Queiros J (Joao)

From: [redacted] <[redacted]@repsol.com>
Sent: 13 December 2013 16:10
To: Queiros J (Joao); McKie J (Jim) (MARLAB); MS Marine Licensing
Cc: Tait A (Adrian) (MARLAB); Morley L (Laura) (MARLAB); May R (Roger)(MARLAB)
Subject: 013/OW/SGFoF1 - 10: Request For Comments Addendum Seagreen Wind Energy Limited: 18 October 2013 - ICOL Response
Attachments: Letter Attachment 3.pdf; ICOL Representation on Seagreen HRA Addendum 13.12.13.pdf; Letter Attachment 1.pdf; Letter Attachment 2.pdf

Joao

Please find attached our formal representation to the consultation on the Seagreen HRA Addendum.

We would appreciate your suggestions on how best to communicate these points to all organisations that were consulted with since we feel it is essential that these errors are immediately recognised. Based on your earlier communication there are circa 60 organisations that received copies.

Regards
[redacted]

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13 December 2013

Joao Queiros
Marine Laboratory,
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Dear Sir,

Representation to consultation undertaken, on the Addendum in support of the Seagreen Alpha and Bravo offshore windfarms and transmission asset project, by the Marine Scotland Licensing Operations Team.

Thank you for your letter dated 18 October 2013 regarding the recent application for consent under Section 36 of the Electricity Act 1989 and a Marine Licence under part 4 of the Marine (Scotland) Act 2010 and the Marine and Coastal Access Act 2009 to construct and operate Seagreen Alpha and Bravo offshore Wind Farms and transmission asset project.

Please consider this email to be our formal representation to these applications. ICOL do not offer any comment in respect of information presented for other projects.

Inch Cape Offshore Limited (ICOL) have reviewed the documents and identified a significant number of factual errors in the information presented in relation to the Inch Cape project which are detailed in the attachments to this letter.

Illustrative examples include;

- The number of piles quoted for Inch Cape is 1162 rather than 944, an error of 23%.
- The number of piling days is quoted as 581 days instead of 168 days, an error of 246%.
- The maximum excavated volumes per wind turbine generator (WTG) quoted for Inch Cape is 114,012m^3 rather than 28,503m^3, an error of 300%
- WTG operational times for Inch Cape have been re-calculated incorrectly by multiplying percentage wind availability by percentage downtime, as opposed to subtracting the latter from the former.
- Flight densities of <u>all</u> kittiwake have been used for Inch Cape instead of those for only <u>adult</u> kittiwakes.

In addition, we note that a large amount of data presented in the Inch Cape Environmental Statement has been modified before being used in assessments within the Seagreen documents. In many cases it is not clear exactly how data has been modified. We have confirmed with Seagreen that some of these alterations were made in an attempt to present information on a comparable basis (referred to as a 'common currency'). It is important to note however, that these modifications reflect the opinion of the Seagreen project rather than any common position across projects and that there was no prior discussion before these figures were offered as 'common'.

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Modifications have also been made to site specific Inch Cape information which is inherently different to that for other projects and we disagree with in principle with this approach, and with any figures derived as a result.

Taking these significant points together, and as evidenced in the attached comments, ICOL do not consider that any information presented in the Seagreen HRA Addendum in relation to Inch Cape can be relied upon, in whole or in part.

There are also multiple instances where ICOL survey and assessment methodologies have been brought into question. We feel this is inappropriate on the basis that ICOL followed guidance and specific advice from relevant authorities both in terms of the assessments and the way results were reported.

For the reasons outlined above, ICOL do not consider the assessment presented in this submission is relevant to the determination of the Inch Cape applications and would appreciate confirmation from MS-LOT of your views on this point.

Yours sincerely,

[redacted]

[redacted]

On behalf of Inch Cape Offshore Limited

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Inch Cape Comments on the Seagreen HRA Addendum - (Marine Mammals)

Table 3.39 Number of piles associated with the Seagreen Project Alpha and Seagreen Project Bravo (including The Transmission Asset Project), Neart na Gaoithe and Inch Cape (and their respective transmission assets)

Table 14.2 of Inch Cape ES (Design Envelope Parameters Used to Inform the Marine Mammal Assessment) clearly explains that the total number of piles is 944. It also clearly explains how the 944 piles have been calculated. ICOL does not understand why Seagreen has presented 451 piles for the worst case and 711 piles for the most likely scenario. This gives a total of 1162 piles increasing the number of piles at IC by 218 piles (an increase of approximately 23%). The correct values are 283 piles for the Worst Case scenario and 661piles for the Most Likely Scenario. **Therefore the figures presented for Inch Cape in the Seagreen HRA In-combination are factually incorrect.**

"3.292. Indicative schedules for pile installation phases are included in each project-specific ES, and are summarised here:

- *Seagreen: two years, estimated 2015 - 2016;*
- *Neart na Caoithe: 15 months, estimated Q2 2015 to Q3 2016;*
- *Inch Cape: two years, estimated 2016 -2017. In the Inch Cape ES (Inch Cape ES Volume l A; Chapter 7 Description of the Development; Table 7.1 2), the foundation installation phase is also shown as potentially taking place from Q2 2017 to Q2 2019 - which is also equivalent to two years."*

Table 7.12 of Chapter 7 of the Inch Cape ES details that the construction phase of Inch Cape will start in 2016, but piling would be likely to start in 2017. Paragraph 90 of Chapter 7 explains the approach taken to cumulative piling assessments within the ES. In summary, ICOL has not attempted to separate sequential and concurrent piling scenarios for the projects, as was felt that the degree of uncertainty over project build programmes was too great and the scenario of some sequential and some concurrent was not addressed. Instead, ICOL has combined both sequential (piling occurring within the Firth of Forth and Tay for up to five years) and concurrent (all Firth of Forth and Tay projects piling together) as one worst case scenario. It is recognised in paragraph 90 of Chapter 7 that this assessment scenario is '*not likely*', but '*the assessments presented consider all three projects piling concurrently (2016) to allow for potential programme slippage and overlap of piling schedules, and as such are considered to be a conservative representation of worst case for each receptor*'. **Therefore the figures presented in Inch Cape ES are valid.**

