

**To the NHMRC. Please read with regards to the ILFN measured in my home at Cape Bridgewater by acoustician Steven Cooper, when I participated in his testing program.**

### **3.2 Health amenity**

Noise levels at residences surrounding mines are generally not high enough to have direct effects on health, such as hearing loss. The indirect effects of noise and vibration on the health of people exposed to excessive levels have been extensively documented. Investigations have found that prolonged exposure can adversely affect mental and subsequently physical health, particularly in those most sensitive to noise.

Noise produces psychological effects in very specific ways. These are, essentially, interference with communication or concentration, and sleep disturbance. These factors lead to irritability, which is the first sign of the psychological impact of noise. The psychological response to noise is determined by personal factors and by factors associated with the noise itself.

Low-frequency noise can be particularly annoying and can result in complaints many kilometres away from the source. Low frequency noise can be considered to range in frequency from about 10 hertz to 200 hertz. The common sources are large pumps, motors or fans and crushing circuits and screens. The perceived loudness and annoyance due to low-frequency noise increases extremely rapidly with increasing levels above the threshold of hearing.

Sound in the frequency range below 20 hertz is normally defined as 'infrasound' and can be heard (or felt) as a pulsating sensation and/or pressure on the ears or chest, or can cause secondary effects such as rattling of windows or doors.

Because low-frequency noises between 20 hertz and 200 hertz propagate with minimal attenuation over large distances and transmit easily through building fabric, it can be quite prominent inside residences without the masking effect of higher frequencies. Low frequency noises are perceived as more annoying than typical mid-high frequency noises by residents. When determining compliance, most regulatory authorities have objective tests to determine whether low frequency noise is present.

Where low frequency noise is found to be characteristic of the noise source, an adjustment must be made to measured levels to account for the increased annoyance. Factors such as the attitude or mood of the person, his or her environment, the degree of arousal or distraction experienced, and whether the noise is felt to be an invasion of privacy or disruptive, will dictate personal response.

This is important for shift workers who sleep during the day. The predictability of noise and how frequently it occurs will also influence the reaction.