SCOTTISH FISHERMEN'S FEDERATION

Our Ref: MM/fl: 16-101

Scottish Fishermen's Federation
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Scotland UK

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3rd October 2016

By email: Roseanne.Dinsdale@gov.scot
MS.MarineRenewables@gov.scot

Dear Sirs,

BOWL UXO Clearance Marine Licence

The Scottish Fishermen's Federation, on behalf of its members, the Anglo-Scottish Fishermen's Association, the Clyde Fishermen's Association, the Fife Fishermen's Association, the Fishing Vessel Agents & Owners Association (Scotland) Limited, the Mallaig and North-West Fishermen's Association Ltd, the Orkney Fishermen's Association, Scallop Association, the Scottish Pelagic Fishermen's Association Ltd, the Scottish Whitefish Producers' Association Ltd and the Shetland Fishermen's Association Welcomes the opportunity to comment on this application.

Subject to suitable appropriate responses to the points raised below, the SFF will not object to this licence, which naturally implies if these points are not cleared to the satisfaction of the SFF an objection would be extant.

The SFF has a major concern in that despite the obvious interest of the fishing fleets in this matter, there have been numerous meetings between the developers, Marine Scotland, JNCC and SNH without industry input. This does not seem to be best practice, and indeed means that time and energy has to be taken by all concerned to address the industry concerns post application.

Regarding the statement on page 12, the SFF would expect any decision on relation to a pre-determined lay down area to be made with SFF involvement and a clear understanding of fishing grounds in the area which should not be prejudiced by this choice.

Further to this point, the SFF would seek clarity that there is no need for a licence for sea disposal of any dredged substance or objects, as noted in point 7 of the application since these actions are described in the Environmental report?

Throughout this section when describing the Categories there is a clear lack of understanding of the potential to create craters, which will be detrimental to safe trawling or dredging, this needs to be addressed by showing evidence that the depth of any crater left will not trap fishing gear. It would be sensible, as stated previously, to utilise the knowledge of fishing grounds which the SFF can provide, to help provide that clarity.

The SFF is concerned that the depiction of a Guard Vessel, on page 16, precludes the use, for mitigation, of appropriate fishing vessels, and since G/V work is seen as a major part of mitigation needs to be clear.

The communications procedures on page 32 do not include Kingfisher, not is there sufficient details of the involvement of fisheries advice on location for detonation.

The description of possible interference with fishing in para 5.7 on page 44, neglects to note that the creation of craters is a safety hazard in areas where towed gear is the norm. This could also be referenced in the table on page 53.

The SFF would like to have clarity on the matter of what action/timeline there is between confirmation of an item being deemed explosive and the carrying out of the explosion. Will these objects be left on the seabed, will they be marked or guarded and when will they be notified to Kingfisher, SFF etc.

Yours faithfully,

[redacted]

Bertie Armstrong
Chief Executive
Scottish Fishermen's Federation

SEPA
Scottish Environment Protection Agency
Buidheann Dìon Àrainneachd na h-Alba

Our ref: PCS/149124
Your ref: 06145

If telephoning ask for:
Susan Haslam

21 September 2016

Rosanne Dinsdale
Marine Scotland
Aberdeen

By email only to: rosanne.dinsdale@gov.scot

Dear Ms Dinsdale

Marine (Scotland) Act 2010
Application for Marine Licence - UXO Clearance
Beatrice Offshore Wind Farm site

Thank you for your consultation email which SEPA received on 21 September 2016.

Advice for Marine Scotland

We have **no objection** to this planning application.

Regulatory advice for the applicant

Details of regulatory requirements and good practice advice for the applicant can be found on the Regulations section of our website. Please note that if any waste is brought ashore it would be subject to the Waste Management Regulations and classifications

If you are unable to find the advice you need for a specific regulatory matter, please contact a member of the regulatory team in your local SEPA office. Details about local offices are available from www.sepa.org.uk/contact/office-locations/

Should you wish to discuss this letter please do not hesitate to contact me on 01349 860359 or planning.dingwall@sepa.org.uk.

