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January 19, 2012

Re: Wind Turbine Health Impact Study: Report of Independent Expert Panel
January 2012

The purpose of this letter is to respond to the Wind Turbine Health Impact Study: Report of Independent Expert Panel of January 2012 that was prepared for the Massachusetts Department of Environmental Protection, Massachusetts Department of Public Health.

I would like to share excerpts from Ontario, Canada experiences regarding the serious risks to health that can occur when industrial wind turbines are sited in close proximity to residents.

As background, I have held senior executive positions at a teaching hospital, a professional organization and Health Canada (PMRA). I am a former Director of Publications and Editor in Chief of the *Compendium of Pharmaceuticals and Specialties (CPS)*, the book used by physicians, nurses, and health professionals for prescribing information in Canada.

Contact with those experiencing adverse health effects which correlated with the onset of industrial wind turbine operations, inspired my research on the topic.

I volunteer my time and expenses, self support research and other activities such as education regarding the science related to wind turbine health effects. Some of my activities include meeting with authorities, locally, provincially and federally.

A colleague and I initiated a self reporting health survey in March 2009. WindVOiCe (Wind Vigilance for Ontario Communities) follows the principles for Health Canada's *Canada Vigilance Programs* for self reporting suspected adverse events for prescription and consumer products, vaccines and other. The results of this research have been published in a special edition of a peer reviewed scientific journal. [1]

I have also researched societal impacts relating to this topic. This article has also been published in a peer reviewed journal. [2]

Based on several years of investigation : "My research demonstrates that IWTs were initially welcomed into communities. The reported adverse impacts were unexpected…" and "In addition to physiological and psychological symptoms there are individuals reporting adverse impacts, including reduced well-being, degraded living conditions, and adverse societal and economic impacts. These adverse impacts culminate in expressions of a loss of fairness and social justice." [3]

Several months after the publication of my article, Shepherd et al noted: "… wind turbines were initially welcomed by many communities due to their environmental credentials…"

"… residents living within 2 km of a turbine installation reporting lower overall quality of life, physical quality of life, and environmental quality of life. Those exposed to turbine noise also reported significantly lower sleep quality …" [4]

Quality of life and social well being are important health considerations. I have found the stressors occurring within the home and community environment as the result of a change in the environment, e.g. industrial wind turbines, are contributing to adverse health effects. To date, there is no mitigation available to those suffering.

There is ample evidence regarding the health risks associated with industrial wind turbines.

In 2009 The American Wind Energy Association and Canadian Wind Energy Association funded experts to conduct a literature review which explicitly identifies a causal link (through annoyance) to the reported adverse health effects.

The authors of the industry convened report determined the documented "wind turbine syndrome" symptoms (sleep disturbance, headache, tinnitus, ear pressure, dizziness, vertigo, nausea, visual blurring, tachycardia, irritability, problems with concentration and memory, and panic episodes associated with sensations of internal pulsation or quivering when awake or asleep are symptoms) "are not new and have been published previously in the context of "annoyance"" and are the "well-known stress effects of exposure to noise". [5]

This acknowledgement cannot be ignored.

Peer reviewed studies consistently acknowledge wind turbine noise is perceived to be more annoying than transportation noise or industrial noise at comparable sound pressure levels. [6]

Now that the experts funded by members of the wind industry have identified a causal link steps must be taken to ensure these health outcomes are avoided.

Three of the authors of this industry report testified at an Ontario Environmental Review Tribunal which was conducted under oath. 26 expert witnesses from around the world testified (10 Appellants, 16 Respondents – Ministry of Environment and Suncor Inc developer). The evidence and testimony of this tribunal is further evidence that wind turbines can harm human health.

An Ontario Freedom of Information request and peer reviewed articles published during 2011 should also be considered.

I have attached legal opinions and citations regarding the evidence including a summary which I presented to the *Standing Senate Committee on Energy, the Environment and Natural Resources*, October 18, 2011.

