

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

**SITE: ScottishPower Renewables (SPR) Demonstrator Tidal Array Sound of Islay.
FILE REF: FKB/Z227**

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. South-East Islay Skerries Special Area of Conservation

1b. Name of component SSSI if relevant

1. N/A

1c. European qualifying interests & whether priority/non-priority:

1. South-East Islay Skerries Special Area of Conservation

Phoca vitulina (Common/ harbour seal)

1d. Conservation objectives for qualifying interests:

Annex II Species Conservation Objectives

To avoid deterioration of the habitats of the qualifying species (common 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:

- 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 demonstrator tidal array at the Sound of Islay	Marine Scotland
2b. Date of Consultation: SNH response to Section 36 consultation received on the 28 th January 2011	
2c. Type of Case: Tidal – demonstrator array deployment at sound of Islay	

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

Background

The proposal is for the installation, operation and decommissioning of a tidal demonstrator array which will consist of up to 10 pre-commercial turbines. The Hammerfest Strom HS 1000 tidal stream device, (1 MW maximum capacity), the design is based on a 300 kW prototype which has undergone monitoring in Norway and been adapted for use in UK tidal conditions. The device is due to be installed for testing at EMEC in May/June 2011. The installation of the HS 1000 turbine will involve the deployment of a substructure and a single nacelle head with three blades on a horizontal axis the device is fully submerged. The noisy works associated with this project are temporary and are related to both the construction and the decommissioning noise such as vessels, installation of the substructures, ballast weight noise. The device will be on site for a period of up to 14 years.

The installation of the HS 1000 device involves the Dynamic Positioning (DP) vessel, lowering the Gravity Base sub structure and ballasting it to the seabed using three ballast packages with a combined weight of ~ 800 tonnes, the lowering of the nacelle onto the substructure, cable connection and demobilising of the DP vessel. This is expected to last 5 days per device. Marine Scotland and SNH will sign off the installation methodology plan once it is finalised, following the test deployment at EMEC ensuring that all lessons learnt and additional mitigation measures can be incorporated into the plan. Commissioning will then take another 20 days. A DP vessel will also be used for on-going maintenance and decommissioning at the end of the 14 year test period.

The nacelle can be removed from the substructure for maintenance purposes. Other than the gravity base the device has no other requirements for mooring or anchoring to the seabed (no piling or drilling). The nacelle comprises of a 23m diameter rotor with a blade length of 8.98m, and the height from seabed to blade tip is 33.5m. The nacelle head will not rotate, the blades of the device will pitch to maximise the energy extracted from the tidal current and are able to generate power from both the ebb and flood tide. A mechanical brake will be housed within the nacelle between the gearbox and the generator, this, in conjunction with the pitch control system will allow rotation of the device to be stopped in an emergency and for maintenance.

Location

Islay is the most southerly of the main inner Hebridean Islands and is located South west of the Island of Jura, the development area is within the Sound of Islay which is a 1 km wide stretch of water that separates Islay and Jura. The 10 devices will be located within the 48m contour of the site, below the route of the Islay-Jura ferry boundary line the export cable route will land on Jura. The ten turbines will be spread out in four rows the split being 2/2/3/3 from North to South of the Sound. The bathymetry of the Sound constitutes a relatively flat and deep seabed with depths up to 62m with very steeply sloped sides. The shallowest turbine is proposed to be sited in 50m water depth which will ensure that there is sufficient clearance draft to enable vessels to continue to use the Sound unaffected by the turbines.

The overall footprint of the device will be approximately 200 m² with the feet of the device having an area of contact with the seabed of 32.97m² and the gravity base sub structure will weigh approx 1,120

metric tonnes.

Timings and Methodology

Installation is expected to occur over a period of 72 days, this has made allowances for spring and neap tidal cycles but not weather downtime. It is anticipated that the installation will consist of four stages:

1. Pre installation of mooring systems and arrival barges in preparation for construction.
2. Heavy lift vessels on site to lift and move the substructures on to barges
3. Anchor handling vessel to move substructure from barge onto site for ballast operations and cable pull in
4. A lift vessel will be used to install the nacelles once the site is prepared.

