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2nd February 2016

Dear Stan,

#### **Cromarty Firth Port Authority Oil Transfer Licence Application**

I am writing in response to your consultation on the potential for the proposed cargo transfers to have any significant effects on the environment or European protected sites

I recognise the need for sustainable development within this area. However, having read the documents supporting this application, I have five areas of concern where the application appears to be seriously lacking compared to recent assessments for other activities potentially affecting the Moray Firth SAC's Bottlenose Dolphin interest. These are listed below and discussed in more detail in Annex I.

#### **Areas of concern:**

1. Key information used within the assessment does not reflect current scientific understanding
2. Key information required to undertake a robust HRA is missing
3. Evidence to support the suggestion that significantly likely effects can be mitigated is lacking
4. Insufficient attention is given to cumulative impact assessment, particularly those impacts that may arise as a direct consequence of this licence
5. The assessment does not consider potential alternative sites that would pose lower residual risk

Given these issues, any consent given on the basis of the supporting documentation would appear very vulnerable to successful challenge in the European Court.

Critically, the precise area identified for this activity represents one of, if not the, most intensively used areas for bottlenose dolphins in European waters. Not only are dolphins present on an almost daily basis throughout the year, but over 50% of individual dolphins from the entire east coast Scotland population use this small area during the summer. This greatly increases their vulnerability either from chronic exposure to routine noise, VOC emissions and contaminated ballast water, or to accidental exposure to crude oil spills. Even if more robust population level assessments of risk are developed for the HRA, uncertainties over key risk factors cast doubt on the likelihood that significant effects on Favourable Conservation Status (FCS) can be dismissed. In particular, there is considerable uncertainty over how variations in exposure to VOCs, surface oil and ballast water may affect an individuals' health, reproduction and survival. Consequently, there should be a broader options appraisal and comparative risk assessment to determine whether alternative sites are more appropriate for this activity. At the very least, this should be undertaken by the applicant to identify alternative sites and comparative risks within their own area of jurisdiction. However, given the aims of the 2011 UK Marine Policy Statement, an absence of wider scale integration of such activities through the SAC Management Group and relevant National Marine Plans might also be open to challenge.

To provide some context to my comments, they are based upon >25 yrs experience of leading scientific studies of marine mammal populations in the Moray Firth. My research and advisory work has involved a range of industry and government bodies both in the UK and abroad (see [www.abdn.ac.uk/lighthouse](http://www.abdn.ac.uk/lighthouse)) and produced >100 peer-reviewed publications on marine mammal ecology. This has included work on an international advisory panel reviewing studies of the impacts of the Exxon Valdez spill on harbour seals, advising on monitoring following the Braer spill, and serving on scientific advisory groups for Scottish Natural Heritage, Marine Scotland Science, the Natural Environmental Research Council, the US National Marine Fisheries Service and the US National Science Foundation. Until 2009, I was also the scientific advisor to the Moray Firth SAC Management Group, and my response to this application has therefore focused upon those issues relating to bottlenose dolphins.

I hope that these comments are useful. Whilst informed by my wider activities, they represent my own views and should not be attributed either to the University of Aberdeen or to any of the bodies that I have worked with or for.

Yours sincerely,

A handwritten signature in black ink, reading 'Paul Thompson'. The signature is fluid and cursive, with a long horizontal stroke extending from the bottom of the name.

Professor Paul Thompson, FRSE

cc Emma Langley, Intertek, Exchange House, 33 Station Road, Hampshire, GU30 7DW



## Annex 1.

### a) Background to statements on dolphin occurrence & sensitivity within the licence area

Since the 1970's, it has been recognized that the Moray Firth is one of the few places in UK waters where bottlenose dolphins occurred regularly (Evans 1980) and that this represents a significant concentration of this species in European terms (Reid, Evans & Northridge 2003).

During the 1990's, regular and systematic surveys within the inner Moray Firth highlighted that these animals were concentrated more locally in the narrow entrances to the Cromarty, Inverness and Beaully Firths (Hastie *et al.* 2004), with the entrance to the Cromarty Firth showing the most consistent use throughout the year (Wilson, Thompson & Hammond 1997).

