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Explicit Warning Notice

To Planning Authorities, Departments of Health, Environmental Protection Agencies, Federal, State and Local Governments, Wind Industry Developers and Acoustic Consultants

Our ***Explicit Cautionary Notice*** dated 29th June, 2011[1] warned of the emerging serious health problems with large industrial scale wind turbines, with adverse health impacts including repetitive sleep disturbance and physiological stress having been reported at that time out to 10km.

Over two years have passed since that caution, and none of the above addressees has taken any substantive action. The wind industry, its supporters, and its paid acoustic consultants remain in active denial.

In recent months, thorough and definitive acoustic field and laboratory studies performed by Dr Neil Kelley [2, 3, 4, 5] and others in the 1980s have been "rediscovered". *The studies identified a direct causal link between wind turbine infrasound and low frequency noise and neighbours' health problems* including sleep disturbance, collectively described as "annoyance". The research was presented at the American Wind Energy Association conference in California in 1987. [6]

The wind industry, specifically wind turbine manufacturers and wind developers, *therefore knew* about the direct causal relationship between these specific sound frequencies and health damaging "annoyance" symptoms, which included repetitive sleep disturbance.

Not only does this body of research clearly identify infrasound and low frequency noise (ILFN) as the direct causal agent,[7, 8] *at levels well BELOW the threshold of audible perception*,[9] but it *also nominates evidence based maximum tolerable noise limits in the ILFN frequency range the researchers considered necessary to protect health, based on their field data.* [10]

The subsequent failure by the wind industry and government noise pollution authorities to ensure these health protective guidelines were incorporated into wind turbine noise pollution regulations, and then properly monitored and enforced, *has directly resulted in the serious harm to the health of thousands of rural residents around the world.* The harm is now predictably increasing, as the size of the wind turbines increases. [11]

This is a global disgrace.

This has happened because wind turbine product manufacturers have failed to present the truth about the existence and cause of adverse health impacts *known to them for nearly thirty years* from Dr Kelley's research. Wind industry excuses that the research "did not apply to modern upwind turbines" have been dismissed by Dr Kelley, [12] a view supported by the growing number of concerned senior acousticians such as Dr Paul Schomer, current Director of Acoustic Standards in the USA. [13, 14,]

Furthermore the acoustic field research findings of a growing number of independent acousticians working in Australia, and North America [15, 16, 17, 18, 19, 20, 21] are entirely consistent with Kelley's work.

Who Needs to Consider Their Part in This Extraordinary Failure ?

Acoustic engineers working with the wind industry have failed to abide by their professional codes of conduct [22, 23, 24] to place the protection of the health of the community above commercial interests.

Acoustic engineers who advised or wrote the government wind turbine noise pollution guidelines subsequent to the Kelley research, ensured that the very sound frequencies below 200 Hz known in 1985 to cause adverse health effects and symptoms known as "annoyance" were not included, and were never measured.

Government bureaucracies including departments of health, planning and noise pollution have consistently failed to protect the health of residents, and failed to investigate and act when serious health problems including exhaustion, and home abandonment were reported by residents and their health practitioners. The first medical practitioner to report health problems to the authorities in Australia was Dr David Iser, in 2004. [25]

RECOMMENDATIONS

1. **The Kelley evidence-based health protective criteria for wind turbine noise in the infrasound and low frequency noise range must be immediately implemented, monitored and actively enforced, with priority attention to those residents who are reporting serious harm to health and sleep.**

2. **Those guidelines will require ongoing field research as they may prove insufficient to protect health, especially as wind turbine size increases, and the numbers of turbines per development increase the cumulative impact and the extent of the project footprint.**

3. **Acoustic models and acoustic standards MUST be regularly updated to reflect the latest developments in knowledge about infrasound and low frequency noise attenuation, and new dose response information relating to adverse health impacts resulting from chronic exposure.**

4. **Multidisciplinary acoustic and physiological research must be urgently conducted in order to determine the acoustic and perception thresholds at which sleep disturbance is occurring, with particular reference to residents "sensitized" to the sound energy with chronic exposure.**

FOOTNOTES

1. Waubra Foundation's Explicit Cautionary Notice http://waubrafoundation.org.au/about/explicit-cautionary-notice/
2. Kelley, N et al 1985 "Acoustic Noise Associated with the Mod 1 Turbine" http://waubrafoundation.org.au/resources/kelley-et-al-1985-acoustic-noise-associated-with-mod-1-wind-turbine/
3. Kelley, N 1987 "A proposed metric for assessing the potential for community annoyance from wind turbine low frequency noise emissions" http://waubrafoundation.org.au/resources/1987-problem-with-low-frequency-noise-from-wind-turbines-scientifically-identified/
4. Hubbard, H 1982 "Noise induced house vibrations and Human Perception" http://waubrafoundation.org.au/resources/hubbard-h-1982-noise-induced-house-vibrations-human-perception/
5. Hubbard & Shepherd 1988 "Wind Turbine Acoustic Research - Bibliography with selected Annotation" http://waubrafoundation.org.au/resources/hubbard-h-shepherd-k-nasa-wind-turbine-acoustics-research/
6. Kelley, N 1987 op cit http://waubrafoundation.org.au/resources/1987-problem-with-low-frequency-noise-from-wind-turbines-scientifically-identified/
7. Kelley, N et al 1985 op cit http://waubrafoundation.org.au/resources/kelley-et-al-1985-acoustic-noise-associated-with-mod-1-wind-turbine/
8. Kelley, N 1987 op cit http://waubrafoundation.org.au/resources/1987-problem-with-low-frequency-noise-from-wind-turbines-scientifically-identified/
9. Kelley, N et al 1985 op cit http://waubrafoundation.org.au/resources/kelley-et-al-1985-acoustic-noise-associated-with-mod-1-wind-turbine/
10. Kelley, N et al 1985 p 225 op cit http://waubrafoundation.org.au/resources/kelley-et-al-1985-acoustic-noise-associated-with-mod-1-wind-turbine/

