-established grey seal *Halichoerus grypus* breeding colony. The seals tend to be found in areas where there is easy access from the shore, and freshwater pools on the islands appear to be particularly important. The islands support the second-largest breeding colony in the UK, contributing around 9% of annual UK pup production.

The grey seal population in Orkney are described as stable and increasing slightly by SMRU data. PBR of grey seals from the Northern Isles of Orkney has been calculated by SMRU (SMRU 2008) as 885, SNH consider it is unlikely that this tidal turbine, alone or in combination with other tidal

devices already in situ at the Falls of Warness, is likely to cause more than 885 individuals to be removed from the Grey seal population.

Compared with other times of the year, grey seals in the UK spend longer hauled out during their annual moult and during their breeding season. Tracking of individual seals has shown that they can feed up to 700km offshore although most foraging probably occurs within 100km of a haulout site. Individual grey seals based at a specific haulout site often make repeated trips to the same region offshore, but will occasionally move to a new haulout site and begin foraging in a new region. Movements of grey seals between haulout sites in the North Sea and the Outer Hebrides have been recorded. Approximately 45% of the world's grey seals breed in the UK and 90% of these breed at colonies in Scotland with the main concentrations in the Outer Hebrides and in Orkney.

Grey Seals are described as generalists, as they feed mainly on the sea bed at depths up to 100m, they forage in the open sea and return regularly to haul out on land where they rest, moult and breed. They may range widely to forage and frequently travel over 100km between haulout sites. Foraging trips can last anywhere between 1 and 30 days. Marine Scotland reviewed the 2008 observation data from the FoW site and compared the figures to that of the SCOS 09 report it can be ascertained from this assessment that only a small proportion of the population of grey seals would be affected by the SR250 device.

In order to assess the likely collision risk of grey seals with the device Marine Scotland used a quantified assessment of the collision risk to grey seals presented by the proposed development to calculate the theoretical collision rate. The estimated collision risk was calculated to be 84.10% if the seal swam straight through the rotor with no avoidance. When this result is then incorporated into the theoretical collision risk model it concluded that the theoretical collision risk was **0.37 animals per year**.

The final theoretical collision risk is then calculated using 50% as the operation time of the rotors and 98% as the estimated natural avoidance rate of seals which then reduces the number of collisions further. The results from the models for Grey Seals have been attached in Tables 3 & 4.

The result clearly shows that there is less than one grey seal expected to collide within Quadrant D2 within a year. The tool estimated that the grey seals would dive 6 times in an hour and due to the SCOS 09 report we calculated that when the seal was in the water 100% of the time it was assumed as feeding time therefore the diving time was increased increasing the possible interaction with the device.

SMRU has reported that the pup production in Orkney has now levelled off (SCOS-BP 09/1 & 09/2; SCOS-BP 06/4) but even if this trend continues, the British grey seal population as a whole is likely to continue increasing for some years (see SCOS-BP 03/3). There is a time lag in changes in pup production being translated into changes in population size. Detailed annual population estimates are given by region in the Appendices of SCOS-BP 09/2.

Common Seal – Sanday SAC

The JNCC statement (2005) supporting the designation of Sanday as an SAC for common seals states "Sanday SAC is situated in the north-east of the Orkney archipelago and supports the largest group of common seal *Phoca vitulina* at any discrete site in Scotland. The breeding groups, found on intertidal haul-out sites that are unevenly distributed around the Sanday coast, represent over 4% of the UK population. Near shore kelp beds that surround Sanday are important foraging areas for the seals". Identified through the Joint Nature Conservancy Council Special Area of Conservation Site Details.

The colony is part of a single metapopulation inhabiting the Northern Isles of Orkney (advice from the Sea Mammal Research Unit (SMRU) to SCOS (Special Committee on Seals). The Orkney harbour seal population has declined by 67% since the late 1990s and has been falling at an

average rate of >13% p.a. since 2001 referenced through the Scientific Advice on Matters Related to the Management of Seal Populations: 2009. SCOS report (SCOS2).

Common seals from Sanday and the Northern Isles of Orkney metapopulation are likely to utilise the Falls of Warness. The Potential Biological Removal (PBR) for common seal numbers in the Northern Isles metapopulation (SMRU 20083) has been calculated from 2007 counts as 23 individuals. This figure relates to all non natural forms of mortality affecting the common seal population, not just those that may arise as a consequence of this development. It is likely that this value will be revised downwards following re-calculation of the PBR from 2008/09 counts. SNH considers it possible that this device, alone or in combination with other human activity within the Northern Isles of Orkney metapopulation area, has the potential to remove more than 23 individuals from the metapopulation.

Each year SMRU carries out surveys of harbour seals during the moult in August, recent survey counts and overall estimates are summarised in SCOS-BP 09/3. It was considered to be impractical to survey the whole coastline every year and SMRU aimed to survey the whole coastline across 5 consecutive years. However, in response to the observed declines around the UK the survey effort has been increased and an attempt was made to survey the entire Scottish and the English east coast populations during 2007. It was determined that seals spend the largest proportion of their time on land during the moult and they are therefore visible during this period to be counted in the surveys.

