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MOORSYDE WIND FARM

Comments on the Noise Section of the Environmental Statement and other Documents

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1 INTRODUCTION

1.1 This report is prepared on the instructions of Ms T Faiers and Mr R Watson of Ancroft Southmoor Farm, Berwick upon Tweed TD15 2TD. It deals with the various applications and revisions for the Moorsyde Wind Farm at Felkington. The original application was for 14 turbines. Thereafter the scheme was amended several times. The first amendment, which I will call the "First Amended Scheme" was for ten turbines with a sound power level at 10m/s of 100.4dBA. The "Second Amended Scheme" was for seven turbines each with a sound power level at 10m/s of 100.4dBA. The "Third Amended Scheme" was for seven turbines each with a sound power level at 10m/s of 105 or 105.5dBA. I have only considered operational noise and no comments have been made on construction noise. The documents I have looked at are the following.

The noise section, Section 12, of the Environmental Statement

The Noise Calculations in Appendix M

The Audit report by Ironside Farrar insofar as it relates to noise.

The Addendum report dated March 2006 insofar as it relates to noise.

The update of December 2006 insofar as it relates to noise.

The Revised Noise Impact Assessment of 15th November 2007.

Attended Noise Monitoring Data November 2007.

1.2 I have been a noise consultant for thirty-seven years. I was one of the original members of the Institute of Acoustics, our professional body, when it was founded in 1974 and I have been a Fellow for over 20 years. I have been a supporter of renewable energy for nearly 40 years but I also believe that people have the right to be protected from unreasonable levels of noise. I have been involved in windfarm assessment since 1993.

2 THE ENVIRONMENTAL STATEMENT

2.1 Parts of Section 12 are poorly written with many vague statements ranging from the meaningless to the simply wrong. The effect of this is to give an

impression that the wind farm will not be a noise problem without presenting any clear evidence. For example:

Section 12.1.1 says that the assessment considers the impact of the wind farm. It does not do that. It merely identifies whether it meets the limits set out in ETSU-R-97.

In 12.1.9 it says the source noise levels of wind farms are relatively low. This is a meaningless statement. They may be low compared with a jet engine but they are high compared with an electric lawnmower. The sound power level is around 102dBA, about the same as a car travelling at 70mph. Depending on the distance, this may be low in the context of an urban area but it is high in the context of a quiet rural one.

12.1.9 suggests that the noise of turbines will normally be masked by background noise. An examination of the figures 12.1 to 12.6 shows that in a downwind situation the turbine noise is greater than the average background noise level at wind speeds up to 7 or 8 m/s. In Amended Scheme 3, at Ancroft Southmoor for example, the turbine noise will be more than the background noise for most of the time.

Table 12.1 is derived from PPS22. However the noise level in a quiet bedroom has been changed to 35dB from the figure of 20dB in PPS22. So the impression given by the table is that a wind farm at 350m is hardly any noisier than a quiet bedroom. The real situation is that this wind farm at 350m is about 48dB or nearly 30dB more than a quiet bedroom – nearly eight times as loud.

In 12.2.15 it says that the sound power level of the turbine level is subtracted. This is clearly wrong.

Whilst nothing is strictly incorrect in paragraphs 12.3.3 and 12.3.4 they give the impression that ETSU-R-97 is a method of measuring impact. This is not the case. Paragraph 1 of the Executive Summary of ETSU-R-97 clearly says that *This document describes a framework for the measurement of wind farm noise and gives indicative noise levels thought to offer a reasonable degree of protection to wind farm neighbours, without placing unreasonable restrictions on wind farm development or adding unduly to the costs and administrative burdens on wind farm developers or local authorities.*

3 TURBINE NOISE

3.1 The method of assessment used by the applicant is set out in The Assessment and Rating of Noise from Wind Farms (ETSU-R-97). This is incorporated into PPS22 Renewable Energy Technologies. ETSU-R-97 provides a range of

maximum noise levels to be applied during the day between 35dB and 40dB (or 5dB above background noise if this is more).