Para 3.304 "Based on the estimated durations of piling activities at each site, the period within the installation phase over which piling-related activity may occur is:

- *174 days at Project Alpha;*
- *162 days at Project Bravo;*
- *209.5 days at Neart na Gaoithe; and,*
- *581 days at Inch Cape"*

Inch Cape Comments on the Seagreen HRA Addendum - (Marine Mammals)

ICOL does not understand how the 581 days figure has been derived by Seagreen and question why any recalculation was required. Table 14.2 of the ICOL Marine Mammal Chapter (Chapter 14) states that piling will take place over a two year period, approximately 11 per cent to 23 per cent of the time (depending upon the number of vessels used and hardness of substrate encountered). Thus the total number of days that ICOL predict piling would occur within the Inch Cape site is: 730 x 11% = 80 days and 730 x 23% = 168 days. **ICOL note that Seagreen has included vessel mobilisation and piling set up within this period, however the figures presented for Inch Cape in the Seagreen HRA are factually incorrect.**

Para 3.298

"Based on the assumptions in paragraphs 3.295 to 3.297, the time spent engaged in active pile driving at each project is:

- *Seagreen Project Alpha: 64 hours of fully driven piling, and 152.9 hours of drive-drill-drive piling - total 216.9 hours;*
- *Seagreen Project Bravo: 59.6 hours of fully driven piling, and 142.5 hours of drive-drill drive piling – total 202.1 hours;*
- *Neart na Gaoithe: 410.4 hours of fully driven piling, and 1,118.3 hours of drive-drill- drive piling - total 1,528.7 hours; and*
- *Inch Cape: 1,894.2 hours of fully driven piling into hard substrates, and 1,493.1 hours of fully driven piling into softer substrates – total 3,387.3 hours."*

ICOL does not understand how these values presented for Inch Cape have been derived. Table 14.2 of Chapter 14 provides the calculations that were used to predict a maximum requirement of 944 piles for the Inch Cape site, and that hard substrate (worst case) has been predicted encountered across 30% of the site. Thus the worst case scenario for the duration of piling is predicted to be 4.2 hours: 944x30%x4.2hrs = 1189 hours for hard substrate. For the most likely scenario (70% of the site) the duration of the piling is predicted to be 2.1 hours: 944x70%x2.1hrs = 1388 hours. This gives a total of 2577 hours. ICOL notes that Seagreen appear to have miscalculated the total number of hours of piling predicted as a consequence of their mis-use of the total number of piles presented in Table 3.39 of the Seagreen Addendum. The proportion of the installation phase with active piling presented for Inch Cape in Table 3.41 has also been miscalculated. **Therefore the figures presented for Inch Cape in the Seagreen HRA In-combination are factually incorrect.**

Inch Cape Comments on the Seagreen HRA Addendum - (Marine Mammals)

Para 3.320 "At Neart na Gaoithe, the modelled prediction is very similar to that at Seagreen: the Neart na Gaoithe ES predicts a modelled release of 5,000m^3 from each foundation, which for 125 foundation pieces is equivalent to the Seagreen estimate. The worst case assessment at Inch Cape for sediment excavation per foundation (including scour protection) is 114,012m^3, which for 213 foundations is also in the region of the Seagreen estimates."

The value presented for Inch Cape has been misinterpreted. Table 7.5 of Chapter 7 of the Inch Cape ES presents 28,503 m^3 as the maximum excavated volume per wind turbine generator (WTG) with a note stating *"it is expected that the majority of foundation locations will not require this level of excavation and the extrapolated figure for the entire site will not equate to the maximum volume times the number of WTGs"*. Table 7.7 of Chapter presents 114,012 m^3 the maximum excavated volume per OSP with a note stating ""*it is expected that the majority of foundation locations will not require this level of excavation and the extrapolated figure for the entire site will not equate to the maximum volume times the number of OSPs*". The Seagreen HRA uses data presented for the OSPs (5 structures) and applied them to WTGs (213 structures). **Therefore the figures presented for Inch Cape in the Seagreen HRA In-combination are factually incorrect.**

Para 3.332. "The area of influence in terms of seabed disturbance at the Seagreen Project is equivalent to approximately 3.75km^2 at Project Alpha and at Project Bravo. The Inch Cape assessment estimates temporary habitat disturbance as -9.6km^2 over the development area during the construction phase, and Neart na Gaoithe estimates - 2.9km^2 of temporary habitat disturbance during the construction phase. The effects of seabed habitat disturbance and considered to be short-term and reversible, over days to weeks, and therefore are not significant."

This value presented for Inch Cape is factually incorrect. Table 12.2 of Chapter 12 of the Inch Cape ES states the value of temporary habitat disturbance "*...total seabed area disturbed is 5.54 km^2...*". This table also provides a clear breakdown of how this value has been calculated. The data presented in the Seagreen addendum increases the temporary area disturbed by 73.3 %.

Para 3.334 "The Neart na Gaoithe ES provides an assessment of the potential noise effects on prey species that may cause an overall loss of available prey items. Neart na Gaoithe noise modelling indicates only localised effects on species such as sandeels, and so predicts that prey will remain available to marine mammals during the construction period (Neart na Gaoithe ES Chapter 13 paragraph 423). The Inch Cape assessment predicts effects of minor (fatality and injury) to moderate (behavioural) significance in prey species."