The Ontario Environmental Review Tribunal Decision, July 18, 2011 stated:

> "This case has successfully shown that the debate should not be simplified to one about whether wind turbines can cause harm to humans. The evidence presented to the Tribunal demonstrates that they can, if facilities are placed too close to residents. The debate has now evolved to one of degree." [7]

A Freedom of Information request from the Ontario Ministry of Environment notes:

> "It appears compliance with the minimum setbacks and the noise study approach currently being used to approve the siting of WTGs will result or likely result in adverse effects…" [MOE memorandum, Ontario Senior Environmental Officer, April 9, 2010]

The Ontario Ministry of Environment documents are available at www.windyleaks.com

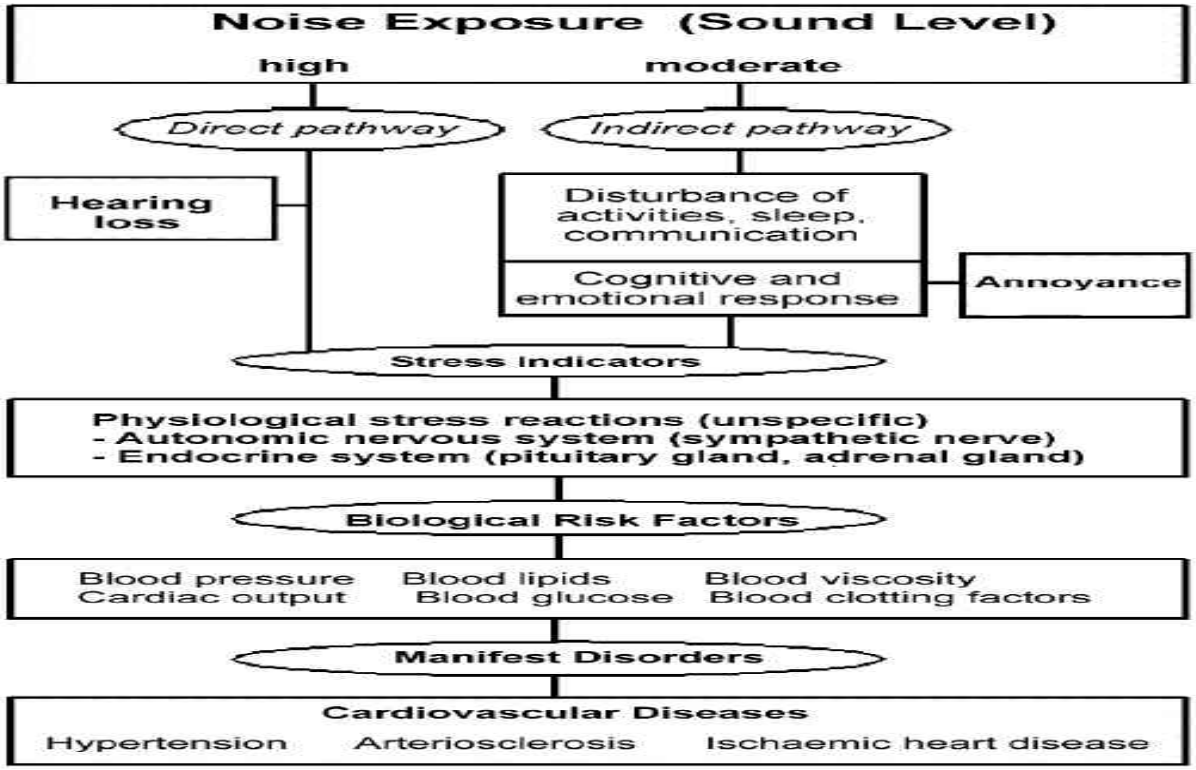
I note that the *Wind Turbine Sound and Health Effects – An Expert Panel Review – December 2009* states that: wind turbine sound/noise may cause annoyance [p. 5-3], stress [p. 4-3, 4-10] and sleep disturbance [p. 4-3], which may have other consequences [p. 4-3, 4-10] [8] Annoyance may seem of little consequence in everyday language; however, in clinical terms it has negative health consequences. The term annoyance is acknowledged as an adverse health effect. See attached Senate slides for some of the citations available regarding the term annoyance and its significance in clinical terms.