- 3.2 An examination of figures 12.1 to 12.6 of the ES shows that the First Amended Scheme met the lower day time limit set out in ETSU-R-97 and the night time limit. Turbine noise levels in the ES were only provided for a few properties. I have provided turbine noise levels at 10m/s for all properties within 1.5km of a turbine (about 83 properties in all) in Section 6. I agree that the First Amended Scheme met the lower day time limit and the night time limit. I also agree that the Second Amended Scheme met the lower day time limit and the night time limit.
- 3.3 However, there is considerable concern regarding the turbine used for the calculations in the First and Second Amended Schemes.

In 12.2.17 it states that the warranted source noise data has been used. In Appendix M para 5.3 it shows the warranted levels of Vestas NEG-Micon NM80 2.75MW. The warranted levels produced by Vestas are not warranted levels in the normal sense. Most manufacturers will take measured results for sound power and add the "uncertainty" of 1 or 2dB to the measurements so leaving a margin of error. What Vestas do is provide the measured levels as warranted and then say that they warrant the measurements you make after you have deducted the uncertainty.

The second point about the turbines is that the figures given, as stated in Appendix M para 5.3 are in "Mode 4" which is the quietest mode at 100.4dB at 8m/s. I presume that the estimates of power to be generated by the wind farm elsewhere in the ES have also been based on the use of the turbine in Mode 4 (where electrical power output is reduced). The standard running mode has noise levels up to 4dB higher than those used in the calculations.

This is the quietest turbine of its type that I can find. The Nordex N80 2.5MW is 103dB at 8m/s. The Vestas V90 2MW is 105dB and the V90 3MW ranges from 103 in Mode 4 to 109dB in Mode 0. The Siemens Bonus 2.3MW is 105dB though this may now be updated. This means that the developer has absolutely no margin in which to tender for turbines. Any other turbines will be more noisy.

- 3.4 In 12.5.6 of the ES it says that the turbine supplier will be required to comply with the noise limitations required by ETSU-R-97. In the first place this is ambiguous as the lower day time noise level under ETSU-R-97 can range from 35 to 40dB. They do not say what figure the turbine manufacturer will be required to adhere to. In the second place it would be quite unsatisfactory if the turbines installed were more noisy than the predicted figures as this would mean local residents would have been misled. If it is possible that turbine noise levels will be higher than predicted, which seems likely in view of the turbine levels chosen for the calculations, then the worst case situation should be chosen so that local residents can be appraised of the real position.

- 3.5 The Third Amended Scheme is the same as the Second Amended Scheme except that the turbines used for the noise calculations are about 5dBA higher than those used for the first and second Amended Schemes. This is about 50% louder than the original turbines and it is not acceptable that this change appears to have been made as an amendment to the application rather than a new application. If the turbines had been changed to be 50% taller then this would have warranted a completely revised application so there is no reason why the same should not apply to noise. It also means that some of the statements in the ES may no longer be correct.
- 3.6 The graphs in Figs 1 to 20 of the Revised Noise Impact Assessment appear to show that the noise levels from the Third Amended Scheme also meet the lower day time limit and the night time limit. I will deal with this later in Section 5 below on "Assessment of the Third Amended Scheme"
- 3.7 I concur with the points made by Ironside Farrar in their Audit and most of these are repeated by me in this report. As to the responses to this Audit I note the following:

The addendum report at 6.3.53 says that there is no agreed standard on assigning levels of significance to varying levels and durations of noise in the context of existing noise levels. This is wrong. BS4142 provides such a method and, indeed, is precisely the basis for the ETSU limit of 5dB over background noise. The writers of ETSU-R-97 took BS 4142 as a starting point and applied absolute limits to it on the grounds that BS4142 would hinder the development of wind energy. DEFRA, in September 1998, submitted their Noise and Nuisance Policy under Health Effect Based Noise Assessment Methods to the EU. This said that *BS4142:1997 provides a technical means of assessing whether or not 'complaints are likely'. The result of an assessment carried out to BS4142 would normally be relevant to the deliberations of any court considering whether or not a nuisance exists.*