More recently, combined visual and passive acoustic surveys across the entire Moray Firth SAC confirmed that the entrance to the Cromarty Firth contained the highest densities of bottlenose dolphins, as well as important concentrations of other marine mammal species (Bailey & Thompson 2009).

Parallel to these studies of distribution, photo-identification of individual dolphins has underpinned estimates of the size of the bottlenose dolphin population that ranges along the East coast of Scotland. The population consists of only 195 individuals (Cheney *et al.* 2013). Whilst recent studies indicate that the population is stable or increasing (Cheney *et al.* 2014a) its small size means that it is particularly vulnerable to stochastic events (be they natural or the result of human activity) that affect survival (Thompson *et al.* 2000).

These individual-based studies further indicate that >50% of the individuals from this wide-ranging population may use the entrance to the Cromarty Firth within a single summer (May – Sept) survey season. Sightings of large groups of 40-50 individuals within this area indicate that it may not be uncommon for as many as 25% of the population to be within the proposed oil transfer area at the same time, raising the potential for significant population level exposure in the case of an accidental spill.

The regular occurrence of dolphins within this area has been further demonstrated in recent years through passive acoustic monitoring (Bailey *et al.* 2010), and year-round acoustic surveys (Cheney *et al.* 2014b) have highlighted greater use of the area in winter months than had previously been recognized.

### b) Supplementary information on the five key concerns about the ES

#### 1. Key information used within the assessment does not reflect current scientific understanding

Table 5.2 of the Transfer Licence application outlines potential effects of an accidental oil spill upon marine mammals (p 29). However, background on the size of the bottlenose dolphin population using the Moray Firth SAC is outdated, and a lack of understanding of the relative importance of the proposed site in relation to distribution in



the wider Moray Firth (see above), indicates that the assessment has not been based on a thorough review of recent baseline data.

Most critically, statements about the effects of oil exposure on cetaceans highlight that the report fails to consider appropriate scientific literature. For example, if cetaceans come into contact with an oil spill, the key risk is not "*clogging of blowholes by oil*" (as suggested in Table 5.2), but ingestion or inhalation of hydrocarbons that may cause short or long-term health effects. This was recognized >15 yrs ago in a Gubbay & Earll (2000) report that was commissioned by SNH to inform oil spill contingency planning in the Moray Firth SAC. More recently, work on bottlenose dolphin populations exposed to oil after the Deepwater Horizon incident has greatly increased our understanding of longer-term health effects. Post mortem analysis of stranded dolphins in the affected area (Venn-Watson *et al.* 2015) and health assessments of live dolphins temporarily captured one-year after exposure (Schwacke *et al.* 2013) showed evidence of elevated levels of lung disease and adrenal disease. Follow up monitoring of 10 pregnant females from Schwacke *et al.*'s (2013) study subsequently confirmed that these disease conditions resulted in lower reproductive success and higher mortality (Lane *et al.* 2015). Similar results are emerging from studies across southern US coasts affected by Deepwater Horizon, as reported at a major international conference in Dec 2015 (<https://www.marinemammalscience.org/conference/conference-schedule/> )

Table 5.2 is also misleading by suggesting that: "*Due to their ability to move away from oil spills and their body mass marine mammals are not particularly sensitive to oiling*". This pre-supposes that dolphins are aware that breathing in VOCs or ingesting contaminated fish may adversely affect their health in future! There is absolutely no evidence base for this statement. On the contrary, Gubbay & Earll's (2000) review notes that: "*Cetaceans appear to be able to detect oil but do not necessarily avoid it in the wild. Killer whales, grey whales, humpback whales, fin whales, Dall's porpoises, white sided dolphins, bottlenose dolphins and common dolphins have all been observed in the wild swimming and feeding in the presence of large globules of oil, sheens and slicks, without apparent ill effect or obvious abnormal behaviour patterns at the time.*"