Para 3.349."At Neart na Gaoithe, the assessment of potential EMF effects indicates that any impact will be localised and negligible, since marine mammals may swim away from the cable without effect (Neart na Gaoithe ES Chapter 13 Marine Mammals, paragraph 162). The Inch Cape assessment predicts a minor impact (Inch Cape ES Volume IA: Chapter 14)."

Due to the marked difference in assessment approach between the ICOL and Seagreen assessments, ICOL believes that is impossible to compare the conclusions presented in the Inch Cape assessment directly and consider they are used out of context in the Seagreen Addendum on several occasions, some examples of which are detailed above. **This presentation of the Inch Cape conclusions, taken from the Inch Cape assessment, does not faithfully represent the difference in assumptions and methodologies used and is therefore not a like for like comparison.**

Inch Cape Comments on the Seagreen HRA Addendum - (Marine Mammals)

Para 3.355"The Neart na Gaoithe assessment does not make explicit reference to the potential for physical barrier effects to marine mammal migration, but the minimum WTG spacing is indicated as 480m (Neart na Gaoithe ES Chapter 5 Project Description, Table 5.9). The Inch Cape assessment also does not make specific reference to the potential for physical barrier effects, but indicates that the minimum down-wind and cross-wind spacing between WTGs will be 820m (Inch Cape ES Volume IA: Chapter 7 Description of Development, Table 7.3)."
Barrier effect was addressed in the Inch Cape ES through assessment of 'Underwater Wind Turbine Generator (WTG) Noise' and 'Long Term Presence of Wind Turbine Generators' in Section 14.7.2 of Chapter 14. Paragraph 146 of Chapter 14 states '*A Marine Scotland funded review (2012) concluded that WTG noise is unlikely to cause permanent hearing damage in seals, porpoises or bottlenose dolphins, even at close proximity to the WTGs. It was also concluded, after a review of telemetry studies, that operational wind farms do not appear to affect harbour seal movement patterns*. In addition, paragraph 149 of Chapter 14 states '*a Marine Scotland funded report concludes that there is no evidence for displacement of harbour porpoise and grey seals from the operational Robin Rigg Offshore Wind farm (Walls et al., 2012). Harbour porpoise and grey seals were the only marine mammals present in high enough numbers pre- and post-construction to enable robust analysis*'.
Para 3.366."At Seagreen, the impact ranges at 130dB$_{ht}$ are negligible and not significant for all species. At Neart na Gaoithe and Inch Cape, ranges are not presented for auditory injury at this threshold. Given that this threshold is used to indicate damage over a very short exposure time, it is assumed that impact ranges at other projects would be similar to those modelled for Seagreen. It is considered that ranges for injury at this threshold are within the range of mitigation by marine mammal observers and acoustic deterrents (i.e. up to 500m range) Therefore, impacts at 130dB$_{ht}$ are not considered significant for in combination sequential or concurrent installation phases."
ICOL did not undertake assessments using the 130 dBht (*species*) criteria and clearly explained why not. As described in the Seagreen Appendix in Table 3.16, 130 dBht (*species*) is a criteria proposed by Nedwell (2007) to represent an audible noise level with the potential to induce auditory injury. It is predicted from a single noise pulse. ICOL has used a modelled M-weighted noise dose from repeated noise exposure predicted to arise from piling events, using the 186 dB criteria for seals and 198 dB criteria for cetaceans, to model potential exposure to noise levels (both audible and inaudible) sufficient to induce audible injury (PTS onset). **The use of the M-weighted criteria is considered to be more conservative criteria for predicting PTS, and was accepted by the SNCBs and Marine Scotland as the criteria for prediction of potential PTS through consultation for the Inch Cape ES.**

Inch Cape Comments on the Seagreen HRA Addendum - (Marine Mammals)

Table 3.44 Worst case in combination concurrent installation scenario: summary of the ranges out to which auditory injury is predicted for a fleeting bottlenose dolphin.
ICOL is unclear as to why the mean ranges for PTS shown in Table 3.44 remain the same for both the most like piling scenarios and worst case piling scenarios. ICOL would expect the PTS ranges to be larger for the worst case scenarios, as the piling is extended for longer periods of time and thus one would expect any fleeing animal would have to swim further to reach levels of noise that no longer have the potential to induce PTS. ICOL assumes, therefore, that Table 3.44 relates to the 130 dBht (*species*) contour for the single 'loudest' noise pulse from each combination, and thus to not reflect 198 dB criteria for PTS onset. For example, Table 14B.40 of Appendix 14B to Chapter 14 for the Inch Cape ES presents a PTS radii for Inch Cape piling alone of 2.6 km using the 198 dB contour for a fleeing bottlenose dolphin being exposed to a most likely scenario piling event. Noise modelling was undertaken by the same consultant (Subacoustech), so the differences in results are unlikely to be a consequence of different modelling methodology. **ICOL do not understand how the modelled radii is larger for Alpha and Inch Cape together when compared to Alpha, Inch Cape and Neart na Gaoithe together.**
Table 3.45 Worst case in combination concurrent installation scenario: summary of the ranges out to which auditory injury is predicted for a fleeing pinniped
As for Table 3.44, ICOL considers that the radii for predicted PTS onset are unexpectedly low for cumulative effects. For example, Table 14B.SEL of Appendix 14B to Chapter 14 for the Inch Cape ES presents PTS radii for Inch Cape piling alone of 29 km using the 186 dB contour for a fleeing pinnipeds being exposed to a most likely scenario piling event. ICOL would also expect a much greater difference between most likely and worst case piling scenarios, and suggest that **these radii might be 130 dBht (seals) rather than M-weighted 186 dB criteria for multiple noise exposure from each piling event.**
Table 3 48: Number of grey seal predicted to experience behavioural effects due to piling noise in each project-specific ES.
Although ICOL has presented predicted displacement of grey seals to 90 dbht (seals) for reference (Table 14B.16 of Appendix 14B of Chapter 14), ICOL notes that Seagreen has undertaken displacement calculations to 90 dBht (seals) and not 75 dBht (seals) as presented in the Inch Cape ES. As a consequence, **overall numbers predicted to be displaced are not directly comparable between the two studies.**
Para 3.409."The ES concludes that grey seal have low sensitivity to behavioural disturbance arising from pile driving noise. The worst in combination case for behavioural effects is considered to occur where piling-related activity at Project Alpha, Project Bravo, Neart na Gaoithe and Inch Cape is over the longest duration. However, pile installation is not a continuous activity. There may be unplanned reasons for additional 'down time' between piling events, or within the period of piling activity, such as inclement weather or unscheduled equipment maintenance. In the worst case (sequential installation of Project Alpha and Project Bravo), active pile driving noise represents 1.2% of the two year installation phase at Alpha, and 1.2% of the two year installation phase at Bravo. This noise is intermittent over the installation phase."

