

## **Noise Working Group (NWG)**

DTI, 1 Victoria Street  
2 August 2006

### **Present:**

Alan Smith (DTI)  
Jonathan Perks (FES)  
Mark Dorrington (FES)  
Helen Matthews (DEFRA)  
Richard Perkins (DEFRA)  
Andy McKenzie (Hayes McKenzie Partnership Ltd)  
Bob Davies (RD Associates)  
Dick Bowdler (New Acoustics)  
Geoff Leventhall  
Marcus Trinnick (Bond Pearce)  
Mark Jiggins (Hoare Lea Acoustics)  
Andrew Bullmore (Hoare Lea Acoustics)  
Mike Anderson (RES)

### **Notes of the Meeting**

#### *Introduction by Chair*

Alan Smith welcomed those present. He introduced the background to the meeting and highlighted DTI's objectives for the Group which is to provide clear expert advice and guidance on the Aerodynamic Modulation (AM) issue raised in the Hayes McKenzie report on Low Frequency Noise.

#### *Terms of Reference*

The following Terms of Reference and Objectives were agreed:

#### **Noise Working Group – Terms of Reference and Objectives**

The DTI have requested that a peer review of the Hayes McKenzie report will be undertaken by the Noise Working Group (NWG), most of whom were involved in the Working Group on Noise From Wind Turbines and the authors of "The Assessment and Rating of Noise from Wind Farms" (ETSU-R-97).

#### **The NWG will address issues specifically relating to the Hayes McKenzie report:**

- Consider and agree the main conclusions of the report
- Consider the report's findings relating to aerodynamic modulation
- If appropriate, provide a means to assess and apply a correction where aerodynamic modulation is a clearly audible feature
- Make clear recommendations, which will assist planning authorities. These recommendations will provide clarity and minimise any confusion when assessing applications
- Recommend actions (if any) to be taken in relation to updating ETSU-R-97

It is intended to complete this review and publish its recommendations in Autumn 2006.

#### *Review of the Hayes McKenzie Report*

The main conclusions of the report were agreed. It was noted that “Aerodynamic Modulation” should really be called Amplitude Modulation and is sometimes referred to as Blade Swish. These and future notes will refer to this as ‘AM’, and this for the purposes of the Noise Working Group is defined as aerodynamic modulation, amplitude modulation and blade swish. The causes of this effect are unknown, but there are theories that have been developed by Van de Berg and Oerlemans. It is possible that the effect is caused by a combination of these causes.

It was recognised that complaints concerning windfarm noise are currently the exception rather than the rule. The cause of these complaints was thought to result mostly from AM even if they are articulated in different ways from Members of the public (blade swish, low frequency noise, whoosh, pulse etc) The trend for larger more sophisticated turbines could lead to an increase in noise from AM and it was therefore timely to review this issue.

There was a discussion concerning whether the levels of AM measured by McKenzie were significantly higher than the levels specified in ETSU-R-97 as stated in the Hayes McKenzie report (page 58). It was agreed that we needed clarification from the author on this point.

*Action on FES to seek clarification from Malcolm McKenzie on this issue.*

There was also a discussion on the night time criteria level specified in ETSU-R-97. This level was based on the empirical evidence available at the time and was consistent with published WHO (World Health Organisation) guidance. There was a lengthy debate about whether it would be appropriate to reduce the existing night time levels as set out in ETSU-R-97, but it was agreed that there is currently insufficient evidence to change this level. Given the lack of existing evidence, relatively few complainants relating to noise issues from sites already developed, consistency with WHO guidance, the NWG considered that ETSU-R-97 struck the right balance between energy policy and planning advice and this document was robust in terms of existing noise level limits, and that this should be communicated to all users of ETSU-R-97.

#### **Identify and Agree Solutions**

It was agreed that an understanding of the causes of AM should be developed. A pragmatic and staged approach would be appropriate, the first stage being to gather empirical data from existing developments. It was agreed that the NWG should commission a study to gather empirical data from existing sites to better understand the extent of the AM issues. This should be undertaken as soon as possible, but the group were of the view that due to the nature of the noise and the weather, this would have to be carried out in the summer months and it may be too late to mobilise this year. The study will include:

1a	Literature study to review the current knowledge of AM
1b	Identify potential sites which could be used to carry out objective noise measurements Maximum of 10 sites (including 5 where there had been complaints). This would include: <ul style="list-style-type: none"> <li>• Asking LPAs for information on which sites they had received complaints concerning noise</li> <li>• Identifying control sites (where there had been no complaints)</li> <li>• Developing a methodology for carrying out noise measurements</li> </ul>
1c	Contact <ul style="list-style-type: none"> <li>• turbine manufacturers to find out what their understanding of AM is and what work they are doing to address this issue</li> <li>• windfarm developers to see whether they have any historical data which would help determine the circumstance when AM occurs</li> </ul>
	Report findings back to DTI / DEFRA / NWG
2	Carry out objective noise tests as defined in 1b It was agreed that it would be sufficient to carry these measurements outside of buildings; this would considerably reduce the difficulties of obtaining permissions and access
3	Analyse results This will include the quantification of AM as well as the frequency and length of time AM is found to occur at each site
4	Make recommendations if required
	Report findings back to DTI / DEFRA / NWG

A very rough estimation was that this would take 12 months to complete and the cost would be of the order of £100k.

DTI and DEFRA agreed to consider how this could be supported taking into consideration their funding situations and other commitments.

### **Recommendations / Review of Actions**

It was agreed that ETSU-R-97 has been a useful document to assist the planning process and that there is currently insufficient evidence available to recommend any change to this document. However, since it was agreed that AM may become more of an issue in the future, the work recommended above would provide a foundation for clearly identifying and understanding the extent of the AM noise issue and therefore whether any amendment to ETSU-R-97 would be appropriate at some future date.

In the meantime it was agreed that the advice should be given to all stakeholders involved in windfarm development including LPAs:

- Aerodynamic Modulation is a real effect in a few cases, but the cause is currently not understood and therefore when and where it occurs cannot be predicted.

- For future windfarm developments, developers may wish to allow some margin to allow for the noise created by this effect. This means that developers should not exploit the existing 43DB limit by going right up against it and should therefore allow margin to tune the blades, or in such areas where AM may be an issue develop say a 3 not 4 turbine site and keep well below 43 DB.
- Existing developments (which have or are seeking consent) must be unaffected by this advice: they can't be penalised retrospectively.
- Research will be commissioned to understand the issues surrounding Amplitude Modulation

AM refers to aerodynamic modulation, amplitude modulation and blade swish.

This advice was framed such that it was fair to operators of existing and planned developments and would allow developers of future developments to prepare appropriate risk strategies.

These recommendations and actions were agreed by those present; following agreement by the members of the working group, who were unable to attend, DTI (with the help of FES) will prepare a statement, based on the recommendations described above, to send to appropriate organisations and individuals.

#### **Any Other Business**

There was no other business.

#### **Date of Next Meeting**

To be agreed.

Jonathan Perks and Mark Dorrington  
3 August 2005