Yours sincerely

Susan Haslam
Senior Planning Officer
Planning Service

Ecopy: Jonathan.wilson@sse.com

SEPA Dingwall Office
Graesser House, Fodderty Way,
Dingwall Business Park, Dingwall IV15 9XB
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Disclaimer
This advice is given without prejudice to any decision made on elements of the proposal regulated by us, as such a decision may take into account factors not considered at this time. We prefer all the technical information required for any SEPA consents to be submitted at the same time as the planning or similar application. However, we consider it to be at the applicant's commercial risk if any significant changes required during the regulatory stage necessitate a further planning application or similar application and/or neighbour notification or advertising. We have relied on the accuracy and completeness of the information supplied to us in providing the above advice and can take no responsibility for incorrect data or interpretation, or omissions, in such information. If we have not referred to a particular issue in our response, it should not be assumed that there is no impact associated with that issue. For planning applications, if you did not specifically request advice on flood risk, then advice will not have been provided on this issue. Further information on our consultation arrangements generally can be found on our website planning pages.

Dinsdale R (Rosanne)

From: Rennie, Lynn <Lynn.Rennie@repsolsinopecuk.com>
Sent: 18 October 2016 07:57
To: MS Marine Renewables
Cc: Dinsdale R (Rosanne)
Subject: RE: BOWL - Application for Marine Licence - UXO Clearance

Good morning

In relation to the above application, and in advance of tomorrow's deadline, I can confirm that Repsol Sinopec Resources UK Limited have engaged with BOWL on their plans and they have confirmed future engagement with ourselves prior to detonation.

We therefore wish to make no comment in respect of BOWL's application.

Kind regards

Lynn

Lynn Rennie | Commercial Advisor | Repsol Sinopec Resources UK Limited
T: +44 (1224) 352885
www.repsolsinopecuk.com | My Business Card

From: Rosanne.Dinsdale@gov.scot [mailto:Rosanne.Dinsdale@gov.scot]
Sent: 21 September 2016 09:37
To: marineenergy@snh.gov.uk; erica.knott@snh.gov.uk; planning.dingwall@sepa.org.uk; renewables@sff.co.uk; navigation@nlb.org.uk; ArchieJ@nlb.org.uk; oga.correspondence@oga.gsi.gov.uk; robert.a.white@oga.gsi.gov.uk; navigationsafety@mcga.gov.uk; nick.salter@mcga.gov.uk; MS_Renewables@gov.scot; Paul.Stainer@gov.scot; DIO-Safeguarding-Offshore@mod.uk; EMT@decc.gsi.gov.uk; Rennie, Lynn; stimms@ithacaenergy.com; Sarah.Pirie@edpr.com
Cc: Catarina.Aires@gov.scot; Jessica.Drew@gov.scot; Nicola.Bain@gov.scot; Paul.Cook2@gov.scot
Subject: BOWL - Application for Marine Licence - UXO Clearance

Dear Sir/Madam

MARINE (SCOTLAND) ACT 2010, PART 4 MARINE LICENSING

06145 – BOWL – Unexploded Ordnance Clearance

Marine Scotland Licensing Operations Team (MS-LOT) have received the attached proposal under the above Act for a Marine Licence for unexploded ordnance clearance within the location of the Beatrice Offshore Wind Farm site.

Please find the application form and supporting document attached.

Please note that it is intended to carry out these works in November and December, however the date on the application form lasts until February 2017 to allow flexibility for any delays due to weather etc.

Please forward any comments you may have on these proposals, in an electronic format to (MS.MarineRenewables@gov.scot) by 19th October 2016.

If you are unable to meet this deadline please inform us in writing as soon as possible. We will aim to grant an extension to the consultation period.

Should you have any queries please do not hesitate to contact us.