Inch Cape Comments on the Seagreen HRA Addendum - (Marine Mammals)

This paragraph is presented within the 'Detailed Assessment of in-combination underwater noise effects during construction' however we note that the assessment only appears to include predicted percentage durations of each year for Alpha and Bravo sites, and not those for Neart na Gaoithe and Inch Cape. **ICOL therefore considers that this statement of piling duration for Seagreen only is not relevant to an in-combination assessment.**
Para 3.422 "This section presents the information on the potential for in combination behavioural effects (at 90dBht) in harbour sea l, arising from underwater noise during the construction phase. At this threshold, 100% of harbour seals within the impact area are expected to show a response."
ICOL is unclear as to why Seagreen did not include the 75 dBht (seals) contour for this assessment on harbour or grey seals, and notes that Seagreen have used the 75 dBht contour for bottlenose dolphin in their assessment of potential impacts upon this marine mammal species. As noted in paragraph 3.44 of the Seagreen Addendum, Marine Scotland Science had requested that Seagreen use the Moray Firth Framework for the assessment of potential impacts upon marine mammals, and the framework provided a potential displacement value for seals experiencing up to this perceived noise level (referred to in paragraph 3.251 of the Seagreen Addendum as providing an expected 65% of individuals to show a response).
Table 3.52 Potential number of harbour seal experiencing behavioural effects arising from concurrent piling between projects (90dBht), modelled by Seagreen
ICOL is unclear how Seagreen has calculated these figures. In Table 3.51 Seagreen quote figures for worst case displacement of harbour seals at 90 dBht (seals) for individual projects as Alpha = 51, Neart na Gaoithe = 152 and Inch Cape = 127 (driven piles). The table also provides potential displacement figures for drive-drill-drive scenarios for Seagreen and Neart na Gaoithe of 38 and 95 respectively, reflecting the likely use of a smaller hammer for these scenarios. However, **for in-combination numbers using the 90 dBht (seals) contours, Seagreen has modelled less individual seals to be displaced during concurrent piling of projects** (91 from Alpha and Inch Cape together, 56 from Alpha and Neart na Gaoithe, and 96 from all three projects piling together) **for either of the modelled worst case or most likely scenarios.**
Para 3.450 "Table 3.53 summarises the behavioural impacts on bottlenose dolphin predicted in each ES. For the purposes of assessment, it is considered that average bottlenose dolphin densities (from SCANS II data for Survey Block V) are most appropriate. Spatially explicit density overlay was also used in the ES to predict impacts, but is not considered appropriate because of the lack of spatially explicit densities along the coast north of the survey region (see Seagreen ES Volume l: Appendix H5; Section 2.5). However, the Neart na Gaoithe assessment presents impacts on bottlenose dolphin as derived from SAFESlMM. SAFESlMM predictions are likely to be significantly overestimated due to both the method by which the underlying densities have been calculated (Seagreen ES Volume I: AppendixH5; Section 2.5) and also the was SAFESIMM calculate impact numbers (Seagreen ES Volume l: Chapter l3; paragraph l3.231). Hence, the Neart na Gaoithe predictions are considered to be very precautionary."

Inch Cape Comments on the Seagreen HRA Addendum - (Marine Mammals)

ICOL notes that the figure of three bottlenose dolphin predicted to be displaced by piling at Inch Cape alone is taken from Table 14B.25 and not Table 15B.15 as stated in the Addendum. In addition, this figure of three individuals is that predicted from the 90 dBht (bottlenose dolphin) contour and not the 75 dBht (bottlenose dolphin) contour as quoted in the Addendum. Table 14B.25 of Appendix 14B provides a figure of 10 bottlenose dolphin modelled to have the potential to be displaced by up to 75 dBht (bottlenose dolphin) percieved noise levels from Inch Cape alone (using the standardised methodology described in Appendix 14B to Chapter 14 of the Inch Cape ES), and 13 potential displaced by concurrent piling from one vessel on each of the Alpha, Neart na Gaoithe and Inch Cape projects together. Figure 14C.91 of Appendix 14C of the Inch Cape ES provides a visual representation of the 90 and 75 dBht (bottlenose dolphin) for the three projects under Seagreen and Neart na Gaoithe's drive only scenarios. ICOL did not undertake modelling for the drive-drill-drive scenarios, as these were not proposed at the time of the Inch Cape ES production. Figure 14C.91 illustrates that while the 90 dBht (bottlenose dolphin) contours of the three projects are not modelled to meet the coastline, the concurrent 75 dBht (bottlenose dolphin) contour from the three projects extend to much of the Firth of Tay coastline and thus could be expected to produce a response from more than five individuals as quoted within Table 3.54 of the Seagreen Addendum. ICOL confirms that they have not used SCANSII data to generate the modelled number of bottlenose dolphin to be displaced by piling related noise in each scenario, but have instead used spatially explicit data to reflect likely population distribution (rationale explained in Appendix 14A, Section 14A.2.2). Therefore **ICOL consider these figures are quoted incorrectly, and ICOL do not understand how the two assessments have provided such different results unless Seagreen has confined their assessment to 90 dBht (bottlenose dolphin) contours rather than the 75 dBht (bottlenose dolphin) contours described.**