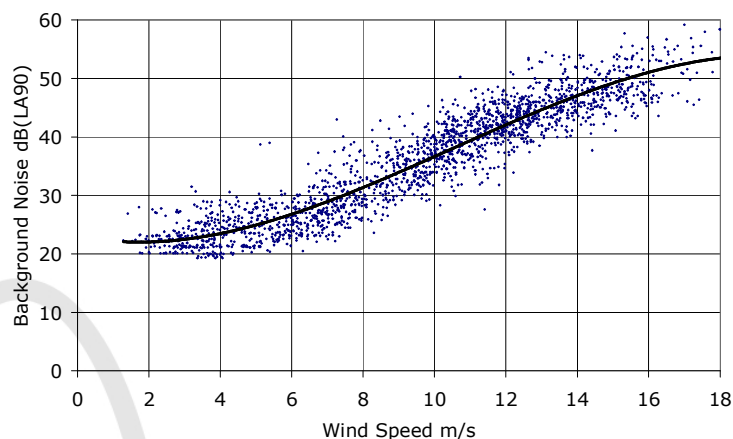
An explanation of the lack of a measure of significance is given in paragraphs 6.3.54 and 6.3.55 of the Addendum Report. This is convoluted and, frankly, not comprehensible. If it is saying that, if a development complies with ETSU-R-97 then the impact is not significant, this cannot be the case. Let me give one example. Wind farm A may have turbines that comply with the lower limit of 35dB and wind farm B, with similar background noise levels, have turbines that comply with 40dB because, for example, fewer people are affected. The impact of the second one must be more significant than the impact of the first one. Therefore a simple compliance with ETSU cannot be a measure of significance. Whilst ETSU-R-97 may be the method of assessment required by government it is disingenuous to suggest that it is a measure of impact.

The explanation in 6.3.59 and 6.3.60 fails completely to answer the point raised by Ironside Farrar. Their concern and mine is,

when they come to tender the turbines, that there may be no suitable turbines to meet the ETSU lower limit of 35dB and so the developer may press for the ETSU lower limit of 40dB. The response says simply that the turbines will meet ETSU. It does not identify whether they will meet 35dB or 40dB. Both Ironside Farrar and I seem to agree that there is an unacceptable lack of transparency here.

4 BACKGROUND NOISE

- 4.1 Background noise levels were measured for the First Amended Scheme described in the ES. These have not been updated for the Second or Third Amended Schemes but there is no need to do this.
- 4.2 In 12.3.13 of the ES it says that they have ignored the requirement in ETSU to discard noise levels during heavy rain. Why they did this is not clear except that they seemed to think that ETSUs requirement was unnecessary in this case. If ETSU-R-97 is the selected method of assessment then the procedure should be followed.
- 4.3 The graphs show a very poor range of wind speeds with hardly any data above 8m/s. The left hand part of a background noise curve is dominated by non wind related noise and so a lack of data in the right hand side distorts the polynomial curve at all wind speeds.
- 4.4 The polynomials used are second order. This means they only curve one way. That is to say they continue to rise more and more steeply with increasing wind speed. The curves should be third order (or higher) because there is a flattening off of noise level as shown in the example below. This is exacerbated because of the lack of data at high wind speeds discussed above.



- 4.5 The effect of this is to shift the point where the background noise plus 5dB curve meets the ETSU lower limit (as can be seen in figures 12.1 to 12.6). With this particular choice of turbine the effect on these figures is minimal but another turbine with a more typical noise curve might well breach the limit.
- 4.6 Use has also been made of the Attended Noise Monitoring Data. This consists of noise levels taken at four locations simultaneously with the unattended measurements. Measurements were made at each location for nine periods of ten minutes. These measurements are used to justify the use of one particular location to be used as a proxy background noise location for another place. The measurements are quite valueless.

They represent one and a half hours out of 11 days of measurements. There is no reason why these should be representative of the whole period.

They are nearly all made during the middle of the day. ETSU requires noise level to be assessed at night or during the "quiet day" which does not start until 1800 hours.

The two nearest weather stations for which detailed data is available are Edinburgh and Newcastle. The average wind speed at Edinburgh during the measurement period was 2.8m/s and at Newcastle was 4.8m/s. At this sort of wind speed in the middle of the day it is most likely that the noise measured is non wind related – perhaps distant traffic or closer noise from agricultural activity. In this case the measurements are of no value in establishing relative wind related noise.

