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Morlais Project

Note on EMF/EMR

Applicant: Menter Môn Morlais Limited
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Royal HaskoningDHV

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MORLAIS,
Menter Môn,
Neuadd y Dref / Town Hall,
Llangefni,
Ynys Môn / Anglesey,
LL77 7LR

08/01/2021

RE: Electro-Magnetic Radiation EMR

To whom it may concern,

All cables associated with the Morlais project will be designed, installed and operated within the relevant UK and international standards, this will include compliance with EMF/EMR standards. The standards are seen as theoretical maxima and designs will work to 'as low as reasonably achievable levels' below these limits.

The recommendations contained within the enclosed B&V note will be adopted by Menter Môn.

At the request of the homeowner and within a mutually convenient timeframe, background and post commissioning surveys will be undertaken to establish EMR levels within the property.

Yours Sincerely,

Andrew Billcliff

Technical Director

Cronfa Datblygu Rhanbarthol Ewrop
European Regional Development Fund

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BLACK & VEATCH

BLACK & VEATCH LIMITED

M E M O R A N D U M

To:	Andy Billcliff (Menter Môn)	Date:	8th January 2021
From:	Nick Lovett (Black & Veatch)	Subject:	Developer cables at Landfall: Electric & Magnetic Fields
Copy:	Graham Morley (Menter Môn) Andy Jones (Black & Veatch) Tim Baker (Black & Veatch) Greg Dudziak (Black & Veatch)	File:	

Request

Menter Môn (MM) has requested that Black & Veatch (B&V) provide information on the possible effects of electric and magnetic fields (EMFs) on a concerned resident's property due to the future installation of high voltage electrical cabling. The property is located immediately east of Plot 4 as shown in the figure below (Drg No. MOR/WLP/SHEET1/v2).

As part of the Morlais project design phase, a cable route and two landfall options were developed for the routing of up to nine submarine cables, which are as follows (with reference to the figure below):

1. Horizontal Directional Drilled (HDD) bores and cable ducts (HDD Ducts) between the onshore Transition Pits (located within Work No. 5) and a seabed location. The HDD Ducts will pass beneath Plots 1, 3, 3a, 5 and 8.
2. Open trench cable ducting from the Transition Pits to the cliff edge (passing through Plots 3, 5 & 8), use of J-tubes pinned to the cliff face (Plot 3a) and foreshore works (Plot 1).

The submarine cables would be installed by tidal energy developers following commissioning of the project, with the maximum cable voltage limited to 33kV.

Remarks

B&V makes the following remarks in respect of EMFs generated from electrical cables:

1. Drawings developed as part of the Morlais design phase show that the nearest 33kV cable would be located approximately 35m from the rear of the property. Note: there are two cable options, trenched cable and horizontal directional drilled, and in both cases the distance is approximately the same at 35m.

2. Electric fields are produced by voltage, whilst magnetic fields are produced by current. Generally, the higher the voltage, the greater the strength of the electric field, and the higher the current, the greater the strength of the magnetic field.

3. Electric fields are measured in Volts per metre (V/m), whilst magnetic fields are measured in microteslas (μT).

4. Electric fields are easily absorbed by the ground and building materials and would likely be undetectable at ground level. Any potential health risks attributable to electric fields can therefore be discounted.

5. Magnetic fields can readily pass through ground and most building materials.

6. The UK Government sets guidelines for exposure to EMF in the UK. The UK has adopted guidelines published by the International Commission on Non-Ionizing Radiation Protection (ICNIRP). The ICNIRP defines a reference level of 100 μT for exposure to the public (Ref 1), above which further investigation of magnetic fields is required. The permitted level of exposure to magnetic fields in the UK is higher than this at 360 μT which apply where the time of exposure is significant (Ref 1). These guidelines are designed to ensure that EMFs do not interfere with nerves, but were set after examining all the evidence, including evidence on cancer (Ref 1). It is the policy of the electricity industry to follow these independent exposure guidelines (Ref 1). The design and installation of the Morlais cabling will be undertaken to appropriate standards to ensure that EMF levels comply with the UK guidelines.

7. Power is typically transmitted in 3 separate conductors, known as phases. An underground 33kV cable is typically a single cable with 3 conductors in close proximity to each other and contained in a single outer sheath. The magnetic fields from each of the 3 conductors tend to cancel each other out so that any resultant magnetic field tends to arise from any net current in the sheath. The strength of the magnetic field reduces as the distance from the cable increases. Reference 2 provides typical values for a 33kV buried cable. We see that the magnetic field reduces from 1.0 μT immediately above the cable to 0.07 μT at a distance of 20m.

8. There will be differences between the above example provided in Point 7 and the design at Morlais, including but not limited to the cable type, current, soil conditions, power factor in the cable, and possibly electrical frequency. These factors will affect the strength of the magnetic field at the location of interest, however, the example is indicative of a broadly similar arrangement and, as an order of magnitude comparison, shows only one thousandth of the ICNIRP reference level; that is a value of c.0.1 μT (based on the 0.07 μT value defined in Point 7) compared to a reference level of 100 μT and maximum allowable limit of 360 μT.

Recommendations

Consideration of published information and with reference to the scheme design developed to assist the consenting process, indicates that the magnetic field levels at the property in question are unlikely to exceed permissible limits when the scheme becomes operational. The following steps may be taken to further mitigate any remaining risk:

1. A specialist consultant could be commissioned at an early stage of the design to complete numerical modelling to predict the EMFs at the property based on different operational scenarios and accounting for key variables (e.g. soil permeability, current, power factor, etc.). The findings of the modelling work could then be used to understand the risk of EMF issues and inform the scope of further study/surveys.

2. An EMF survey could be undertaken at the property by an independent assessor prior to construction to establish the baseline background EMF levels. The survey should include actual EMF measurements at various locations within the property, quantified in microtesla, not just as percentages of the legal limit. A post commissioning survey once the scheme is operational could then be undertaken to demonstrate that the EMF levels remain well below the legal threshold.

References

The following information references have been considered in preparing this memorandum:

1. Electric and Magnetic Fields - The Facts, Energy Networks Association, September 2017.
2. https://www.emfs.info/sources/overhead/specific/33-kv/

End of Memo