Para 3.459."The 75dB$_{ht}$ contour associated with piling at Seagreen Project Alpha and with Inch Cape extends to the coastline adjacent to the project offshore locations. For Neart na Gaoithe, the contour extends close to the coastline, but does not reach it. Under the worst case scenario for in combination behavioural effects - sequential installation of Project Alpha, Project Bravo, Neart na Gaoithe and Inch Cape - there is only one installation vessel in operation on any given day during the 39 month sequential installation phase, and therefore there can only be one piling event at any one time. It should also be noted that the 75dB$_{ht}$ contour represents the outer limit of the noise disturbance threshold, and therefore not all dolphins in their coastal habitat will be affected. Bottlenose dolphin tend to be encountered in coastal waters. Therefore, the 20m depth contour has been used to differentiate between these waters, and ' non-coastal' waters where encounters may be less frequent (Culloch and Robinson, 2008; Robinson et al., 2007). Water depths across Seagreen Project Alpha and Project Bravo range between 35m and 60m below LA T, and the projects are located between 27km and 38km offshore, and hence the Seagreen Project is not likely to represent prime habitat for bottlenose dolphin."

ICOL confirms they modelled worst case piling scenarios for Alpha and Neart na Gaoithe and not the drive-drill-drive scenario that appears to have been modelled by Seagreen, as this information was not available at the time. **Figure 14C.91 shows that the 75 dBht (bottlenose dolphin) contours for both Alpha, Neart na Gaoithe and Inch Cape meet the coastline along a significant proportion of the Forth of Tay.** No maps have been presented by Seagreen to allow comparison. The Seagreen description does, however, fit the modelled 90 dBht (bottlenose dolphin) contours for the projects.

Inch Cape Comments on the Seagreen HRA Addendum - (Marine Mammals)

Para 3.460."Given that actual piling noise represents 1.2% of the total duration of the sequential installation phase, and that this noise is intermittent throughout that phase, it is not considered that the 75dBht contour will represent a barrier to bottlenose dolphin between the Firth of Tay and the Moray Firth SAC."
ICOL notes that the 1.2% of the total duration of the sequential installation phase relates to Alpha and Bravo projects only. Table 14.2 of Chapter 14 of the Inch Cape ES presented a figure of between 11% and 23% of the year for piling duration of Inch Cape alone, depending upon the number of piling vessels on site (one or two) and the hardness of the substrate encountered. **ICOL therefore considers that this statement of piling duration for Seagreen only is not relevant to an in-combination assessment.**
Para 3.461 "Bottlenose dolphin population modelling for cumulative effects (e.g. reproductive failure) in respect of the Beatrice Offshore Wind Farm (BOWL, 2013), using the reference population 195 individuals as a baseline, suggests that there would be no long term effect on the bottlenose dolphin population of the Moray Firth SAC."
ICOL note that the assessment undertaken for the Addendum to the Beatrice ES used the Moray Firth Framework methodology and thus is not equivalent to the methodology utilised by Seagreen in the Addendum for Alpha and Bravo. ICOL are therefore unsure how the outcome from two separate assessments for separate projects, utilising two different methodologies, are offered as comparable.

Inch Cape Comments on Seagreen HRA Addendum - Ornithology

Collision Risk Modelling:

The Seagreen Addendum in-combination HRA assessment for ornithology (subsequently referred to in this note as the Addendum) produces breeding season collision risk estimates for five key seabird species in the Forth/Tay region, which are presented for each of the proposed WF sites separately, as well as cumulatively. ICOL notes that; (i) estimates are generated for three species for which no estimates were produced in the Inch Cape ornithology assessment (i.e. fulmar, lesser black-backed gull and herring gull); and (ii) the estimates produced for both gannet and kittiwake, and which are attributed to Inch Cape, are considerably higher than those produced in the Inch Cape ornithology assessment.

The Inch Cape assessment produced no collision estimates for fulmar because of an absence of records of this species flying at potential collision height (PCH), whilst no breeding season estimates were produced for lesser back-backed gull and herring gull because of the small sample of birds recorded in snapshot counts - i.e. four and five, respectively, within the development area (snapshot counts being the source for the flight density estimates used in collision risk modelling – see Section 15A.2.5.2, Appendix 15A of the Inch Cape assessment). The small numbers of each of the two gull species recorded in flight within the development area mean that estimates of collision risk for these species are unlikely to be reliable, whilst they also suggest that the collision risk to these species is small. ICOL has not undertaken a detailed examination of the collision risk figures produced in the Addendum for these three species, but note that they largely bear out the lack of need for calculating breeding season collision estimates for these species (the Addendum predicting no collisions of fulmar and lesser black-backed gull at Inch Cape). However, ICOL has some concerns over the veracity of the estimated four collisions per annum for herring gull associated with the Forth Islands SPA, given that a total of only five flights for this species were recorded in the development area over two full breeding seasons of survey effort.

In terms of the collision estimates produced in the Addendum for gannet and kittiwake, several changes have been made to the approach, and underpinning assumptions, that were used for the collision risk modelling undertaken in the Inch Cape assessment. ICOL have been unable to replicate the figures presented in the Addendum and it is not possible from the explanation provided in the Addendum to understand what changes have been made. ICOL considers that these changes have resulted in less reliable collision estimates. Details of some of changes are given below, along with explanations for the effects on the estimation of collision mortality.

