

## Comments to Australian EPA Study at the Waterloo Wind Farm By: George Hessler, Hessler Associates, Inc.

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No one knows why a relatively few wind farms evoke such intense adverse community reaction with multiple claims of ill health effects. Two wind farms of recent notoriety in this regard are the Waterloo project in Southern Australia and the Shirley wind farm in the United States. Anti-wind farm advocates contend that low frequency infrasound (0 to 20 Hz frequency range) is the cause of ill health effects, but cannot explain why the overwhelming vast majority of wind farms operate successfully and do not elicit any adverse community response. Similarly, pro-wind farm advocates cannot explain the reaction at sites like Waterloo and Shirley.

The EPA measurement program at Waterloo showed similar results as at Shirley that there is a measurable low level of infrasound that reaches a maximum level around the blade passing frequency (BPF) and harmonics of the wind turbines. Three bladed modern wind turbines rotate in the 10 to 14 RPM range so the BPF ranges from 0.5 to 0.7 Hz or periods of 2 to 1.4 seconds. At these very low and slow frequencies and periods, any such sound pressure would be perceived, if at all, as a series of pulses, not as ordinary noise. The threshold for hearing for ordinary low frequency noise is currently standardized down to only 20 Hz, far far above the frequency of maximum infrasound generated by wind turbines. Published thresholds below 20 Hz down to 4 Hz are fairly uniform between researchers with a scatter band of results of approximately 9 dB. Research below 4 Hz is sparse and variances between the few researchers reach 20 dB. So any comparison of wind farm infrasound to published hearing thresholds is completely meaningless.

What is clearly needed for Waterloo and all other wind projects is an unbiased study to determine the *threshold of perception* for low frequency infrasound or pulses from wind turbines. It is an honor and privilege for this writer to have colleagues such as Doctors Geoff Leventhall, Paul Schomer and Bruce Walker. Without doubt, all three learned scientists would endorse the need for such a study. Dr. Leventhall and Dr. Schomer do not agree on possible perception mechanisms of the body for perceiving very low frequency sound or pulses but both would urge quality research to advance our understanding. Fortunately for all, Bruce Walker has developed a synthesized pulse generation source and super-woofer playback system to simulate very low frequency wind turbine pulses in rooms. Hence, it is now technically possible to simulate wind turbine immissions to audiences of unbiased listeners to determine the threshold of perception or other possible physical reactions to levels above the threshold.

The completed EPA survey was focused on demonstrating compliance with existing standards. The final EPA report also presents guidelines for low frequency noise found in the literature that are totally invalid in the author's opinion for accessing actual wind turbine immissions. What is sorely needed now by all sides of the issue is a formal endorsed and controlled perception study of wind turbine noise in the infrasound frequency region. I urge the EPA and/or appropriate Health agencies to take the next step, beyond compliance measurements, to initiate such a study, preferably at a university where students could comprise the audiences.