8.6.4 Complex noise effects on health

Wind turbines and the noise produced from these generators is a relatively new and complex concept. Large changes have been made to turbine design affecting noise propagation over recent years. The complex nature of the noise from wind turbines has motivated recent research on the possibility of adverse health effects from wind turbine noise. There are numerous conflicting papers dealing with this issue yet to date there is no clear evidence to suggest that wind turbine noise causes any physical health problems. Adopting a precautionary approach to this potential impact, a review of these studies is presented below.

A British General Practitioner conducted a study of 42 people suffering adverse affects and *living within 2km of wind turbines*. Despite the small sample size, anecdotal survey style (this paper has not been published or formally peer reviewed), Dr. Harry made several points of interest for wind farm development:

- The noise produced by wind turbines is complex (intermittent, involving low frequency sound, complicated by other factors) and therefore, the responses produced can also be complex
- The kind of symptoms experienced can act to reinforce each other; sleep disturbance, tiredness, anxiety, head aches and migraines, depression. Having one family member who experiences any or all of these symptoms is likely to affect the well being of other family members, who may not experience adverse noise effects directly
- People most susceptible are those with noise sensitivity; children, the elderly, those with existing stress or depression
- Attitudes to wind turbines and to the amenity value of the landscape and 'peace and quiet' values also appeared to affect the level of adverse impact
- The vibrational component and the visual reinforcement of the moving turbines can compound the effects
- There can be a disincentive for affected people to report symptoms due to the effect it may have on their ability to sell a house near a turbine, generating a 'catch 22' for sufferers

The Swedish Environmental Protection Agency commissioned a report on noise from wind turbines conducted by E. Pedersen from Halmstad University. The aim of the report was to review all present knowledge on perception and annoyance of noise from wind turbines in residential areas as well as recreational areas. The report was to form a base for further discussions on regulation and guidelines for noise from wind turbines in Sweden. The results of the review came to the following conclusions:

- Annoyance from wind turbines is to a degree correlated to noise exposure, but is also influenced by the turbines' visual impact on the landscape
- Wind turbine noise does not directly cause any physical health problems
- Regulations regarding noise from wind turbines for different countries in Europe were inconsistent. The recommended levels, where stated absolutely, varied from 40 – 55 dBA during the day and 35 – 45 dBA during the night when recorded from outside a dwelling. Countries such as France and Scotland recommend that wind farm noise be limited to between 3 – 5 dBA above background noise

The World Health Organisation (WHO Guidelines for Community Noise, 1999) has developed guideline values for community noise that present noise levels where the lowest adverse effects may occur as a result of noise including temporary or long term deterioration in physical, psychological or social functioning.

The available knowledge of the adverse effects of noise on health is sufficient for the WHO to develop guidelines on the following:

1. Annoyance
2. Speech intelligibility and communication interference
3. Disturbance of information extraction
4. Sleep disturbance, and
5. Hearing impediments

The most significant and relevant of these in relation to wind farms is the noise levels that could impact the ability of nearby residents to sleep. The WHO guidelines on noise levels that do not result in sleep disturbance is 45dBA measured outside the residence. This is above the criteria levels of the SA noise guidelines of 35dBA that the wind farm must comply with for non-involved landowners.

Early identification of the noise problems and mitigation of its effects may be the best approach to avoiding potential health problems. The Proponent commits to monitoring and mitigating noise exceedances in accordance with the SA EPA Guidelines (refer to Section 7.3). Visual impact mitigation is discussed in Section 7.2. Community level impacts are discussed in Sections 8.2 and 8.3.

As personal perceptions differ, it would never be possible to ensure all members of the local community are in favour of the proposal. It is hoped that commitments such as the Community Enhancement Program would demonstrate the Proponent's responsibility to the local community as well as the broader benefits of the proposal.