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USBL use for operational survey work

Dear Sir/Madam

We are writing in connection with the European Offshore Wind Deployment Centre (EOWDC) in relation to some upcoming geophysical survey works during the Operation and Maintenance (O&M) phase.

The objective of this letter is to outline our assessment of the potential impact of the O&M phase work on European Protected Species (EPS) in Aberdeen Bay (see subsequent pages). The effects on EPS for construction were previously assessed in the document EPS Risk Assessment: Construction Phase Works (document no. 1148902-1-B4) and there has been no known change to the baseline information on the site and marine mammals present in that assessment.

Our assessment concludes that:

- There is no potential for lethal effects, physical injury or auditory injury to marine EPS; and
- While there is potential for temporary disturbance of individual EPS animals, this potential for disturbance is considered to be negligible within the context of the wider populations of EPS.

We therefore assume that no mitigation will be required (because there is no potential for auditory injury).

As temporary disturbance is unlikely to cause any population level effects, it is also considered unlikely that it will have an impact on the favourable conservation status of any cetacean EPS. It is therefore our opinion that the conditions for granting an EPS licence have been met, and that a licence can be issued if required.

Confirmation at your earliest convenience would be much appreciated.

Yours sincerely,



Amy Walker
Environmental Specialist

1. Introduction

The use of geophysical survey systems and positioning equipment in the Wind Farm site and Export Cable Corridor will be undertaken periodically for the purposes of Wind Turbine Generator (WTG) inspections and maintenance works, and seabed surveys in the cable corridor. The planned geophysical surveys will provide an up-to-date understanding of seabed conditions across the works area.

The expected durations of the individual works periods are expected to be short (17 days) with a total of 50 days' work over the year. This total excludes weather and technical downtime and is not anticipated to exceed 200% of estimated durations stated.

2. Proposed Geophysical Survey Equipment

The vessels required for the O&M phase work are equipped with geophysical survey systems and positioning equipment that will be utilised during the works. Geophysical survey systems and positioning equipment increase levels of anthropogenic noise in the marine environment because they operate by producing and receiving sound. The works will utilise some or all of the following equipment:

- Multibeam Echo Sounder (MBES) will gather detailed bathymetry data;
- Side Scanning Sonar (SSS) to provide information on seabed debris/features; and
- Ultra Short Baseline (USBL) positioning systems and positioning transponders to monitor positioning of the remotely operated equipment such as an ROV.

This increase in anthropogenic noise has the potential to affect marine mammals occurring in the Aberdeen Bay area due to the sensitivity of marine mammal hearing. As sound travels much further underwater compared to airborne noise, the resulting effects on marine mammals can be at distance from the sound source.

The vessel undertaking the each section of the planned works is still to be confirmed. Consequently, the precise details of the equipment to be used during the work are not yet available and will depend on the vessel used. However, the broader types of equipment that will be required are known and the assessment is based on a realistic worst-case scenario. Representative examples of the equipment that could be used are presented in Table 2.1 below.

Table 2.1: Example geophysical survey and positioning equipment

Representative Geophysical Equipment	Operating Frequency (kHz)	Source Level (SPL) Reported by Manufacturer (dB re. 1 μ Pa)
Subsea Positioning USBL		
Sonardyne Ranger USBL	35 – 50	200 (peak), 188 (rms)
Sonardyne Ranger 2 USBL HPT 3000	19 – 34	194 (peak), 188 (rms)
Sonardyne Scout	30 – 35	193 (peak)
Easytrak Nexus 2 USBL	18 – 32	198 (peak), 192 (rms)
Ix Blue GAPS	19 – 30	191 (rms)
Multibeam Echo sounder		
Reason Seabat 7125	400	220 (rms)
R2 Sonic 2024 MBES	200 – 450	229 (peak), 162 (rms)
Kongsberg EM2040C Dual Head	200 – 400	210 (peak), 204.5 (rms)

Representative Geophysical Equipment	Operating Frequency (kHz)	Source Level (SPL) Reported by Manufacturer (dB re. 1 μ Pa)
Side-Scan Sonar - dual frequency		
EdgeTech 4200	300 / 600	208 – 213 (peak), 205 – 210 (rms)
Klein 3900	445 / 900	226 (peak), 220 (rms)
EdgeTech 4125-MP	400 / 900	215 (rms)

3. EPS Risk Assessment

Cetaceans have been recorded within the Aberdeen Bay all year round. Harbour porpoises and bottlenose dolphins are resident while white-beaked dolphin and minke whale occur on a seasonal basis. Risso's dolphins are considered to occur on a regular/occasional basis and have been recorded off Aberdeenshire at various times of the year. With the exception of Risso's dolphin ('unknown'), the conservation status of each species is 'favourable'. It is possible that at least some of these species will be present during at least part of the duration of the works.