    "the joint radiation levels (expressed in terms of acoustic intensity and measured external to a structure) in the 8, 16, 31.5 and 63 Hz standard (ISO) octaves ***should not exceed band intensity threshold limits of 60, 50, 40 and 40 dB (re 1 pWm –2) more than 20% of the time****. These figures compare favourably with a summary of low-frequency annoyance situations by Hubbard."*
11. Moller & Pedersen 2011 "Low Frequency Noise from Large Turbines" J Acoustical Society America 2011 129: 3727 – 3744 http://waubrafoundation.org.au/resources/moller-pedersen-low-frequency-noise-from-large-wind-turbines/
12. Lloyd, G 2013 Article in the Australian which quoted Dr Kelley directly http://waubrafoundation.org.au/resources/lloydg-newer-wind-turbines-could-be-just-as-harmful-as-prototypes/
13. Schomer, P 2012 "Co-Operative Measurement and Survey Analysis of Low Frequency Noise and Infrasound at the Shirley Wind Farm, Wisconsin" http://waubrafoundation.org.au/resources/co-operative-measurement-survey-analysis-low-frequency-infrasound-at-shirley-wind-farm/

    "The four investigating firms are of the opinion that enough evidence and hypotheses have been given herein to classify LFN and infrasound as a serious issue, possibly affecting the future of the industry. It should be addressed beyond the present practice of showing that wind turbine levels are magnitudes below the threshold of hearing at low frequencies"
14. Schomer, P 2013 "A Proposed Theory to Explain some Adverse Physiological Effects of the Infrasonic Emissions at some wind farm sites" conference paper presented at Inter Noise 2013 Denver, August 2013 http://waubrafoundation.org.au/resources/schomer-et-al-wind-turbine-noise-conference-denver-august-2013/
15. Bray, W & James, R 2011 "Dynamic measurements of wind turbine acoustic signals employing sound quality engineering methods considering time and frequency sensitivities of human perception" http://waubrafoundation.org.au/resources/bray-james-dynamic-measurements-wind-turbine-acopustic-signals-noise-con-2011/
16. Ambrose, S and Rand, R 2011 "Bruce McPherson Infrasound and Low Frequency Noise Study" http://waubrafoundation.org.au/resources/bruce-mcpherson-infrasound-low-frequency-noise-study/
17. Cooper, S 2013 "Hiding wind farm noise in ambient measurements" http://waubrafoundation.org.au/resources/cooper-s-hiding-wind-farm-noise-ambient-measurements-denver-august-2013/
18. Thorne, R 2012 "Wind Farn Generated Noise and Adverse Health Effects" Case series from 2 Victorian Wind Developments, submitted to the Australian Federal Senate Inquiry http://waubrafoundation.org.au/resources/wind-farm-generated-noise-and-adverse-health-effects/
19. Hansen, C et al 2012 "Wind Farm Noise – what is a reasonable limit in Rural Areas?" http://waubrafoundation.org.au/resources/wind-farm-generated-noise-and-adverse-health-effects/

20. Nobbs, B, Doolan, C & Moreau, D 2012 "Characterisation – noise in homes affected by wind farm noise" http://waubrafoundation.org.au/resources/characterisation-noise-homes-affected-by-wind-turbine-noise/
21. Huson, L extract of expert evidence given to Cherry Tree hearing, Victorian Civil Administrative Tribunal, 24th October, 2013 based on infrasound data collected at Macarthur wind development http://waubrafoundation.org.au/resources/huson-l-expert-evidence-at-vcat-cherry-tree-hearing/

    "I find it entirely plausible that infrasound can cause nuisance and disturbed sleep in communities surrounding wind farm developments similar to the Macarthur and Leonards Hill developments."
22. For details of the Australian, British, American and Canadian professional codes of ethics for acousticians, see http://waubrafoundation.org.au/resources/acoustic-organisation-codes-conduct/
23. For a discussion about ethical issues for acousticians with respect to wind turbine noise, see Steven Cooper's article published in the Australian Acoustical Society Journal http://waubrafoundation.org.au/resources/wind-farm-noise-an-ethical-dilemma-for-acousticians-steven-cooper/
24. For a more general discussion about professional ethics and wind turbine noise, see http://waubrafoundation.org.au/resources/laurie-s-wind-turbine-noise-adverse-health-effects-and-professional-ethics/
25. Iser, D copy of Toora Wind Development population survey results, and letters written to Victorian politicians in 2004 http://waubrafoundation.org.au/resources/dr-david-iser-first-gp-report-health-problems-victoria-2004/