The positioning, additional ballast and the cable pull will take approximately 56 hours for each device during slack water it will be lowered to the seabed from the vessel using a crane, the ballast packages will then be lowered onto the receptacles on the support structure. Cable connection is expected to take 3 days as cable tests have to be carried out prior to connection. The next stage involves the installation of the nacelle, in advance of a slack tide the nacelle will be lifted from the vessel and deployed using guide lines, it will then be locked into position by ROV this is scheduled to take 1 day. The installation of the HS1000 at EMEC is using a DP vessel and it will remain in position by operating the thrusters. There will only be one installation vessel working on the site as the NSRA expressed concerns over navigational safety if more vessels were used.

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

Prior to installation of the devices SPR will review all of the monitoring proposals carried out in association with the test deployment at EMEC and ensure that all of the proposed mitigation i.e. soft start, MMO onboard the DP Vessel for the duration of the works are adequate. If it is determined that they are not adequate then the EMP will be revised prior to installation of the tidal array to introduce appropriate measures.

The operational appraisal will evaluate the effects of a tidal array to further understand the collision monitoring and barrier effects submitted by SPR and focus on the theoretical collision risk assessment model and include a review off the observation data acquired from the Sound of Islay.

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 installation of the tidal array is likely to have a significant effect on the qualifying interests of one Natura site. The primary concern was the potential for the physical interaction between the species qualifying interest – Common seals and the operation of the tidal energy array.

In relation to South-East Islay Skerries SAC, it is likely there will be significant effects on the species qualifying interests (common / harbour seal at South-East Islay Skerries SAC).

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

- Population of the species as a viable component of the 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 with respect to the location of the proposed demonstrator tidal array, 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 HS 1000 array on common seals from the South-East Islay Skerries Natura site.

Telemetry data from seals tagged at the South-East Islay Skerries SAC in 2004/05 show that during 1195 days of telemetry (tracking) of tagged adult seals, no visits were made to the development area. On one occasion, one seal visited a haul out site at the southern end of the Sound of Islay, to the south east of the proposed development. The evidence from the telemetry studies indicates that adult common seal do not make heavy use of the development area, but was not sufficient to establish that there is no connectivity between the common seal population using the South-East Islay Skerries SAC and the development area. The Sound of Islay is well within the foraging range of harbour seals from the SAC and common seals were recorded within or hauled out in the Sound. Therefore, connectivity between the development site and the SAC is assumed.

Marine Scotland has developed a theoretical collision risk and transit models which in combination estimates the number of animals colliding with tidal turbines when transiting through the rotor area, assuming there is no avoiding action. The aim of the model is to estimate the number of animals colliding with the tidal turbine over a period of a year. The collision model factors in the size, foraging behaviour and the estimated number of dives made by seals in the survey area. The no avoidance risk is the rate of collision assuming that seals swim as if the tidal turbine structures and rotors are not present, i.e. they take no avoiding action. It is assumed that if the animal is hit then it is killed, whether immediately or through injury. The model parameters assume that all common seals in the water are feeding continuously, and dive to the sea bed 12 times in each hour.

The model produces 2 results; the first result assumes that there is no avoidance of the device and the second answer takes into consideration the percentage of time that the rotors are in operation and the estimated avoidance rate of seals, derived from information related to the MCT tidal turbine device deployed in Strangford Loch.

For the Sound of Islay project, the model is based on the SMRU Marine mammal survey data from shore based observations over a 12 month period from July 2009 to August 2010, as described in the SMRU Report Number MMM 0309 SPR – Sound of Islay. Using the observation data, the average number of Common seals recorded within the survey area was 1.9 seals per hour. The assessment has been based on only 1 year's data and the continued applicability of the model calculations and conclusions of this Appropriate Assessment will be reviewed once additional data become available.

Common seal – South-East Islay Skerries SAC

Approximately 30% of European common seals are found in the UK although this proportion has declined from approximately 40% in 2002. Common seals are widespread around the west coast of Scotland and throughout the Hebrides and Northern Isles. Scotland holds approximately 85% of the UK common seal population. The Sound of Islay demonstrator project is approximately 18 Km (Environmental statement chapter 9.3.4) from the SAC designated for Common seal *Halichoerus grypus* at the South East Islay Skerries. 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.

Each year, SMRU carries out surveys of common seals during the moult in August. 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. Recent survey counts and overall estimates are summarised in SCOS-BP 09/3. Surveys of common seals around the Scottish coast are carried out on an approximately five yearly cycle, with the exception of the Moray Firth and Firth of Tay which are surveyed annually. In 2006, significant declines in common seal numbers were found in Shetland and in Orkney and elsewhere on the North Sea coast of the UK (Loneragan *et al.* 2007). In response to the observed declines in common seal numbers around the UK, the survey effort has been increased recently and an attempt was made to survey the entire Scottish and the English east coast populations during 2007 and 2008. Areas missed in 2007 (the Western Isles, the far north and west coast and the Small Isles) were surveyed in 2008, with the exception of Shetland.