1. The use of Band model option 3 (and, secondarily, option 2) instead of option 1: Collision estimates in the Addendum are derived from generic flight height data (provided in Cook et al. 2012) as opposed to site-specific flight height data. Therefore, the collision estimates for Inch Cape presented in the Addendum are not necessarily based upon data that reflect the flight patterns and behaviour of bird populations on the Inch Cape site. Given the importance of variation in flight heights in affecting collision estimates, ICOL therefore consider these estimates unreliable. The Addendum justifies the use of generic flight height data largely on the basis of requiring a common currency in measurements across the different sites, but this means that any differences there may be in flight behaviour between the different sites are not reflected in the subsequent collision estimates. Although the Addendum argues that such differences in flight behaviour are unlikely to occur due to the proximity of the different sites to

each other, this is an untested assumption, which may be incorrect, and in any event is an assumption that is not required since specific flight data is available for Inch Cape. For example, the Addendum itself refers to differences in the temporal distribution of certain species across the different sites (which presumably reflect between-site differences in behaviour and patterns of usage – see paragraph 2.345), whilst for groups of gannets recorded during the breeding season within Inch Cape, 88% of those flying in southerly or south-westerly directions were estimated to be at heights of 10m or lower, compared to 65% of those flying in northerly or north-easterly directions (a difference which is highly significant in statistical terms, and shows that flight behaviour does vary at this relatively local scale, suggesting that between-site differences may occur). ICOL assumes that, as at Inch Cape, the ornithology surveys for the different Forth/Tay sites were undertaken by experienced surveyors and that, consequently, flight height data will be relatively reliable. Thus, relatively small differences in the methods of data collection, or amendments that may be required to make the different data sets compatible are likely to represent minor sources of error compared to those produced by assuming generic flight height data across the different sites.

2. Changes to the methods used to estimate the contribution of the different SPA populations to the on-site population: The Addendum uses two approaches to estimating the contribution of the different SPA populations to the on-site population, with bird tracking data (collected by CEH) being used as the primary method where available (i.e. for kittiwake at three of the four SPAs in the case of collision modelling). Where tracking data are not available, an apportioning calculation based upon average foraging ranges and distances to colonies is used. The apportioning calculation is similar to that used for this purpose in the Inch Cape assessment, differing only in its lack of a component to account for the expected decrease in the probability of bird-occurrence with distance from the colony (which was incorporated within the calculations used for the Inch Cape assessment). Although this is a source of variation between the respective sets of collision estimates, this difference in the apportioning calculation is unlikely to result in any systematic differences.

   However, the use of tracking data to apportion kittiwake collisions is likely to be a major source of difference in the kittiwake collision estimates that are attributed to Inch Cape. The tracking data used in the Addendum derive from a single year of tracking at each SPA only, but there may be considerable between-year variability in seabird foraging areas. This is demonstrated specifically for the Inch Cape development area by further data on the tracking of kittiwakes from the Isle of May, within the Forth Islands SPA (Daunt et al. 2011). These data show that over the three years of 2001, 2002 and 2010 the overlaps between the foraging areas of the tracked birds and the Inch Cape development area were 41%, 0% and 74%, respectively. It is also worth noting that all tracking data from the Forth Islands SPA derive from the Isle of May colony, which although it holds c.70% of the SPA population is also closer to Inch Cape than other colonies within this SPA (and consequently the tracking data may not be wholly representative of this SPA, and could overestimate use of the Inch Cape site). Finally, clarification is required on how the tracking data have been treated in the Addendum, particularly in terms of any potential bias that might result from variation in the numbers of tracks between individual birds. Therefore, whilst recognising that the use of tracking data in the Addendum for the purpose of apportioning collisions is based upon advice received from SNH, the above issues suggest potential problems in the (current) use of the tracking data for this purpose, and ICOL considers this to be a further factor that may affect the reliability of the collision estimates produced in the Addendum.

3. Changes to assumptions concerning the proportion of breeding adults within populations: For kittiwake, the Addendum uses data collected during field surveys to estimate the proportion of breeding adults within the on-site populations, whereas the Inch Cape assessment bases this upon the estimated stable age structure of the population, as derived from population modelling. As a consequence, calculations in the Addendum assume that 91.3% of the predicted kittiwake collisions during the breeding season affect breeding adults, compared to 74.4% in the Inch Cape assessment. Field collected data are likely to overestimate the proportion of breeding adult kittiwake because birds may adopt adult plumage from their second year although breeding does not generally begin until four years. Therefore, the 91.3% figure used in the Addendum is likely to include a proportion of immature birds, causing the predicted collision risk for breeding adult kittiwakes from the different SPA populations to be overestimated. The modelled stable age structure used in the Inch Cape assessment suggests that 85 – 97% of kittiwakes would be classed as breeding adults on the basis of just plumage during breeding season surveys (based upon the estimated percentages of second year, third year and older birds in the population, and assuming some second years and all third year and older birds have plumage characteristics typical of adults). Therefore, the use of field data to estimate the proportion of breeding adult kittiwake within populations is a further factor that is likely to limit the reliability of the collision mortality estimates produced for kittiwake in the Addendum.

4. The use of different metrics for the reference sea level from which turbine height is determined: The Addendum has made changes to the assumptions used in the Inch Cape assessment concerning the distance between sea surface level and the lower rotor swept height, which appears to equate to a change in the ICOL Design Envelope that results in a 1.5m decrease in turbine height. ICOL has difficulty understanding the rationale for these changes and consider that changes to ICOL design parameters are entirely inappropriate when seeking to achieve the objective of consistency in measurement points between data from the different WF sites. Any figures affect by this change should therefore be disregarded.