Yours sincerely

Rosanne

Rosanne Dinsdale
Marine Renewables Casework Officer
Marine Scotland - Marine Planning & Policy

Scottish Government | Marine Laboratory | 375 Victoria Road | Aberdeen | AB11 9DB

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Website: http://www.gov.scot/Topics/marine/Licensing/marine

Frequently Asked Questions

Northern Lighthouse Board

84 George Street
Edinburgh EH2 3DA
Switchboard: 0131 473 3100
Fax: 0131 220 2093
Website: www.nlb.org.uk
Email: enquiries@nlb.org.uk

CAPTAIN PHILLIP DAY
DIRECTOR OF MARINE OPERATIONS

Your Ref: 06145 – Beatrice UXO Clearance
Our Ref: AJ/OPS/ML/O6_01_354

Ms Rosanne Dinsdale
Marine Renewables Casework Officer
Marine Scotland – Marine Planning and Policy
Marine Laboratory
375 Victoria Road
Aberdeen
AB11 9DB

12 October 2016

Dear Rosanne

MARINE (SCOTLAND) ACT 2010, PART 4 MARINE LICENSING.

Thank you for your Email dated 21 September 2016 advising of the intention by **Beatrice Offshore Windfarm Limited (BOWL)** to carry out marine survey in connection with any required UXO clearance within the area of marine works associated with the Beatrice Offshore Wind Farm in the Moray Firth.

NLB have no objection to the proposed activities as described in the Clearance Methodology Plan (CMP) and note that UXO clearance by detonation will be the final option where avoidance or relocation of any suspected anomalies cannot be achieved.

We further note the intention to liaise with the marine community including the operators of the Beatrice Oilfield, and that Radio Navigation Warnings, Notices to Mariners and the deployment of guard vessels are all part of the mitigation measures as described within the Clearance Methodology Plan Ref: LF000005-REP-1326.

Please advise if we can be of any further assistance, or require clarification any of the above.

[redacted]

marinescotland science

T: +44 (0)1224 876544
MS_Renewables@gov.scot

The Scottish Government

Rosanne Dinsdale
Licensing Operations Team
Marine Scotland
375 Victoria Road
Aberdeen
AB11 9DB

05971 - 003-0W-BOWL-8 - Marine Licence Application: Unexploded Ordnance Clearance

Marine Scotland Science has reviewed the submitted documents and has provided the following comments.

marine mammals

MSS note that the potential zone for PTS to harbour porpoise is 3.9km from a 50 kg charge when considering the peak SPL. Clearly this is a larger area than can be effectively surveyed using MMOs and PAM, and so we welcome the inclusion of techniques to encourage mammals to move away from the detonation site. The advice that we have provided is on the assumption that a 50 kg ordnance requires to be cleared. We understand that in many circumstances the resulting explosion is likely to be smaller than that modelled in the documentation provided, but without such information beforehand we must consider the scenario that is presented. We note that there is a possibility that larger ordnances may require to be cleared. In these circumstances we support the discussions that have taken place with SNH, but would also point to our advice below.

We are largely content with the proposed mitigation, although we note that the fleeing threshold used (TTS) is only reached by the largest of the deterrence charges at less than half of the mitigation distance required.

We also note that given a swim speed of 1.5 ms^{-1} a harbour porpoise initially located close to the ordnance would have to swim directly away in a straight line in order to be able to move outside of the injury zone in the time permitted. When considering similar issues for the piling strategy, allowance was made for animals to move twice the likely injury distance to account for the possibility that they do not flee in a straight line. We suggest that it may be appropriate to consider increasing the duration that the ADD is used for to allow extra time for porpoises to move out of the PTS zone.

MSS agree that the risk injury to bottlenose dolphins from the Moray Firth SAC is low. However, this is on the basis that no ordnance will be detonated on the cable route, as discussed at the meeting on 6th September and as stated in the marine licence application. Should it be necessary to detonate any ordnance along the cable route, this may require further consideration, depending upon the distance to areas regularly used by bottlenose dolphins.

ornithology

marine fish ecology
MSS is broadly in agreement with regards marine fish ecology and appreciate the short duration of the activity, the intermittent nature of the noise produced and the likely occurrence of noise at a different location each time, as well as the proposed mitigation.