The main routes to impact are considered to be:

- Increased Noise from Geophysical Survey Systems;
- Increased Noise from vessels; and
- Collision risk.

The assessment of increased vessel noise and collision with vessels in EPS Risk Assessment: Construction Phase Works (document 1148902-1-B4) is still applicable to the planned works during the O&M phase and as the effects were considered negligible they have not been assessed further here.

3.1. Increased Noise from Geophysical Survey Systems

The proposed work has the potential to increase levels of anthropogenic noise in the marine environment (and therefore the potential to affect marine mammals) due to the use of the sound-emitting equipment which is required to carry out the work.

3.1.1. MBES and SSS

The (high frequency) sounds produced during MBES surveys fall outside the hearing frequencies of cetaceans (and therefore will not cause disturbance). Furthermore, in shallow (< 200 m) water, these high frequency sounds are likely to attenuate more quickly than the lower frequencies used in deeper waters (JNCC, 2017¹). This is also assumed to be the case for the high frequency sounds produced by the SSSs listed in Table 2.1. As per the EPS Risk Assessment: Construction Phase Works, no mitigation is therefore deemed to be required for operation of such equipment (as per the JNCC guidelines) and therefore it (MBES and SSS) has not been considered further.

3.1.2. USBL equipment

The remaining type of equipment proposed for use, USBLs, has been assessed based on the highest possible peak SPL (200 dB re. 1 μ Pa; see Table 2.1). However, as the actual equipment to be deployed has not been confirmed by the

¹ JNCC. (2017). JNCC guidelines for minimising the risk of injury to marine mammals from geophysical surveys which can be downloaded from http://jncc.defra.gov.uk/marine/seismic_survey.

contractors as yet, this value is considered conservative and it is estimated that actual SPLs will be within the range of values presented in Table 2.1.

Lethal effects and physical injury

The source pressure levels for all pieces of USBL equipment listed (Table 2.1) are lower than the lethal effects and physical injury criteria (240 and 220 dB re. 1 μ Pa respectively). Therefore there is no potential for lethal effects or physical injury as a consequence of increased anthropogenic noise.

Auditory injury

Using the NOAA (2018) thresholds, the maximum source levels for all types of USBL equipment listed are below the level which has the potential to induce the onset of PTS at close range for all cetacean species. There is therefore no potential for auditory injury as a consequence of use of USBL systems/transponders.

Behavioural response

Table 2.1 indicates the operation of USBLs (18 - 50 kHz) will be audible to all cetacean species and therefore have the potential to cause disturbance.

Harbour porpoise responses have been observed over ranges of 5-10 km from geophysical (seismic) survey vessels in the Moray Firth, although animals were detected again at affected sites within a few hours (Thompson *et al.*, 2013²). While the noise levels produced by these oil and gas exploration geophysical surveys will be in excess of those produced during the works described here, little evidence exists for displacement radii resulting from lower level noise emitting equipment. Thus, while still considered a conservative estimate, a disturbance radius of 5 km (i.e. the lower end of the range reported by Thompson *et al.* (2013)²) has been used to calculate the area which has the potential to be affected by geophysical survey systems and positioning equipment noise at any one time for cetacean species (Table 3.1). The 10 km disturbance radius is considered to be overly conservative as:

1. It was observed as a consequence of oil and gas seismic surveys that utilise subsea inspection equipment that produces noise of significantly higher source levels than the equipment described in Table 2.1; and
2. The surveys that resulted in the 10 km displacement radii were undertaken in the much deeper water of the Moray Firth, and sound travels further in deeper water.

As a consequence, an impact area of 78.5 km² was used in Table 3.1 (where $r = 5$ km in the simple calculation of area = πr^2). This area is also considered an overestimate because the coast is within approximately 1.5 km of the site's western boundary and therefore some of the estimated area of impact will encompass land rather than water.

Due to a lack of comparative studies, this disturbance radius was also used for consideration of potential impacts upon dolphin species and minke whales. This is also considered a conservative proxy.

Any disturbance is considered to be temporary as porpoises were observed to return within a few hours of cessation of seismic activity within the Moray Firth (Thompson *et al.*, 2013²).