5. Changes in the population estimates used for SPA colonies and other colonies within the regional population: ICOL notes that the differences between the Addendum and the Inch Cape assessment in the regional population estimates used for kittiwake, as well as a marked difference in the population estimate for the St Abbs Head to Fastcastle SPA. Whilst acknowledging that the Addendum appears to have followed recent advice from SNH on the SPA colony counts that should be used (provided subsequent to the submission of the Inch Cape assessment), the estimate for the St Abbs Head to Fastcastle SPA used in the Addendum derives from 2000, and seems likely to represent a considerable overestimate of the current population (given the scale of kittiwake declines in this region).

6. Erroneous calculation of WTG operational times: WTG operational times for Inch Cape appear to have been re-calculated incorrectly in the Addendum by multiplying percentage wind availability by percentage downtime, as opposed to subtracting the latter from the former. Any figures affect by this change should therefore be disregarded.

The above issues highlight some of the main concerns ICOL has with the way in which estimates of collision mortality have been calculated by Seagreen in relation to Inch Cape within the Addendum, and detail why ICOL considers that these estimates are unreliable and should be disregarded. It should also be noted that collision modelling within the Inch Cape assessment was undertaken using

precautionary assumptions where required, used the best available evidence available at the time and the followed the advice that had been received from SNH and RSPB on the approaches to be taken.

Displacement:

As with collision risk modelling, the Addendum produces in-combination estimates of breeding season displacement (with predicted population-level consequences) for the different WF sites. However, in contrast to the estimation of collision mortality, displacement effects are presented in terms of the combined effects only, without any breakdown to show the contribution of the individual sites to this overall effect. Therefore, it is difficult to determine exactly how the predicted level of effect on the different SPA populations from the proposed Inch Cape Wind Farm differs between the Addendum and the Inch Cape assessment.

Several fundamental changes have been made to the approach, and underpinning assumptions, that have been used to estimate displacement effects in the Addendum compared to the Inch Cape assessment, most notably:

1. Consideration of the on-site population only: The Addendum considers displacement effects for on-site populations only and does not incorporate the precautionary consideration that effects will extend into a buffer area around the WF site. In contrast to this, within the Inch Cape assessment, displacement effects are measured in relation to the population of the WF site plus 2 km buffer (in line with a specific request from Marine Scotland (MS) in August 2011 that developers consider displacement rates for seabirds within the wind farm footprint and a 2km buffer). Furthermore, the statement made in the Addendum concerning the re-calculation of site populations without buffers (paragraph 2.275), which is undertaken apparently to create a 'common currency' in this measure between the different sites, needs to be explicit as to the nature of the re-calculation applied to the Inch Cape data, since this could represent a further factor causing differences in displacement estimates between the Addendum and the Inch Cape assessment.

2. Derivation of the on-site population estimate: The Addendum calculates the on-site population from which displacement estimates are derived as the mean of the seasonal peaks (i.e. taking the mean value of the peak breeding season counts in each year of survey), whereas the Inch Cape assessment uses the peak of the seasonal means (i.e. calculating the mean value for each separate breeding season and taking the maximum of these values). These population estimates will undoubtedly differ (so causing potential differences in the estimated displacement effects between the Addendum and the Inch Cape assessment), with the logic of the approach used in the Inch Cape assessment having been to increase the chances of obtaining an estimate that was representative of the whole breeding season and not overly influenced by results from potentially anomalous single surveys.

3. Differences in displacement rates: The assumed rates of displacement used for different species differ between the Addendum and the Inch Cape assessment, with the Addendum using higher percentage displacement rates than the Inch Cape assessment for some species (e.g. 60% vs 50% for each of the three auk species) but lower rates for others (e.g. 60% vs 75% for gannet). The displacement rates used in the Inch Cape assessment were presented to, and discussed with,

SNH, MS and RSPB at a meeting in February 2013, with the justification and rationale for the displacement rates used in the Inch Cape assessment presented in the ornithology chapter.

4. Assumed mechanism for population level impacts: The Addendum estimates the population level impacts of displacement by assuming that displaced birds suffer increased mortality rates, whereas the Inch Cape assessment assumes that population level impacts operate via reductions in breeding success (with all displaced birds assumed to fail to breed). The relative contributions of these two mechanisms to causing population level impacts are unknown, but the life-history strategy of seabirds (i.e. long-lived species with low annual reproductive output) suggests the latter may be of most importance (and appears to have been viewed favourably by SNH and RSPB). Irrespective of what approach is used, the difference in approach is a further factor that may affect the predicted impacts of displacement.

5. Changes to the methods used to estimate the contribution of the different SPA populations to the on-site population: As for collision risk modelling above, the differences between the Addendum and the Inch Cape assessment in the methods used to estimate the contribution of the different SPA populations to the on-site population will influence the estimated displacement effects, with the use of a single year of tracking data to achieve this for kittiwake at three of the four relevant SPAs being a particular concern to ICOL. Notably, although tracking data are also available for guillemot, razorbill and puffin from the Isle of May (within the Forth Islands SPA) they do not appear to have been used for this purpose.

6. Changes to assumptions concerning the proportion of breeding adults within populations: In addition to the changes made in the Addendum to the estimated proportion of breeding adult kittiwakes (described above for collision risk modelling), a figure of 70% is assumed for the proportion of breeding adults within the breeding season populations of each of the three main auk species at Inch Cape (i.e. guillemot, razorbill and puffin). The basis for this 70% figure is not stated and it is notably lower than the values estimated for these species from the modelled stable age structures, as derived from the population modelling undertaken as part of the Inch Cape assessment (i.e. 83.6%, 87.7% and 82.1% for guillemots, razorbills and puffins, respectively – see section 15B.2.2.4, Appendix 15B of the Inch Cape assessment). Therefore, the changes made in the Addendum to the assumed proportion of breeding adults within the Inch Cape populations are considered to limit the reliability of the predicted displacement impacts on these three auk species, as well as on kittiwake.