The number of common seals counted in 2007 and 2008 (5,043), were 1.6% greater at West Highland, from Cape Wrath to Appin in Loch Linnhe, than the previous count in 2005 (4,966).

SNH advised that it is necessary to consider the likely significant effects (LSE) of the development on the distribution of common seals within the South-East Islay Skerries SAC. The main mechanisms of disturbance will be the noise and increased vessel movements arising during the construction and installation operations. Field studies carried out at the EMEC test centre at the Falls of Warness in summer 2010 addressed the potential for disturbance of common seals and pups from Skerries within 2 Km of such noisy operations as the use of DP vessels. The studies were unable to demonstrate any clear disturbance by the vessel operations. The distance of the South-East Islay Skerries SAC from the Sound of Islay development area (18 Km) is such that we consider that the operations will not affect the long term distribution of common seals within the South-East Islay Skerries SAC

Modelling of collision risk

Marine Scotland used a quantified assessment of the collision risk presented by the proposed development in the Sound of Islay to calculate the theoretical collision rate. The estimated collision risk was calculated to be 45.3% if seals swam straight through the rotor with no avoidance. SPR calculated the proportion of the tidal cycle that the device will be turning as 71.50% due to the fact that it does not start operating until 1.1m/s and stops operating at 4.0m/s. The final theoretical collision risk, calculated using 71.50% as the operation time of the rotors and 98% as the estimated natural avoidance rate of seals, the models predict a collision risk of **0.58 animals per year**. The results from the models for Common seals are attached in Tables 1 & 2. The result shows that less than one common seal is expected to collide within the array of turbines at the site within a year.

Permitted Biological Removal (PBR) Values

The PBR is intended to ensure that the total numbers of seals for which licences may be issued in each Seal Management Area do not reach a level that may adversely impact on local seal populations. Each local PBR takes into account the status of the local seal populations for each species and reflects recent population trends. For example, the PBR for common seals in areas where this species have been subject to local declines will be correspondingly low as a result. It means that some applications for seal licences may, in some cases, be refused or the number of seals reduced, for example where the PBR for the local regional seal population is lower than these numbers. The PBR for common seals in the West Highland area is 442. The predicted additional mortality from the Sound of Islay project is 0.58 seals per year. This is an insignificant proportion of the PBR.

Cumulative effects: There are no other marine renewable energy developments in the West Highland sea area, and therefore no cumulative effects.

In combination effects can arise from interactions with other causes of seal mortality, primarily the granting of Seals Licences. Marine Scotland has consulted with the seal licensing team to ensure that the overall seal licences issued and the potential 0.58 animals calculated using the collision risk model do not put the population into decline. The PBR for common seals in West Highland is 442. Licences have been issued for 201 seals. The total additional predicted in combination mortality is less than the PBR. . The population of common seals on the West Coast of Scotland are described as stable and the SACs in these areas are in favourable maintained condition by SNH. MS agrees with SNH that it is unlikely that this development, alone or in combination with other licensed activities at the Sound of Islay, is likely to cause more than 442 individuals to be removed from the Common seal population.

Due to the overall conservation status for common seals at a UK level being assessed as 'unfavourable-inadequate' which resulted in the implementation of area-specific Conservation Orders by the Scottish Government, providing common seals with year-round protection. In response, SMRU, with funding support, has established a research programme which includes:

- Planned thermal image surveys of common 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.

All of the above survey plans contribute to the overall management plan of protecting common seals whilst they are assessed as unfavourable conservation status. The survey information will also contribute to the development and production of a robust EMP.

Environmental Monitoring Protocols

SPR have agreed to submit the Environmental Monitoring Plan (EMP) as per SNH's recommendation and the report will be signed off by the licensing authority prior to installation of the array. The installation of the Tidal Turbines will learn from the experience gained from the single deployment at EMEC, if strain gauges prove to be successful in the monitoring programme set up at EMEC then they will be incorporated in to the Sound of Islay EMP. The turbine nacelle will also be fitted with a video camera, methodology for use and how SPR intend on analysing the data will be outlined within the EMP. The EMP will be used to support the application for a licence to disturb European Protected Species.