## 2. Key information required to undertake a robust HRA is missing

Examples of information that would be required to undertake the required quantitative assessment of potential change in the bottlenose dolphin population's Favourable Conservation Status include:

**Characteristics of noise from vessels during ship-to-ship transfer.** Whilst there is growing evidence that large-scale displacement of bottlenose dolphins from routine vessel traffic is unlikely (e.g. Pirotta *et al.* 2015a; 2015b), it should be recognized that noise profiles during ship-to-ship transfer may differ from background noise in this area (Merchant *et al.* 2014). In particular, pumps and generators can result in higher frequency noise that may be more disturbing to dolphins (Southall *et al.* 2007). Appropriate models of noise propagation in this complex coastal habitat (see Farcas, Thompson & Merchant 2016) should therefore be applied to data on source levels and frequency characteristics to assess the area over which dolphins may be disturbed.



**Characteristics and concentrations VOCs in the vicinity of transfers.** The health effects outlined above may result from exposure to routine emissions as well as accidental spills. Thus, whilst the ES scopes out human health impacts from exposure to volatile compounds due to distance from shore, it fails to consider potential impacts upon the dolphins that regularly occur in the immediate vicinity of transfer vessels. p24 indicates that *"Ships must comply with industry standard control methods to reduce emissions of VOCs as far as practical"* but this information is inadequate to assess potential exposure to dolphins occurring around the vessels at the time of the transfer. It should be noted that this information may also be required to assess potential health risks to ecotourists and researchers in open boats around the transfer vessel.

**Quantitative assessment of spill risk.** Recent HRA for coastal and offshore construction projects have required an assessment of population level impacts. In addition to a range of ecological data, this requires robust information on the probability of a spill in order to underpin a quantitative risk assessment. Currently, the report provides no quantitative assessment of spill risk, instead using terms such as "unlikely" or "very low". This approach fails to provide sufficient confidence in the conclusion that there are no residual risks after mitigation. Further information on the probability of spills of different sizes must be provided to underpin the HRA, robustly supported by historic data appropriate to the types of vessels and operations considered for the Moray Firth.

**Information on the source and size of vessels.** Potential risks from either oil exposure or ballast water will vary depending upon the type of crude oil (which can affect toxicity) and the origin of the vessel (which can influence contaminant signatures and pathogens in ballast water). Further details on the sizes and characteristics of vessels are also required to quantify the likelihood and consequences of a spill.

3. *Evidence to support the suggestion that significantly likely effects can be mitigated is lacking*

The ES highlights that there will be significant impact on a range of European protected sites in the event of an unmitigated spill, but concludes that there will be no residual effects after mitigation. The mitigation measures supporting this conclusion are presented in Section 7.4, but this consists of only half a page of bullet points providing minimal detail; eg. *"Application of best practice in proposed cargo transfer activities"*

4. *Insufficient attention is given to cumulative impact assessment, particularly those impacts that may arise as a direct consequence of this licence*

I understand that the licencing decision is based upon an assessment of the environmental impacts of a spill not exceeding 1 tonne. I find this difficult to understand given the amount of oil on board and the proposed rates of transfer. Nevertheless, accepting that this remains your primary concern, the HRA should also consider cumulative risks. Typically, cumulative assessment focuses on other activities that are being undertaken in the area. In this case, additional risks would arise as a direct result of an MCA decision to grant this licence. These include the risk of a catastrophic spill within the Moray Firth SAC, either from ships undergoing transfers at the licenced site, or ships under transit and standing-by outside the CFPA area while awaiting a cargo



transfer. These include vessels that are only entering the region because they intend to use the licenced site. Surely an assessment of the risk of a catastrophic spill from one of these vessels should therefore be included within the cumulative assessment.

5. *The assessment does not consider potential alternative sites that would pose lower residual risk*

Given our current understanding of the distribution and occurrence of bottlenose dolphins in European waters, it is difficult to identify a location where ship to ship oil transfers might have a greater potential impact on this European Protected Species.

