

1 June 2015

Select Committee on Wind Turbines  
PO Box 6100  
Parliament House  
Canberra ACT 2600

**Attention: Dr Richard Grant**

Dear Sir,

**REVIEW OF THE ACOUSTIC GROUP REPORT  
"THE RESULTS OF AN ACOUSTIC TESTING PROGRAM CAPE BRIDGEWATER WIND FARM"**

A review of The Acoustic Group report titled, "The results of an acoustic testing program Cape Bridgewater Wind Farm" (the Study) has been conducted.

The overall conclusion drawn from the review is that the Study provides no new credible scientific evidence, and further, no scientific evidence to support the media reporting positively of the Study.

The Study measures infrasound at the blade pass frequency and multiples of the blade pass frequency. The level of infrasound is similar to the levels measured previously by others and is well below the threshold of human perception.

The Study suggests that there is a "pattern" of high severity disturbance associated with four turbine operating modes. When all data are considered, there are limitations, contradictory and limited data and the results do not support the description of a "pattern".

The Study includes a hypothesis that "sensations" felt by the participants might be related to the measured level of infrasound. The hypothesis is based on a very limited subset of the data, with any data excluded from the analysis if it did not fit the theory. When all data are considered, the evidence does not support the hypothesis.

**Measured Infrasound**

Figure 49 of the report indicates that the level of infrasound at the blade pass frequency and multiples of blade pass frequency are in the order of 45 to 71 dB re 20 $\mu$ Pa. This is not new and has previously been measured by others at similar levels.

The established threshold of human perception at these frequencies is in the order of 110 dB re 20 $\mu$ Pa at 5Hz (Watanabe and Møller, 1990) and even higher at lower frequencies. That is, although the infrasound can be detected by instruments, it cannot be perceived by humans.

Since the Study, researchers have simulated the character and level of infrasound measured at wind farms to determine any reported symptoms or sensations. The research, conducted by Colin and Kristy Hansen (Hansen et al, 2015), Renzo Tonin and Associates (Tonin and Brett, 2015) and Channel Island Acoustics (Walker and Celano, 2015), indicates that there is no reported symptoms or sensations to this level, or indeed higher levels, of infrasound.

### **Sensation Pattern**

The Study claims to have *"found a pattern of high severity of disturbance to be associated with four different operating scenarios of the wind farm being:*

- *when the turbines were seeking to start (and therefore could drop in and out of generation)*
- *an increase in power output of the wind farm in the order of 20%*
- *a decrease in the power output of the wind farm in the order of 20%, and*
- *the situation when turbines were operating at maximum power and the wind increased above 12m/s".*

There is no statistical analysis supporting this claim. For the claim to be made, an expert in statistics should have been retained to design the experiment and to analyse the data in a scientific manner.

The "pattern" is based on the analysis of "sensation" classified as "severity category 4" or "5". Of the 522 occurrences where a resident identified a severity category 4 or 5, the Study identifies the conditions as fitting into one of the above categories on 194 occasions. That is, the pattern is based on 37% of the occurrences being classified as one of the four operating scenarios or an average of less than 10% per operating scenario. To provide context, 63% of the occurrences were not classified in any of the four operating scenarios.

Contrary to this pattern, there are many occasions when sensations were recorded when the wind turbines were shut down. For example, during the shutdowns on 22 May and 24 May 2014, the occupants of House 88 identified 9 separate occasions when the sensation level was classified as category 4. That is, at a time when the turbines were not operating, the sensation was classified as a "substantial impact (disruptive)", which is described as "quality of life diminished due to change in character of the area".

Although the Study states, "For one resident, sensation, noise and vibration were observed with the wind farm shutdown", levels of sensation were recorded at all three houses during periods of shutdown. For example, at House 87 on 13 June, sensation was classified by the occupants as category 4 when turbines were not operating and at House 89 on 15 and 22 May, sensation was classified as category 2 when turbines were not operating. On 21 May at 6:10am when turbines were shut down, a resident of House 89 recorded the diary entry, "Sudden awakening (awakening with a start/adrenalin surge to gut)".

Conversely, a resident of House 89 stated, "During the second week, the Wind Facility was in shutdown for eleven days, due to work being undertaken on power lines" ... "During the shutdown we slept." However, although the turbines were shutdown during the day, they were restarted on most nights.

Based on the above, there does not appear to be any establishment of a pattern without ignoring contradictory occurrences.

## **Sensation and Infrasound**

The Study conducts an analysis of the level of infrasound recorded during category 5 sensations compared with category 2 sensations. However, only a very narrow band of category 5 sensations were included in the analysis. The report states that there were 81 occasions when category 5 sensations were recorded but only 31 are included in the analysis. For example, data were excluded if high or low wind speeds were recorded, even though these periods represent two of the four operating scenarios described as "a pattern of high severity of disturbance". The reason given for excluding the data was that the blade pass frequency and harmonics could not be detected.

Rather than trying to understand the reason why category 5 sensations were recorded when infrasound from the wind farm could not be detected, the Study excludes the contradictory data and proceeds with a hypothesis. No explanation as to why a severity category 5 could be recorded without infrasound from the wind farm being detected has been provided. A scientific approach would explore or, at the very least, identify this prior to establishing a hypothesis.

## **Conclusion**

The AAAC Wind Farm Subcommittee has conducted a review of The Acoustic Group's Cape Bridgewater report and has concluded that:

- The level of infrasound measured is similar to the level previously measured by others;
- The claimed "pattern" between high severity sensation and modes of operation is not based on a statistical analysis and ignores contradictory occurrences; and
- The hypothesis that there is a link between "sensations" and infrasound is based on excluding data that do not support the hypothesis.

Based on the above, it is considered that the Study does not follow a rigorous scientific method and provides no justification for the AAAC Position Statement to be updated.

Yours faithfully,

**Australian Association of Acoustical Consultants**