Whilst it is likely that the UXO clearance activities will be completed before the end of December 2016, it is noted that the proposed completion date is 28 February 2017. As highlighted within the Environmental Report, the cod spawning period is between January and April with peak spawning occurring during February and March. As a precaution, and in the event the activity is not completed by the end of December 2016, MSS would suggest that consideration be given to prioritising first any clearance activity within the indicative cod spawning area, as identified by Coull *et al* (1998), in order to minimise the potential for clearance activity within the spawning area during the spawning period, particularly during the month of February.

References
Coull, K. A., Johnstone, R., & Rogers, S. I. (1998). Fisheries sensitivity maps in British waters. *Published and distributed by UKOOA Ltd*, *9*.

commercial fisheries

benthic ecology
MSS has no comments to make regarding benthic ecology. As stated for physical environment effects, temporary impacts of exposions on benthic fauna will be short lived with invertebrate populations returning to normal levels relatively quickly.

physical environment
There are no concerns with physical processes. There will be elevated levels of suspended sediment concentration (as indicted in the environmental report) but these will be short lived and will return to normal/background levels. Any craters created will be back filled in time by natural processes. These temporary changes to the physical processes (increased suspended sediment concentration and craters) may have implications on biological receptors – see these sections for more details.

diadromous fish
The main issue of concern is potential death or injury to animals, including fish, in the vicinity of the of the blast area.

Diadromous fish such as salmon and sea trout could be present during the proposed period for the work – November to February. However, this is not be a peak time of year for life stages of salmon to be present in Scottish coastal waters, although adult salmon which have spawned (kelts) could be moving out to sea at this time. And sea trout could also be present.

The south end of the cable route is close to the mouth of the River Spey which is a SAC for salmon and sea lamprey, but it is noted that there is not an intention to detonate any ordnance found on the cable route – BOWL intends to reroute the cable in such circumstances.

Even if any salmon or sea trout are in the vicinity of where detonations will take place, they will probably be unlikely to be visible. If there is visual evidence of their presence, such as

salmon or sea trout jumping, which would not be expected, mitigation measures along similar lines to those proposed for marine mammals should be put in place. Even if there is no visual evidence of their presence, it would be noted that detonation of small charges prior to any main demolition charge would still seem to be a sensible precaution to encourage any unsighted salmon and sea trout to move away from where the main detonation will take place.

Aquaculture
MSS aquaculture planning have no specific comments to make on the Beatrice Offshore Wind Farm Limited (BOWL): Marine Licence Application: Unexploded Ordnance Clearance. It should be noted that since the comments made on 02/03/2016 in response to the Post Consent Vessel Management Plan, planning applications have been submitted for two proposed shellfish sites within Dornoch Firth.

socio economics

Hopefully these comments are helpful to you. If you wish to discuss any matters further contact the MSS Renewables in-box MS_Renewables@scotland.gsi.gov.uk.

Yours sincerely

[redacted]

Paul Stainer

Marine Scotland Science

Dinsdale R (Rosanne)

From: Nick Salter <Nick.Salter@mcga.gov.uk>
Sent: 12 October 2016 11:47
To: Dinsdale R (Rosanne); MS Marine Renewables
Subject: RE: BOWL - Application for Marine Licence - UXO Clearance

Dear Rosanne,

Thanks you for sight of the UXO Clearance plans. My only comment is that an additional mitigation measure should be included to ensure the UKHO is notified in advance of any disposal activity so they can issue navigation warnings via Admiralty Notice to Mariners. I am content with the remainder of the document.

Best regards,

Nick

Nick Salter
Offshore Renewables Advisor
Navigation Safety Branch | Maritime and Coastguard Agency
Spring Place | 105 Commercial Road | Southampton | SO15 1EG
Tel: 020 3817 2433 | Mob: 07879 000658 | Email: nick.salter@mcga.gov.uk