The indirect pathway is often given a low priority regarding this topic. The Environmental Review Tribunal expressed concerns with respect to *The Potential Health Impact of Wind Turbines (Chief Medical Officer of Health (CMOH) Ontario Report) – May 2010.*

> "…about the Director's apparent lack of consideration of indirect health effects and the need for further work on the MOE's practice of precaution…" [9]

To better understand the importance of the indirect pathway, please note the World Health Organization noise schema below. Symptoms being reported are through the indirect pathway. Testimony under oath during the Environmental Review Tribunal acknowledged that the indirect pathway was not considered by the CMOH. [10]

Statements indicating there is no evidence of a "direct" causal link may be accurate but is also an incomplete assessment of the health risks. The indirect pathway of noise annoyance, sleep disturbance and stress leads to consequences (cardiac). When one focuses on "direct" effect one omits consideration of an equally significant part of the health equation ie indirect effects.



World Health Organization, Night Noise Guidelines for Europe, 2009
http://www.euro.who.int/InformationSources/Publications/Catalogue/20090904_12

Some have referenced that World Health Organization Noise Guidelines (2009) recommend a 40 dB noise level for industrial wind turbines; however, this is an incorrect interpretation of these guidelines. The WHO guidelines are based on road, rail and air craft noise, not on industrial wind turbine noise. Peer reviewed research has shown wind turbine noise is more annoying than these three types of noise at comparable sound levels. Therefore the premise of 40 dB applying to wind turbines is not justified - research [11] and MOE field officer [12] propose 30 to 32 dB.

To conclude, a December 2010 report commissioned by the Ontario Ministry of Environment and submitted as evidence during the Environmental Review Tribunal and just recently released by the Ministry notes:

> "The audible sound from wind turbines, at the levels experienced at typical receptor distances in Ontario, is nonetheless expected to result in a non-trivial percentage of persons being highly annoyed. As with sounds from many sources, research has shown that annoyance associated with sound from wind turbines can be expected to contribute to stress related health impacts in some persons." [13]

This report also states

> "Stress symptoms associated with noise annoyance, and in particular low frequency annoyance, include sleep interference, headaches, poor concentration, mood swings…" [14]

During 2011, there has been significant progress in acknowledging the harm that can occur when industrial wind turbines are sited too close to residents.

Consideration should be given to recent Australian movements towards a minimum 2 km setback (see Senate slides attached for references). Furthermore in January 2012 the National Health and Medical Research Council reaffirmed their position that authorities are instructed to maintain a precautionary approach for this issue.

Social well-being is acknowledged to be a determinant of health: "Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (World Health Organization [WHO], 1948). Many jurisdictions, including the Canadian federal, provincial, and territorial governments and health officials have accepted WHO's definition of health (Health Canada, 2004, vol. 1, p. 1-1)." [15]

I am not certain whether jurisdictions in the United States of America have accepted the WHO definition; however, it is widely accepted that social, physical and mental health should be evaluated when assessing adverse health effects.

The symptoms have been acknowledged through testimony under oath, and / or disclosure evidence and / or witness statements and through other references as briefly provided in this letter.

There are some research gaps regarding the mechanism and the siting distances and noise levels that will protect human health.

To conclude: "In all cases, noise should be reduced to the lowest level achievable in a particular situation. Where there is a reasonable possibility that public health will be damaged, action should be taken to protect public health without awaiting full scientific proof." [16]

I believe we are at the stage where public health officials must acknowledge there are some suffering from exposure to industrial wind turbines. Furthermore it is time to move beyond repetitive literature reviews. There is an urgent need to conduct the research to determine the siting parameters including setback distances and noise levels to ensure protection of health.

Additional information is being provided a number of attachments that I trust will be of interest regarding this topic.

I was unable to obtain the email addresses for Kimberly A. Sullivan, PhD, Dora Anne Mills, MD, MPH, FAAP, Wendy J Heiger-Bernays, PhD. I would request that someone kindly forward a copy of this letter and documenst to each member on my behalf.

Thank you for giving this matter your consideration.