A wide range of factors mean that it will be challenging to develop a robust quantitative assessment of risk to this population's FCS, and then demonstrate effective mitigation of these risks through measures such as those mentioned in Section 7.4. Consequently, if there remains a national need for this activity, consents may require consideration of additional mitigation through more appropriate site selection.

This could occur at several levels.

Cromarty Firth Port Authority area

Here, it would be especially valuable to understand why the continuation of transfers at the Nigg Pier is not being considered. Under existing arrangements, ships are more securely berthed, have access to ballast water treatment plant, and are closer to emergency equipment in the event of an accidental spill.

In contrast, the proposed temporary anchorages are over highly mobile sediment, in relative shallow water, < 2km from relatively remote rocky shores, outside visual range of Port Control, in an area where spills will be more difficult to detect and oil spill response delayed.

Moray Firth SAC

Since its inception, the Moray Firth SAC's Management Group has reviewed existing and new activities within the SAC in order to identify significant risks to the bottlenose dolphin population, and develop appropriately integrated management. CFPA and MCA are both members of the SAC Management Group. Confidence in any consent would be increased if it can be demonstrated that alternative locations have been explored within the Management Group. Similarly, detail on the best practice measures considered as mitigation should be incorporated into the latest management plan?

Scotland's National Marine Plan

Since 2010, wider scale integration of marine activities has also been considered through Scotland's National Marine Plan. I appreciate that regulation of this oil transfer has not been devolved. Nevertheless, given the international profile of this protected population, its regional economic importance, and recent proposals for the EU to develop more Integrated Maritime Policy, are there not opportunities for MCA to conduct a wider scale options appraisal for suitable sites in closer collaboration with Marine Scotland?

## References

- Bailey, H., Clay, G., Coates, E.A., Lusseau, D., Senior, B. & Thompson, P.M. (2010) Using T-PODs to assess variations in the occurrence of coastal bottlenose dolphins and harbour porpoises. *Aquatic Conservation Marine & Freshwater Systems*, **20**, 150-158.
- Bailey, H. & Thompson, P.M. (2009) Using marine mammal habitat modelling to identify priority conservation zones within a marine protected area. *Marine Ecology Progress Series*, **378**, 279-287.
- Cheney, B., Corkrey, R., Durban, J.W., Grellier, K., Hammond, P.S., Islas-Villanueva, V., Janik, V.M., Lusseau, S.M., Parsons, K.M., Quick, N.J., Wilson, B. & Thompson, P.M. (2014a) Long-term trends in the use of a protected area by small cetaceans in relation to changes in population status. *Global Ecology and Conservation*, **2**, 118-128.
- Cheney, B., Graham, I.M., Barton, T., Hammond, P. & Thompson, P. (2014b) *Site Condition Monitoring of bottlenose dolphins within the Moray Firth Special Area of Conservation: 2011-2013*. Scottish Natural Heritage Commissioned Report No 797.
- Cheney, B., Thompson, P.M., Ingram, S.N., Hammond, P.S., Stevick, P.T., Durban, J.W., Culloch, R.M., Elwen, S.H., Mandleberg, L., Janik, V.M., Quick, N.J., Islas-Villanueva, V., Robinson, K.P., Costa, M., Einfeld, S.M., Walters, A., Phillips, C., Weir, C.R., Evans, P.G.H., Anderwald, P., Reid, R.J., Reid, J.B. & Wilson, B. (2013) Integrating multiple data sources to assess the distribution and abundance of bottlenose dolphins *Tursiops truncatus* in Scottish waters. *Mammal Review*, **43**, 71-88.
- Evans, P.G.H. (1980) Cetaceans in British Waters. *Mammal Review*, **10**, 1-52.
- Farcas, A., Thompson, P.M. & Merchant, N.D. (2016) Underwater noise modelling for environmental impact assessment. *Environmental Impact Assessment Review*, **57**, 114-122.
- Gubbay, S. & Earll, B. (2000) Review of literature on the effects of oil spills on cetaceans. Scottish Natural Heritage No 3.
- Hastie, G., Wilson, B., Wilson, L., Parsons, K. & Thompson, P. (2004) Functional mechanisms underlying cetacean distribution patterns: hotspots for bottlenose dolphins are linked to foraging. *Marine Biology*, **144**, 397-403.
- Lane, S.M., Smith, C.R., Mitchell, J., Balmer, B.C., Barry, K.P., McDonald, T., Mori, C.S., Rosel, P.E., Rowles, T.K., Speakman, T.R., Townsend, F.I., Tumlin, M.C., Wells, R.S., Zolman, E.S. & Schwacke, L.H. (2015) Reproductive outcome and survival of common bottlenose dolphins sampled in Barataria Bay, Louisiana, USA, following the Deepwater Horizon oil spill. *Proceedings of the Royal Society of London B: Biological Sciences*, **282**: 20151944.
- Merchant, N.D., Pirotta, E., Barton, T.R. & Thompson, P.M. (2014) Monitoring ship noise to assess the impact of coastal developments on marine mammals. *Marine Pollution Bulletin*, **78**, 85-95.