Maritime & Coastguard Agency
Safer Lives, Safer Ships, Cleaner Seas

From: Rosanne.Dinsdale@gov.scot [mailto:Rosanne.Dinsdale@gov.scot]
Sent: 21 September 2016 09:37
To: marineenergy@snh.gov.uk; erica.knott@snh.gov.uk; planning.dingwall@sepa.org.uk; renewables@sff.co.uk; navigation@nlb.org.uk; ArchieJ@nlb.org.uk; oga.correspondence@oga.gsi.gov.uk; robert.a.white@oga.gsi.gov.uk; navigationsafety <navigationsafety@mcga.gov.uk>; Nick Salter <Nick.Salter@mcga.gov.uk>; MS_Renewables@gov.scot; Paul.Stainer@gov.scot; DIO-Safeguarding-Offshore@mod.uk; EMT@decc.gsi.gov.uk; LRENNIE@talisman-sinopec.com; stimms@ithacaenergy.com; Sarah.Pirie@edpr.com
Cc: Catarina.Aires@gov.scot; Jessica.Drew@gov.scot; Nicola.Bain@gov.scot; Paul.Cook2@gov.scot
Subject: BOWL - Application for Marine Licence - UXO Clearance

Dear Sir/Madam

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06145 – BOWL – Unexploded Ordnance Clearance

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If you are unable to meet this deadline please inform us in writing as soon as possible. We will aim to grant an extension to the consultation period.

Should you have any queries please do not hesitate to contact us.

Yours sincerely

Rosanne

Rosanne Dinsdale
Marine Renewables Casework Officer
Marine Scotland - Marine Planning & Policy

Scottish Government | Marine Laboratory | 375 Victoria Road | Aberdeen | AB11 9DB

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Email: rosanne.dinsdale@gov.scot
Website: http://www.gov.scot/Topics/marine/Licensing/marine

Frequently Asked Questions

Scottish Natural Heritage
Dualchas Nàdair na h-Alba
All of nature for all of Scotland
Nàdar air fad airson Alba air fad

JNCC
Joint Nature Conservation Committee

Marine Scotland
Licensing Operations Team
PO Box 101
375 Victoria Road
Aberdeen
AB11 9DB

SNH ref: CNS REN OSWF BOWL
JNCC ref: 3968 & 3970

For the attention of: Rosanne Dinsdale

18 October 2016

Dear Sirs

BEATRICE OFFSHORE WIND FARM
CLEARANCE OF UNEXPLODED ORDNANCE

Thank you for this consultation, requesting advice from SNH & JNCC on this matter, where unexploded ordnance (UXOs) may be encountered at the Beatrice offshore wind farm site or along the cable route, requiring remedial action. In this regard, BOWL have submitted a marine licence application along with an application for possible disturbance of European protected species (EPS). These submissions, and the accompanying environmental report, reflect the outcomes and agreement reached at the meeting held to discuss this work, 6 September, involving Marine Scotland, ourselves and the developer; as well as the further discussion of mitigation options between BOWL and SNH at the teleconference of 12 September.

Description of Activity

Survey work and risk assessment has indicated that there could be possible UXOs in the area. BOWL will investigate these and if they're positively confirmed then the following options are proposed for remedial action:

(i) the export cable will be re-routed round any UXOs found in the cable corridor;

(ii) within the wind farm, the first option will be to microsite wind farm infrastructure and / or relocate UXOs;

(iii) if this isn't possible then detonation of UXOs is the final option.

Based on the survey work and risk assessment, BOWL estimate a maximum of five detonations. No detonations are anticipated within the cable corridor. Any UXOs found within the wind farm site may be detonated in situ or relocated to a pre-determined location. The risk assessment indicates that 50kg is the most likely size of explosive to be found.

Potential impacts

Underwater explosions are the noisiest activity conducted in the marine environment. There is a realistic potential for mortality and injury of marine fauna, not only due to the sound level emitted but also due to the instantaneous characteristic of the noise. Depending on the size of the explosive, effects could be at significant distance from source.

Our advice focuses on marine mammal interests: bottlenose dolphin and seal species as qualifying interests of Special Areas of Conservation (SAC); and cetaceans as European protected species (EPS). In this regard, we concur that harbour porpoise and seal species are the most at risk as these species are the most likely to be encountered during any operations. The risk is lower for bottlenose dolphins and other EPS cetacean species as they're less likely to be in the area of the wind farm, and BOWL have confirmed that no detonations are planned for the cable route.