Small numbers of individuals have the potential to be disturbed during the operation of geophysical survey systems and positioning equipment during the works (Table 3.1). This equates to very small proportions of the species' reference populations. The impact of this displacement is therefore considered **not significant** in terms of the EPS legislation (i.e. it will not be detrimental to the maintenance of the population of the species concerned at a FCS level in their natural range) as the highest level of population disturbance is equivalent to 1.2% of the bottlenose dolphin population in the Coastal East

² Thompson, P.M., Brookes, K.L., Graham, I.M., Barton T.R., Needham, K., Bradbury, G., Merchant, N.D., (2013). Short-term disturbance by a commercial two-dimensional seismic survey does not lead to long-term displacement of harbour porpoises. Proc R Soc Lond B Biol Sci., 280: 20132001-10.1098/rspb.2013.2001.

Scotland marine mammal management unit. This disturbance is considered unlikely to cause any population level effects and therefore unlikely to have an impact on the favourable conservation status of any cetacean EPS.

Table 3.1: Number of individuals of the different EPS potentially disturbed during the operation of geophysical survey systems and positioning equipment during the works

Species	Number of individuals within the area of potential impact	Percentage of reference population which has the potential to be affected
Minke whale	3	0.01%
Bottlenose dolphin	2	1.21%
White-beaked dolphin	19	0.12%
Harbour porpoise	47	0.02%

Source: As per the EPS Risk Assessment: Construction Phase Works (Section 4), SCANS III density estimates from Hammond et al. (2017)³ were used in calculations of numbers of individuals. Reference population abundance estimates used in percentage calculations were taken from IAMMWG (2015)⁴

4. Conclusions

The proposed work will utilise some or all of the following equipment: Multi Beam Echo Sounder (MBES), Side Scanning Sonar (SSS) and Ultra Short Baseline (USBL) positioning systems and transponders.

4.1. MBES and SSS

The high frequency sounds produced during MBES surveys fall outside the hearing range of cetaceans and therefore will not cause disturbance. Furthermore, in shallow (< 200 m) water, these high frequency sounds are likely to attenuate more quickly than the lower frequencies used in deeper waters (JNCC, 2017¹). This is also assumed to be the case for the high frequency sounds produced by the SSS. As per the EPS Risk Assessment: Construction Phase Works, no mitigation is therefore deemed to be required for operation of such equipment (as per the JNCC guidelines). Therefore MBES and SSS were not considered further.

4.2. USBL equipment

Lethal effects and physical injury: All pieces of possible USBL equipment assessed operate at lower than the lethal effects and physical injury criteria; therefore there is **no potential** for lethal effects or physical injury as a consequence of increased anthropogenic noise from these sources.

Auditory injury: The USBL equipment listed in Table 2.1 does not produce noise of sufficiently high power to induce PTS onset within individuals in close proximity to the noise source; there is therefore **no potential** for auditory injury as a consequence of increased anthropogenic noise from these sources.

³ Hammond, P.S., Lacey, C., Gilles, A., Viquerat, S., Börjesson, P., Herr, H., Macleod, K., Ridoux, V., Santos, M.B., Scheidat, M., Teilmann, J., Vingada, J., Øien, N. (2017). Estimates of cetacean abundance in European Atlantic waters in summer 2016 from the SCANS-III aerial and shipboard surveys. Available from: <https://synergy.st-andrews.ac.uk/scans3/files/2017/05/SCANS-III-design-based-estimates-2017-05-12-final-revised.pdf>

⁴ IAMMWG. (2015). Management Units for cetaceans in UK waters (January 2015). JNCC Report No. 547, JNCC Peterborough.

Behavioural response: Following the 2014 Marine Scotland and SNH guidance (Marine Scotland and SNH, 2014⁵) for territorial waters, there is the potential for disturbance of animals, as defined in regulations 39 (1) (a) and (b) and 39 (2) of the Conservation of Habitats and Species Regulations 1994 (as amended in Scotland), from the operation of USBL equipment during the proposed O&M phase work. Up to 47 harbour porpoises, 2 bottlenose dolphins, 19 white-beaked dolphins and 3 minke whales have the potential to be disturbed. Due to the short duration of each section of works and the fact that any displacement will be temporary (with suitable alternative habitat being available in the meantime), the potential to cause disturbance from the use of the USBL is deemed **negligible** and thus it is considered that the conditions for award of an EPS licence under Section 39 of The Conservation (Natural Habitats, &c) Regulations 1994 (as amended in Scotland) have been met.

⁵ Marine Scotland and SNH. (2014). The protection of Marine European Protected Species from injury and disturbance: Guidance for Scottish Inshore Waters.