



**“Health Canada advises that this statement be revised to indicate that there are peer-reviewed scientific articles indicating that wind turbines may have an adverse impact on human health”**



Health Santé  
Canada Canada

Safe Environments Program  
Regions and Programs Branch, Health Canada  
1505 Barrington Street, Suite 1817  
Halifax, NS B3J 3Y6

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Steve Sanford  
Environmental Assessment Officer  
Nova Scotia Department of Environment  
Environmental Assessment Branch  
P.O. Box 442  
Halifax, NS B3J 2P8

Subject: Health Canada's response to the Digby Wind Power Project Addendum, Digby, Nova Scotia<sup>1</sup>

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Dear Mr. Sanford:

Thank you for your letter July 9, 2009, requesting Health Canada's review of the above-mentioned Project with respect to issues of relevance to human health. Health Canada has reviewed the report, and has the following comments with respect to noise.

- Section 2.1 (Site Layout Review) and Table 1 (Summary of Effects and Significance Prediction Comparison of Site Layouts) – The revised layout adopted by the proponent appears to yield sound levels that should normally be below Health Canada's acceptable threshold value of 45 dBA for sleep disturbance at the exterior of the building of the nearest sensitive receptor (WHO, 1999). However, if a 5 dBA to 8 dBA increase in sound due to the proximity of the ocean were assumed and an additional +/- 3dBA were included to account for model uncertainties, noise levels may exceed 45 dBA. Thus, predicted sound levels, even under assumed worst-case conditions, may underestimate measured levels by 5 dBA or greater. For example, at another wind farm in Nova Scotia, maximum sound levels were estimated to be 49 dBA using ISO9613-2<sup>2</sup>, however, measured values were as high as 54 dBA when wind speeds were 5 m/s blowing on-shore from the ocean (Howe, Gastmeier Chapnic Limited, 2006<sup>3</sup>).
  - Health Canada advises that noise monitoring be undertaken under varying climatic conditions in order to ensure that noise levels do not exceed the acceptable level, and if exceedences are identified, that appropriate mitigation be implemented to reduce the noise level to an acceptable level.

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<sup>1</sup> Stantec. 2009. Digby Wind Power Project Addendum. Addendum to Environmental Assessment Registration Document. Prepared for SkyPower Corp. July 3, 2009.

<sup>2</sup> ISO (International Standards Organization) ISO9613-2. 2003. Acoustics -- Attenuation of sound during propagation outdoors -- Part 2: General method of calculation.

<sup>3</sup> Howe Gastmeier Chapnik Limited (HCG Engineering). 2006. Environmental Noise Assessment Pubnico Point Wind Farm, Nova Scotia. Natural Resources Canada Contract NRCAN-06-00046.

- Section 3.2.2 (Effect of Water on Noise Levels) – The report states that “*it has generally been considered that the increased background wind noise will cause some masking of the sound levels from the turbines*” and “*if there is an enhanced stability, the wind that causes background sound may not increase as much as that which causes sounds from the turbines*”. These statements can be misleading as turbine noise is likely to be audible to the nearest receptors in the form of continuous low-level or intermittent swooshing, as well as low frequencies at approximately 50 Hertz. As such, Health Canada advises the following:
  - Please omit statements about noise masking as they can be misleading; and
  - Please ensure that nearby residents are informed that turbine noises may be audible in terms of a low-level continuous or intermittent swooshing, as well as at low frequencies around 50 Hertz.
  
- Section 3.2.3 (Noise Mitigation) – The report states that “*noise monitoring [will be conducted] on a routine basis or complaint basis*”. In addition to the plan for monitoring and complaint resolution, which is intended to help mitigate any adverse community reaction, it is advisable to also implement a communication strategy. Accurate information with respect to potential acoustical effects related to the operation of the turbines is an essential part of any effective communication strategy.
  - Please ensure that any communication effort presents factual information with respect to expected noise levels, including information pertaining to the audibility of operational noises (low-level continuous, intermittent swooshing or low frequency noise), and also includes the potential effects of specific noise levels on human health (see the following comment below).
  
- Appendix B (Addressing Concerns with wind Turbines and Human Health) – The final sentence in Appendix B states that “*there is no peer-reviewed scientific evidence indicating that wind turbines have an adverse impact on human health*”. In fact, there are peer-reviewed scientific articles indicating that wind turbines may have an adverse impact on human health. For example, Keith et. al. (2008), identified annoyance as an adverse impact on human health that can be related to high levels of wind turbine noise. In addition, there are several articles by Pedersen (and others) related to wind turbine annoyance (as referenced below). The relationship between noise annoyance and adverse effects on human health is also further investigated in the manuscript by Michaud et. al (2008).
  - Health Canada advises that this statement be revised to indicate that there are peer-reviewed scientific articles indicating that wind turbines may have an adverse impact on human health.

References:

Keith, S. E., D. S. Michaud, and S. H. P. Bly. 2008. A proposal for evaluating the potential health effects of wind turbine noise for projects under the Canadian Environmental Assessment Act. *Journal of Low Frequency Noise, Vibration and Active Control*, 27 (4): 253-265.

Michaud, D.; S.H.P. Bly, and S.E. Keith. 2008. Using a change in percentage highly annoyed with noise as a potential health effect measure for projects under the Canadian Environmental Assessment Act. *Canadian Acoustics*, 36(2): 13-28.

Pedersen E. and Halmstad, H.I. 2003. Noise annoyance from wind turbines – a review. Swedish Environmental Protection Agency, Report 5308.

Pedersen, E. and Persson Waye, K. 2008. Wind turbines – low level noise sources interfering with restoration? Environmental Research Letters, 3: 1-5.

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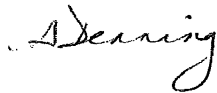
Pedersen E. and Persson Waye, K. 2004. Perception and annoyance due to wind turbine noise – a dose-response relationship. J. Acoust. Soc. Am. 116: 3460-3470.

World Health Organization (WHO). 1999. Guidelines for Community Noise. Eds. B. Berglund, T. Lindvall, D. H. Schwela. WHO: Geneva.

Van den Berg, F. Pedersen E., Bouma, J. and Bakker, R. 2008. Project WINDFARMperception. Visual and acoustic impact of wind turbine farms on residents. FP6-2005-Science-and-Society-20 Project no. 044628: 1-99.

If you have any questions, please feel free to contact me at the contact information below.

Sincerely,



Allison Denning,  
Regional Environmental Assessment Coordinator  
Health Canada, Atlantic Region  
Tel: (902) 426-5575  
Fax: (902) 426-4036  
Allison\_Denning@hc-sc.gc.ca

cc: Tom Ferris, Manager, Safe Environments Program, Health Canada  
Anne-Marie Lafortune, Senior Environmental Health Assessment Advisor, Health Canada  
Derek McDonald, Canadian Environmental Assessment Agency