We advise that the mitigation agreed for marine mammals should also help address any potential impacts to SAC fish interests of the River Spey, as well as other fish. In this regard, MSS are providing more detailed advice and suggested mitigation options for fish species.

For avoidance of doubt, we confirm that we have also considered whether there could be any significant effects on bird species, including qualifiers of the proposed SPA in this area, currently out to consultation. We consider there will be no such effects, hence we have advised that bird interests can be scoped out of assessment.

Finally, as discussed in the environmental report, much of the Beatrice wind farm site comprises a priority marine feature (PMF): medium sands and rich infaunal communities predominantly characterised by SS.SCS.ICS.MoeVen *Moerella* spp. There could be impacts to this PMF if UXO detonations are required, however, these impacts will be localised and only a small proportion of the PMF will be affected. It is a robust biotope and should recover quickly from any such damage.

SNH & JNCC advice

In **Appendix A** we examine the risk to marine mammals from potential UXO detonations, and we provide our detailed advice on the mitigation plan attached to BOWL's environmental report.

We consider that implementation of this agreed mitigation will address the risk of injury or fatality to EPS cetaceans arising from any UXO detonations, such that only disturbance needs to be considered under EPS licensing requirements. In this regard, the UXO detonations may give rise to EPS disturbance, however, this will be infrequent and of limited duration. While individual animals may be disturbed, we confirm that any such disturbance will not be detrimental to the maintenance of EPS populations at a favourable conservation status in their natural range.

SNH has also considered the potential impacts on SAC interests, bottlenose dolphin and seal species. With adoption of the agreed mitigation we can confirm that potential UXO clearance will not result in any population level effects and there will be no adverse impact on site integrity at either the Moray Firth SAC (where bottlenose dolphin are a qualifying interest) or Dornoch Firth SAC (where harbour seal are a qualifying interest).

Both SNH & JNCC would welcome sight of the close-out report for any UXO detonations, particularly to review how the suggested mitigation works in practice. We recommend this report also includes discussion of any effects on benthic interests (the PMF).

Further advice

If you require any further advice in relation to this advice on the potential clearance of unexploded ordnance then please don't hesitate to get in touch, either with myself at SNH or Sarah Canning at JNCC.

Yours faithfully,

Catriona Gall

Marine Renewables Casework Adviser (Offshore Wind)
SNH Policy & Advice

cc. Sarah Canning, JNCC

APPENDIX A

BOWL UXO CLEARANCE: SNH & JNCC ADVICE ON MARINE MAMMAL INTERESTS

SNH & JNCC have reviewed the environmental report that supports the marine licence and EPS licence applications for this potential clearance of unexploded ordnance at Beatrice offshore wind farm. We provide advice on the following key aspects of assessment relevant to marine mammal interests, namely: underwater noise modelling, proposed mitigation and the residual risk of auditory injury.

Underwater noise modelling

The underwater noise assessment is thorough and well explained, the modelling is discussed in context with the available literature. The controlled detonation of unexploded ordnance (UXOs) generates high amplitude shock waves and associated sound waves that propagate through the environment very quickly, and for significant distances. This is the loudest source of noise that we introduce into the marine environment and can have serious consequences for marine mammals including auditory injury and even death. Having reviewed the available literature and the modelling in BOWL's report we agree that direct mortality is not likely to occur outside the recommended 1km mitigation zone[1]. We note, however, that auditory injury (permanent threshold shift) may occur at greater distance dependant on the charge size.

In this regard, BOWL mention the possibility of relocating and grouping UXOs together for detonation. We should be contacted for further advice if this is likely to result in an amount of explosives greater than the 50kg modelled in the environmental report.

Marine mammal mitigation plan

BOWL have incorporated the proposed mitigation into their overall operating procedure, as requested, this is presented in Annex A of the environmental report.

BOWL indicate that only one detonation would occur on any given day, during daylight hours and in good sea conditions (< sea state 3). There will be two vessels involved in the operation, a large 'support vessel' (~65m long, 30m high) and a 'guard boat' (< 12m long). The charges will be set by ROV from the support vessel, and this operation will take about an hour. During this time, marine mammal observations and passive acoustic monitoring (PAM) will also be undertaken (see below). The marine mammal observers (MMOs) and PAM operator will be based on the support vessel.