7. Changes in the population estimates used for SPA colonies and other colonies within the regional population: As for collision risk modelling, ICOL has concerns over the use of some of the older SPA colony counts, without taking any account of more recent trends, most notably the kittiwake estimate at the St Abbs to Fast Castle SPA.

The above issues highlight some of the main concerns ICOL has with the way in which estimates of breeding season displacement have been calculated for Inch Cape in the Addendum, and detail why ICOL considers that these estimates are unreliable. It should also be noted that, as for collision modelling, the estimation of displacement impacts in the Inch Cape assessment was undertaken using precautionary assumptions where required, used the best available evidence available at the time and the followed the advice that had been received from SNH and RSPB on the approaches to be taken.

Other Issues of Concern:

In addition to those issues that are specific to the estimation of collision mortality and displacement,

1. Use of PBRs to assess sustainability of impacts: The Addendum has developed its own PBRs to assess the 'sustainability' of impacts for several species for which PVAs that are specific to the Forth/Tay region already exist. Thus, PBRs are used for gannet, kittiwake and the three auk species, despite the fact that PVAs are already available for these species (i.e. the SOSS gannet PVA, and those produced for the Inch Cape assessment). For these five species at least, the Inch Cape assessment considered that PVAs were likely to produce more reliable assessments of population level impacts than PBRs, and the differences in outputs of PVAs and PBRs may result in differences in the determination of impacts between the Addendum and the Inch Cape assessment.
2. Implied problems with the certainty of the survey methods used at Inch Cape: In a few instances the Addendum suggests (or implies) potential problems or limitations in the survey methods used for the Inch Cape assessment. Two examples include the use of a survey vessel that did not meet COWRIE recommendations and the use of the 'box' method for snapshot counts to estimate flight densities. It is worth noting that the latter is the method that is used by the European Seabirds at Sea (ESAS) team and is well established, whilst in the case of the survey vessel, JNCC confirmed that the slightly shorter than recommended vessel length did not represent a problem due to the vessel's stability and that the vessel met with the guidelines of Camphuysen et al. (2004).
3. Erroneous values in Table 2.201 of the Addendum: This table states that the values shown refer to flight densities of adult kittiwake but for Inch Cape at least they appear to be the flight densities of all kittiwakes (uncorrected for the assumed proportion of breeding adults). It is unclear whether this error has carried on through to the collision risk estimates presented for Inch Cape kittiwakes in the Addendum.

In Table 4.16 it is stated that Inch Cape worst case piling scenario is defined as 451 in the hardest substrate or 711 in the softer substrate.
The value represented here for Inch Cape is incorrect. This comment suggests that the worst case piling scenario for Inch Cape is based on 1162 piles. The Inch Cape EIA, considers 944 piles (i.e. 213 WTGs (213 x 4), five OSPs (5 x 16) and three offshore met masts (3 x 4)) to be the worst case piling scenario.
Paragraph 4.199/4.200 states that duration of installation is 730 days, of which piling will occur on 581 days.
This value represented for Inch Cape piling activity is incorrect. Chapter 13, Table 13.2 details worst case scenario definitions for the Development Area of the Inch Cape Project. This clearly states that piling operations will take place over a two year construction period and that only 11%-23% of this time will be spent physically piling. The total number of days that ICOL predict piling would occur within the Inch Cape Development Area can therefore be calculated as between the following: • *730 x 11% = 80 days* • *730 x 23% = 168 days* *On this basis, it is unclear how Seagreen have arrived at a total number of 581 days of piling activity within the Inch Cape site.*
Paragraph 4.203 states that there will be 1,894.2 hours of fully driven piling into hard substrates. and 1493.1 hours of fully driven piling into softer substrates – total 3,387.3 hours
As stated above, the maximum requirement of piles for the Inch Cape site is calculated as 944. Chapter 11 Section 3 of the Inch Cape ES highlights that the most likely ground conditions are estimated to represent 70 per cent of the Development Area and the worst case (hard substrate) constituting an estimated 30 per cent. Chapter 11, Table 11.11 summarising the piling parameters shows that the worst case scenario for the duration of piling is predicted to be 4.2 hours. The worst case scenario (hard substrate) is therefore calculated as follows: • *Piles x % of site x no. of hours piling = 944x30%x4.2hrs = 1189 hours* *For the most likely scenario, the duration of the piling is predicted to be 2.1 hours. The most likely scenario is therefore calculated as:* • *Piles x % of site x no. of hours piling = 944x70%x2.1hrs = 1388 hours* *Total number of hours = 2577 hours* *Whilst it is unclear, ICOL notes that Seagreen appear to have miscalculated the total number of hours of piling predicted as a consequence of their misuse of the total number of piles presented in Table 4.16 of the Seagreen Addendum.*
Paragraph 4.222 suggests that the Inch Cape assessment estimates temporary habitat disturbance as approximately 9.6km^2 over the development are during the construction phase.
*The value represented here for Inch Cape is incorrect. The direct temporary disturbance of seabed habitats caused by construction based activities has been assessed and is presented in Chapter 13, Table 13.2 of the Inch Cape ES. The total seabed area disturbed is 5.54*km^2*, equating to 3.69% for the Development Area. This table also provides a clear breakdown of how this value has been calculated. The data presented in the Seagreen addendum increases the temporary area disturbed by 73.3 %.*

Paragraph 4.231 states that the worst case assessment at Inch Cape for sediment excavation per foundation (including scour protection) is 114,012m^3, which for 213 foundations is also in the region of Seagreen estimates.
As presented in the Chapter 7, Table 7.5 of the ES the value presented for the maximum excavated volume per wind turbine generator (WTG) is 28,503 m^3. Table 7.7 presents 114,012m^3 as the maximum excavated volume per OSP. The value presented in the Seagreen addendum is therefore incorrect, representing a 4 fold increase for each of the 213 WTGs.