Respectfully submitted,

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Attachments:

Senate presentation
List of peer reviewed articles – Senate presentation
Letter - HC - 11-08-17 - FINAL
Letter - HC - 11-09-23 - REPLY – FINAL
APPEC_-_Letter_to_WPD_re_White_Pines_Project_-_11-11-08[1]
WCO - Letter to Ministers - REVISED - 11 11 23
Letter - WCO to MOE - 12-01-03 – FINAL

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1 Krogh, CME, Gillis, L, Kouwen, N, and Aramini, J, (2011), WindVOiCe, a Self-Reporting Survey: Adverse Health Effects, Industrial Wind Turbines, and the Need for Vigilance Monitoring, Bulletin of Science Technology & Society 2011 31: 334, DOI: 10.1177/0270467611412551, http://bst.sagepub.com/content/31/4/334

2 Krogh, CME, (2011), Industrial Wind Turbine Development and Loss of Social Justice? Bulletin of Science Technology & Society 2011 31: 321, DOI: 10.1177/0270467611412550, http://bst.sagepub.com/content/31/4/321

3 Krogh, CME, (2011), Industrial Wind Turbine Development and Loss of Social Justice? Bulletin of Science Technology & Society 2011 31: 321, DOI: 10.1177/0270467611412550, http://bst.sagepub.com/content/31/4/321

4 Evaluating the impact of wind turbine noise on health-related quality of life by Daniel Shepherd, David McBride, David Welch, Kim N. Dirks, Erin M. Hill. Noise & Health, September-October 2011, 13:54,333-9

5 Colby, W. D., Dobie, R., Leventhall, G., Lipscomb, D. M., McCunney, R. J., Seilo, M. T., & Søndergaard, B. (2009). Wind turbine sound and health effects: An expert panel review 2009. Prepared for American Wind Energy Association and Canadian Wind Energy Association. http://www.canwea .ca/pdf/talkwind/Wind_Turbine_Sound_and_Health_Effects.pdf

6 Pedersen, E., Bakker, R., Bouma, J., & van den Berg, F. (2009), Response to noise from modern wind farms in the Netherlands, Journal of the Acoustical Society of America, 126, 634-643

7 Case Nos.: 10-121/10-122 Erickson v. Director, Ministry of the Environment Environmental Review Tribunal, Decision, p 207

8 Colby, W. D., Dobie, R., Leventhall, G., Lipscomb, D. M., McCunney, R. J., Seilo, M. T., & Søndergaard, B. (2009). Wind turbine sound and health effects: An expert panel review 2009. Prepared for American Wind Energy Association and Canadian Wind Energy Association. http://www.canwea .ca/pdf/talkwind/Wind_Turbine_Sound_and_Health_Effects.pdf

9 Case Nos.: 10-121/10-122 Erickson v. Director, Ministry of the Environment Environmental Review Tribunal, Decision, p 206

10 Case Nos.: 10-121/10-122 Erickson v. Director, Ministry of the Environment Transcript of Dr. G. Rachamin, Mar, 4, 2011 [1] p. 211, [2] p. 216

11 Thorne, B, (2011), The Problems With "Noise Numbers" for Wind Farm Noise Assessment, Bulletin of Science Technology & Society 2011 31: 262, DOI: 10.1177/0270467611412557, http://bst.sagepub.com/content/31/4/262

12 MOE memorandum, Ontario Senior Environmental Officer, April 9, 2010

13 HGC (2010) Low frequency Noise and Infrasound Associated with Wind Turbine Generation Systems, A Literature Review, Ontario Ministry of Environment RFP December 2010

14 HGC (2010) Low frequency Noise and Infrasound Associated with Wind Turbine Generation Systems, A Literature Review, Ontario Ministry of Environment RFP December 2010

15 World Health Organization. (1948). Preamble to the constitution of the World Health Organization as adopted by the InternationalHealth Conference, New York, 19-22 June, 1946; signed on 22July 1946 by the representatives of 61 States (Official records of theWorld Health Organization, no. 2, p. 100) and entered into force on7 April 1948. Cited Krogh, CME, (2011), Industrial Wind Turbine Development and Loss of Social Justice? Bulletin of Science Technology & Society 2011 31: 321, DOI: 10.1177/0270467611412550, http://bst.sagepub.com/content/31/4/321

16 World Health Organization. (1999). Guidelines for community noise. Geneva; OMS, 1999, p 94. Ilus, Berglund, B., Lindvall, T., and Schwela, D. H.