Once the charges are set the support vessel clears the zone out to a distance of 1500m from the detonation site (this is the navigational safety zone to prevent other vessels from entering the wider area). The guard vessel will maintain a detonation safety zone of 500m; the acoustic deterrent device (ADD) will be deployed from this vessel by a dedicated crew member.

The sequence of marine mammal mitigation is as follows:

- Two MMOs and one PAM operator will monitor a 1km mitigation zone (as per JNCC guidelines) for a minimum of one hour prior to detonation.

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[1] Mitigation as recommended in the 'JNCC guidelines for minimising the risk of injury to marine mammals from using explosives' (2010), available from:

http://jncc.defra.gov.uk/pdf/JNCC_guidelines_explosives%20guidelines_august%202010.pdf

- Once the 1km mitigation zone is clear (as confirmed by the MMOs and PAM operator), active mitigation will commence using an acoustic deterrent device (ADD) for 30 minutes.
- This will be followed by 'soft start' detonations using 50g; 100g; and 150g charges at 5 minute intervals. (*We now recommend that, if possible, the ADD also continues to operate during the 'soft start' detonation – see below*.)
- After 45 minutes of active mitigation, the UXO will be detonated.
- Once detonation has taken place there will be a post-detonation search with the support vessel sailing back to the detonation site while the MMOs undertake their observations.

UXO clearance is a novel activity in Scottish waters and discussion with BOWL has focused on developing a sequence of mitigation which is practical to implement and effective as it can be. We consider that the agreed mitigation, given above, will be sufficient to allow marine mammals to clear the 1km mitigation zone prior to UXO detonation, thus avoiding any risk of mortality. We recognise that it is harder to mitigate for auditory injury where there is a risk of permanent threshold shift (PTS) over greater distance, beyond 1km. In this regard, noting MSS advice, we recommend that, if possible, ADD deployment continues through the 'soft start' detonations. This may help improve the effectiveness of deterrence, considering the difference in noise characteristics between the ADD (mid frequency) and 'soft start' (low frequency rumble).

Other than this, we are satisfied with the mitigation plan presented in BOWL's environmental report and only have a few further suggestions for consideration:

- We'd welcome clarification of the contingency measures in relation to marine mammal mitigation if, for example:
  (i) there are any technical difficulties that may interrupt the 'soft start' and / or UXO detonations, or
  (ii) there is any delay in operations due to a vessel entering the navigational safety area.
- In terms of layout, we think it could be beneficial to combine the MMO / PAM communications on Figure 3.1, unless there's likely to be significant separation between them on the support vessel. We wonder if it'd be helpful to appoint a lead contact for this team.
- If MMO / PAM communications are combined on Figure 3.1 then it would be helpful to also include the details of the ADD deployment on this diagram (i.e. combine Figures 3.1 and 3.2). We recommend that the MMOs and PAM operator are also notified if there's a technical problem with the ADD (although the PAM operator may already have picked this up from their readings).
- For UXO clearance, the MMOs and the PAM operator should all have at least three years experience and be familiar with the behaviour of the marine mammal species likely to be encountered in the Moray Firth. We're content that the ADD operator can be a dedicated and trained member of the crew on board the guard vessel.

If the equipment allows, we'd find it helpful if the PAM operator could also record the UXO detonation (at the 1500m stand-off distance) to validate propagation models and provide data to help inform future UXO activities.

Residual risk of auditory injury

We consider that the proposed mitigation (as above) will minimise the risk of direct mortality to marine mammal interests; we also consider that this use of active deterrents will reduce their chance of auditory injury (permanent threshold shift / PTS). However, it is not certain that the risk of PTS is negligible given the possibility that animals do not flee as assumed and that the potential zone of risk (for PTS) may extend further than the 1km mitigation zone.

Based on our review of the noise modelling, we confirm that there is no significant risk of PTS in relation to dolphin species. For porpoise and seal, there could be some risk to individual animals but, having investigated this further, we can confirm that this would not result in any population level effects.