These widespread declines give clear cause for concern and have resulted in the implementation of area-specific Conservation Orders by the Scottish Government, providing harbour seals with year-round protection. In response, SMRU, with funding support, has established a research programme which includes:

- Planned thermal image surveys of harbour seal moulting populations in Shetland and repeat surveys in Orkney
- Satellite-telemetry based study of proportion of time seals spend hauled out during the moult in two populations with contrasting dynamics, i.e. Orkney and the west coast
- Completion of analysis of pup survival rates in two populations with contrasting dynamics, i.e. Orkney and the west coast, Results from 1 to 5 will be presented to SCOS in 2010.
- The Environmental Monitoring Plan (EMP) outlines a strategy to mitigate the risk of collision impacts on common seals. The strategy should include

In order to assess the likely collision risk of common seals with the SR250 device Marine Scotland used a quantified assessment of the collision risk to the seals presented by the proposed development to calculate the theoretical collision rate. The estimated collision risk was calculated to be 73.4% if the seal swam straight through the rotor with no avoidance. When this result is then incorporated into the theoretical collision risk model it concluded that the theoretical collision risk was **0.51 animals per year**.

The final theoretical collision risk is then calculated using 50% as the operation time of the rotors and 98% as the estimated natural avoidance rate of seals which then reduces the number of collisions further. The results from the models for Common Seals have been attached in Tables 1 & 2.

The result clearly shows that there is less than one grey seal expected to collide within Quadrant D2 within a year. The tool estimated that the common seals would dive 12 times in an hour and due to the SCOS 09 report we calculated that when the seal was in the water 100% of the time it was assumed as feeding time therefore the diving time was increased increasing the possible interaction

with the device.

The PBR values for the common seals provided by SMRU were estimated to be 23 this is a higher factor than the number of seals predicted to collide with the turbine within Quadrant D2.

Environmental Monitoring Protocols

- Scotrenewables have submitted an Environmental Monitoring Plan (EMP) as per SNH's recommendation and the report is being revised following SNH's comments. The report will be signed off by Marine Scotland prior to installation of the device. In addition the EMP will be reviewed every three months of turbine operation to ensure the monitoring is still adequate. Please refer to SR250 'Wildlife Monitoring Strategy, document.
- Scotrenewables has produced a 'Marine Mammal Observation Protocol' inline with the EMEC protocol which will be signed off by Marine Scotland once the EMP has been revised. The MMO protocol includes an MMO onboard the vessel during the noisy operations and in addition the MMO activities will cover the stern end of the boat due to the open ducted propeller. The MMO protocol will be agreed with SNH and then signed off by Marine Scotland prior to installation.
- Scotrenewables are also in the process of producing the methodology for the underwater noise surveys that will take place during installation. The methodology will allow comparison with baseline noise monitoring undertaken by EMEC once submitted this will be reviewed by SNH and signed off by Marine Scotland prior to installation.

Conclusion

Marine Scotland considered each of the issues raised by SNH in the advice provided for the SR250 FEPA application. We considered each of these issues in respect of the 3 conservation objectives identified in section 3b in order to conclude as to whether or not an adverse effect on site integrity can be avoided for both species of seals from each of the sites.

The cross-sectional area of the Fall of Warness for the proposed location of the tidal device is 50,000 m². Consequently. Once the distance from the SAC is taken into consideration along with the 2008 observation data and the theoretical models the total sea volume for both the grey and common seals becomes considerable. Therefore in light of all of the information provided Marine Scotland can ascertain that there will be a minimum/no significant risk to either the grey or the common seals at the site.

iii) In the light of the assessment, ascertain whether the proposal will not adversely affect the integrity of the site for the European interests. Separate conclusions must be provided if the SAC and/or SPA and/or Ramsar site. If conditions required, proceed to 3d.

In light of the assessment, Marine Scotland ascertains that the installation, operation and decommissioning of the SR250 device at the Fall of Warness will not adversely affect the integrity of the Faray and Holm of Faray or the Sanday SAC.

3d. Conditions required.

Indicate conditions/modifications required to ensure adverse effects are avoided, & reasons for these.

Condition:	Reason:
<ul style="list-style-type: none">• The licensee will ensure that they comply with the agreed monitoring plans submitted by the licensee in support of the FEPA application. Prior to installation the monitoring plan must be signed off and held by Marine Scotland.• The licensee will ensure that a Marine Mammal Observer (MMO) is in place on the installation vessel during all noisy installation operations likely to cause disturbance• The licensee will produce a monitoring report, within 8 weeks of all supplementary monitoring being completed at the EMEC site, reviewing all of the data collected through the monitoring plan to determine any associated impacts. This report will be submitted to the licensing authority (Marine Scotland).• The licensee must ensure that the multi-cat vessel operator follows the 'soft-start' protocol.• The licensee will undertake monitoring in accordance with the EMP that will be signed off by SNH and Marine Scotland prior to installation.• If it is determined that the device has an unacceptable impact on wildlife then further mitigation measures may be required at the discretion of Marine Scotland.	<ul style="list-style-type: none">• To ensure that any mitigation and monitoring agreed by the regulator to minimise any associated impact on marine wildlife.• This then allows the MMO to have full communication with the vessel operator prior to the works commencing.• To ensure that the monitoring is fit for purpose• To ensure that any basking sharks within the vicinity of the noisy works have sufficient time to move out with the 500m buffer zone.• To assess the Interaction and possible collision of any Marine Mammals with a Tidal Energy Device.• To minimise the impact on the marine wildlife.

4. RESPONSE

a) Marine Scotland Comments

For Marine Scotland advice to other authorities:

Provided that the mitigation and monitoring measures outlined in the relevant sections of the supporting Environmental information and the EMP which will be signed off by Marine Scotland and SNH are adhered to then the installation, operation and decommissioning of the SR250 device will not adversely affect the integrity of both the Faray and Holm of Faray and Sanday SACs.

For Marine Scotland response to request for opinion on effects of permitted development:

Will not adversely affect integrity of the site

For Marine Scotland response to application:

Licence process will continue with conditions

Name of assessor	Fiona Thompson
Date	13/01/2011