- SPR will produce a 'Marine Mammal Observation Protocol' in line with what was submitted for the EMEC deployment which was signed off by Marine Scotland. The MMO protocol will include a MMO onboard the installation vessel, who will have full communication with the vessel operator to ensure that the works do not commence until all common seals are out with the safety buffer to reduce the risk of injury and disturbance. The MMO protocol will be agreed with SNH and then signed off by Marine Scotland prior to installation.
- SPR will review all of the data gathered though the deployment of the Hammerfest Strom device at EMEC and from the underwater noise monitoring data review the protocol for the Sound of Islay deployment, which will be reviewed by SNH and signed off by Marine Scotland prior to installation.
- Collision risk and barrier effect assessments for marine mammals were carried out by SPR without any mitigation or monitoring parameters included and the result was negligible for the

Sound of Islay Site. SPR's overall approach to the mitigation, monitoring and management of the site is proposed to form part of a wider deploy and monitor strategy.

- The EMP will be a live document therefore the post installation monitoring can be altered to conform with what the MMO saw on the site therefore if more mitigation is identified it can be inserted into the monitoring programme prior to sign off by Marine Scotland.
- SPR proposes to study particular effects that may arise from an array as all literature and experience to date has focused on single turbine deployments such as SeaGen.

Conclusion

Marine Scotland considered each of the issues raised by SNH in the advice provided for the Section 36 application associated with the Sound of Islay demonstrator array. We considered each of these issues in respect of the 2 conservation objectives identified in section 3b in order to conclude that there will not be an adverse effect on site integrity for common seals from the South-East Islay Skerries SAC.

Telemetry studies outlined within SMRU Ltd report covering 1195 days of data showed that none of the ten mature tagged seals recorded used or passed through the Sound of Islay development area. Therefore the connectivity between the development area and the SAC is considered to be low. Marine Scotland concludes that the development will not result in significant disturbance of the species (common seals) from the South East Islay Skerries Special Area of Conservation.

Marine Scotland also conclude that the distance of the South-East Islay Skerries SAC from the Sound of Islay development area (18 Km) is such that the operations will not affect the long term distribution of common seals within the South-East Islay Skerries SAC

Modelling of the collision risk to common seals arising from the Sound of Islay projects suggests an additional mortality of 0.58 common seals per year. This is insignificant in comparison to the PBR for the West Highland area of 442 seals. Marine Scotland concludes that the proposed development will not adversely affect the population of common seals as a viable component of the South-East Islay Skerries SAC.

No cumulative effects from interactions with other marine energy developments were identified.

The in-combinations effects could arise through interactions with mortalities occurring through the Seals Licensing scheme. Licences have been granted for 201 common seals within a PBR of 442. The modelled additional mortality arising from the Sound of Islay project is not a significant element of the in combination impact.

Therefore in light of all of the information provided Marine Scotland concludes that the development in the Sound of Islay will not undermine the conservation objectives for common seals in the South-East Islay Skerries SAC.

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 ScottishPower Renewables demonstrator tidal site at the Sound of Islay will not adversely affect the integrity of the South-East Islay Skerries 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 the licensing authority.• The licensee will ensure that a Marine Mammal Observer (MMO) is in place on the installation vessel during the installation operations likely to cause disturbance• The licensee will produce a monitoring report, within 8 weeks of all monitoring being completed at the 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.• The licensee must ensure that the DP-vessel operator follows the 'soft-start' protocol which must be signed off by the licensing authority.• The licensee will undertake monitoring in accordance with the EMP that will be signed off by SNH and the licensing authority.• If through monitoring it is determined that the device could have an adverse effect on the site integrity then further mitigation measures may be required at the discretion of the licensing authority.	<ul style="list-style-type: none">• To ensure that any mitigation and monitoring agreed by the regulator minimises any impacts on common seals and associated wildlife.• This then allows the MMO to have full communication with the vessel operator prior to the works commencing to ensure that the works will not commence when there are common seals in close proximity in order to reduce disturbance risk.• To ensure that the monitoring is fit for purpose• To ensure that any common seals, grey seals, cetaceans and basking sharks within the vicinity of the 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 avoid adverse effects on the site integrity, beyond scientific doubt.

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 Environmental Monitoring Plan EMP which will be provided by the developer and signed off by the licensing authority and SNH prior to installation are adhered to then the installation, operation and decommissioning of the Sound of Islay Demonstrator Array will not adversely affect the integrity of the South-East Islay Skerries SAC.

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	02/03/2011