The wind direction during the measurement period was East at Edinburgh and NNE at Newcastle. Background noise levels vary at different locations in different ways with wind direction. North East is not the prevailing wind direction and so background noise levels may not be typical.

If it is assumed that the wind speed during the measurements was 4m/s the unattended measurements were about 34dBA at the Lodge and 33dBA at Shoresdean. These are 6dB higher than the average Quiet Day noise levels shown on the graphs in the ES so the measurements are clearly not representative.

At Edinburgh there was moderate rain until 1230 hours and at Newcastle there was moderate rain nearly all day. It seems most unlikely that there was not rain on the site for much of the day and this would have affected the measurements.



5 ASSESSMENT OF THIRD AMENDED SCHEME

- 5.1 In 12.2.6 the original ES states that the measurements at Grievestead are considered to be indicative of the farm and the nearby cottages. In the case of Shoresdean in 12.2.8 it says that the measurements here are representative of all locations to the south of Shoresdean.
- 5.2 If we apply the Shoresdean background noise levels to Ancroft Southmoor as the applicant suggests in the ES not only is the ETSU 35dB (or 5dB over background noise) level exceeded but the upper ETSU limit of 40dB is also exceeded. The Third Amended Scheme therefore fails the applicants own preferred noise test.
- 5.3 In fact, in the Revised Noise Impact Assessment, the turbine noise at Ancroft Southmoor has been compared with the much higher background noise levels measured at the Lodge – presumably because the original test resulted in failure.
- 5.4 The problem of compliance is also exacerbated by my concerns about the background noise measurements in general, particularly because of the lack of data at higher wind speeds distorting the curve.

6 TURBINE NOISE LEVELS

Properties	E	N	Num	dB(10)	dB(7)	dB(E)	dB(R)
House adjacent to Hall	395180	646530	1	31	28	35	33
Shoresdean	395422	646403	28	31	29	36	34
Ancroft Northmoor Cott	396293	645596	1	35	34	40	39
Ancroft Northmoor	396422	645614	6	34	33	40	38
Ancroft Southmoor	396788	644403	8	36	36	42	41
Berrington Lough	397170	643360	4	31	30	37	36
Bowsden Moor	396820	642640	4	29	29	35	34
Tilesheds Cottage	394980	643230	1	33	33	39	37
The Gables	394670	643580	1	33	32	39	37
The Lodge	394688	644293	1	36	34	41	39
Felkington	394495	644275	9	35	33	39	38
House	394290	643630	1	31	30	37	35
Grievestead and Cotts	393091	645110	7	33	24	31	29
Shoreswood	394055	646440	11	31	25	32	30

The table shows all the properties within 1.5km of a turbine as far as I can establish them. The fourth column shows the number of properties at each location and the four end columns show the turbine noise levels as L90 in accordance with ETSU. The column "dB(10)" is the noise level from the First Amended Scheme and "dB(7)" is the noise level from the Second Amended Scheme both based on the 100.4dB sound power level shown in Table 1 of Appendix M. dB(E) is the Third Amended Scheme with the Enercon Turbine and dB(R) is the Third Amended Scheme with the Repower Turbine. The noise levels are all those at a wind speed of 10m/s.

7 CONDITIONS

- 7.1 If the application were to be permitted, a condition should be imposed limiting the noise level to 5dB over background noise or 35dBA whichever is the higher. I note that the Local Authority has agreed with this point in the draft conditions. However I also note that the proposed condition permits 43dB at night. This is not necessary as the background noise levels do not vary significantly. On page 63 of ETSU-R-97 it says that *As the night-time lower fixed limit is greater than the day-time limit, the night-time limit could become superfluous unless background noise levels are less during the night than during the quiet day-time periods. Where the local authority and the developer are in agreement that the background noise levels do not vary significantly between the quiet day-time periods and the night-time, then a single lower fixed limit of 35-40dB(A) can be imposed based upon background noise levels taken during quiet day-time periods and the night analysed together.* In any case, such a condition would permit the developer to turn the turbines up at night which would be completely unacceptable. The lower limit of 35dB should therefore apply at all times.