- Pirotta, E., Harwood, J., Thompson, P.M., New, L., Cheney, B., Arso, M., Hammond, P.S., Donovan, C. & Lusseau, D. (2015a) Predicting the effects of human developments on individual dolphins to understand potential long-term population consequences. *Proceedings of the Royal Society of London B: Biological Sciences*, **282**: 20152109.
- Pirotta, E., Merchant, N.D., Thompson, P.M., Barton, T.R. & Lusseau, D. (2015b) Quantifying the effect of boat disturbance on bottlenose dolphin foraging activity. *Biological Conservation*, **181**, 82-89.
- Reid, J.B., Evans, P.G.H. & Northridge, S.P. (2003) *Atlas of Cetacean distribution in north-west European waters*. Joint Nature Conservation Committee, Peterborough, UK.
- Schwacke, L.H., Smith, C.R., Townsend, F.I., Wells, R.S., Hart, L.B., Balmer, B.C., Collier, T.K., De Guise, S., Fry, M.M. & Guillette Jr, L.J. (2013) Health of common bottlenose dolphins (*Tursiops truncatus*) in Barataria Bay, Louisiana, following the Deepwater Horizon oil spill. *Environmental Science & Technology*, **48**, 93-103.
- Southall, B.L., Bowles, A.E., Ellison, W.T., Finneran, J.J., Gentry, R.L., Jr, C.R.G., Kastak, D., Ketten, D.R., Miller, J.H., Nachtigall, P.E., Richardson, W.J., Thomas, J.A. & Tyack, P.L. (2007) Marine Mammal Noise Exposure Criteria: Initial Scientific Recommendations. *Aquatic Mammals*, **33**, 411-521.
- Thompson, P., Wilson, B., Grellier, K. & Hammond, P. (2000) Combining power analysis and population viability analysis to compare traditional and precautionary approaches to conservation of coastal cetaceans. *Conserv Biol*, **14**, 1253-1263.
- Venn-Watson, S., Colegrove, K.M., Litz, J., Kinsel, M., Terio, K., Saliki, J., Fire, S., Carmichael, R., Chevis, C., Hatchett, W., Pitchford, J., Tumlin, M., Field, C., Smith, S., Ewing, R., Fauquier, D., Lovewell, G., Whitehead, H., Rotstein, D., McFee, W., Fougères, E. & Rowles, T. (2015) Adrenal Gland and Lung Lesions in Gulf of Mexico Common Bottlenose Dolphins (*Tursiops truncatus*) Found Dead following the Deepwater Horizon Oil Spill. *Plos One*, **10**, e0126538.
- Wilson, B., Thompson, P. & Hammond, P. (1997) Habitat use by bottlenose dolphins: seasonal distribution and stratified movement patterns in the Moray Firth, Scotland. *Journal of Applied Ecology*, **34**, 1365-1374.