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From: John Dykstra
Sent: January 18, 2012 8:42 PM
To: Office of the Mayor; McHattie, Brian; Farr, Jason; Morelli, Bernie; Merulla, Sam; Collins, Chad; Jackson, Tom; Duvall, Scott; Whitehead, Terry; Clark, Brad; Pearson, Maria; Johnson, Brenda; Ferguson, Lloyd; Powers, Russ; Pasuta, Robert; Partridge, Judi; Tim Hudak - OLA Hudak; Andrea Horwath. MPP
Cc:
Subject: [WARNING: MESSAGE ENCRYPTED]FW: Set Back Increases for IWT

Hamilton City Council
Hamilton City Hall
71 Main St. W
Hamilton, ON
L8P 4Y5

Jan. 18, 2012

Dear Mayor Bob Bratina and fellow members of Hamilton City Councillor,

We understand your desire to attract investment and jobs to the Hamilton area but surely your research has to look at the question "At what cost?" It seems rather self servng to engage in a scheme when residents in another muncipality will pay with their environment, their health and their wealth.

We live in West Lincoln and we have many concerns about the potential impact on the environment, human health and property values, as well as set back distances and noise of the Industrial Wind Turbines (IWT's). The 3 MW Industrial Wind Turbines that the Niagara Region Wind Corporation (NRWC) has proposed for installation in West Lincoln are 179 meters (597 feet) tall. It is our understanding that the 550 meter set back distance was used for the 350 foot 1.5 MW IWT and would not be appropriate for the 597 foot turbines. The Ministry of the Environment has admitted that the computer model used to establish the set back distance was flawed so they can hardly continue to claim that the set back distance is based on a worst case scenario and is indeed a consevative estimate. The worst case senario seems to be from the people living within 550 meters of IWT's that have already been installed. Even Senior Environmental Officers eg. Cameron Hall in his April 9, 2010 report to Jane Glassco and Dave Bray recommends a set back of 35 to 37 dBA plus the 5 dB penalty for the tonal quality of the sound discharged into the natural environment. The Ministry of the Environment claims that the noise from the IWT is not tonal but research reported by others with no vested interest in the

IWT disagree. According to Frey and Hadden wind turbine noise has a "cocktail" of physical acoustic characters that comprise the noise pollution. The pulsing noise, characteristic of wind turbines, can be more intrusive than other types of noise, and the pulsations include both audible and inaudible components, ie low frequency noise, infrasound, and vibration." p.6

The World Health Organization guidelines recommend lowering the permissible decibel levels when noise contains these caracteristics. WHO makes these recommendations because epidemiological studies indicate clearly that environmental noise is prejudicial and injurious to health (WHO 1999, 2010,2011)

If the government is indeed committed to protecting the health of residents in communities that are forced to host IWT's then the precautionary principle should apply, locate wind turbines further away from homes and communities, or invoke a moratorium, in order to protect the public's health.

The document that we have attached is the 170 page review of the literature & discussion of the issues prepared by Barbara Frey and Peter Hadden "Wind Turbines & Proximity to Homes: The Impact of Wind Turbine Noise on Health released Jan. 2012 Given that it is the responsibility of government ministers, ministries and public officials to protect the health, well-being, dignity and quality of life of all citizens we would like to draw your attention to the following references for a much larger set back distance than that currently advocated by the provincial government:

p.6 The World Health Organization guidelines recommend that noise that pulsates, characteristic of wind turbines, can be more intrusive than other types of noise and the pulsations include both audible and inaudible components ie low frequency noise, infrasound and vibration ... has a lower permissible decibel level... because epidemiological studies indicate clearly that environmental noise is prejudicial and injurious to health (WHO 1999, 2010, 2011)

p. 7 Selecting a minimum distance of 2 km. as a buffer between homes and the placement of a wind turbine - even though an even greater distance may be required – is not excessive when the lives and well being of those affected are taken into account.

p. 11 "... wind farm sound can be heard within residences situated within 3.5 km of large turbines"

p. 12 Dr. Lynn (Grey Bruce Medical Officer of Health - Ontario) recommended a minimum setback of at least 1 km to 1.5 km

p.16 April 2010 request to Carmarthenshire County Council, Wales UK .... To formally adopt a 2 km buffer zone policy for large scale commercial wind farm developments, creating a buffer of 2 km between wind turbines and homes,

p. 16 August 2010 Bill in House of Lords proposing a minimum distance between wind turbines and homes based on height of the wind turbine ..... d) greater than 150 m, the minimum distance required is 3,000 m. (height of turbine is measured from the ground to the end of the blade tip at its highest point)

p. 22 It is the responsibility of government and delegated agencies of government to ensure that effective guidance provides the maximum level of protection to families for their health, amenity and human rights, which the Government has contracted to honour in international conventions. Current regulation is unreliable and Inadequate for protecting the health of families living near wind turbines ...Is the need for IWT critical ... if 'yes' then it is for the Government to provide sufficient compensation to the families allowing them to move..... if 'no' Incumbent upon the authorizing agency to set enforceable controls on the level of noise .... prevents injury to their health

p.36 In addition, it should be mandatory for the developer and/or the consulting acoustician to provide a DESIGN WARRENTY that ensures that the wind turbine(s) will not produce a noise exceeding 30dBA LAmax at night, in a bedroom, with a window open, and that the low frequency noise and amplitude modulation will be strictly limited with conditions strictly met.... However, if the developer and/or the consulting acousticians cannot provide a warranty..... then the site is unsuitable for wind turbines

p. 50 Dr. Christopher Hanning –Turbines which result in external noise levels greater than 35dB(A) or are sited closer than 1.5 km from housing therefore present an unacceptable risk of causing sleep disturbance and high levels of annoyance to those residents, and, to a smaller number, a health risk.

p. 52 response of Japan when residents living near wind turbines reported incidents of insomnia, headaches, dizziness, and tinnitus – 4 year study .... Operators must listen to residents before pushing their projects.

p. 54 Because LFN (Low Frequency Noise)travels long distances without attenuation ... Dr. Alec Salt PhD, Washington University School of Medicine USA, recommends setbacks of wind turbines from homes off at least 1 ¼ miles and home monitoring for all dwellings within 2 miles of wind turbines.

p. 55 Ministry of Defence banned wind turbines within a 31 – mile radius of its nuclear monitoring station in Eskdalemuir because of seismic interference.

p. 57 Styles et al, Keele University (UK) When the windfarm starts to generate at low wind speeds, considerable infrasound signals can be detected at all stations out to 10 km.

p.57 Moller and Pedersen Journal of the Acoustical Society of America June 2011 The relative amount of low frequency noise is higher for large turbines (2.3 – 3.6 MW)

p. 59 In August 2011, the Environmental Protection Agency of the Danish Ministry of the Environment issued new guidelines for low frequency noise emitted by wind turbines: The proposed new regulation is based on a 20 decibel limit indoors for wind speeds of 6 and 8 m/s ... The new limit values will apply to all turbines , irrespective of ownership.

p. 62 The government has failed to assess health risks that onshore wind turbines pose to families living nearby, despite clear evidence from international authorities and evidence based reports that noise with the combined acoustic characters emitted by wind turbines is likely to cause injury to health.

p. 83 Shepherd et al in Noise and Health 2011;13:333-9 "Statistically significant differences were noted in some Health-Related Quality of Life domain scores, with residents living within 2 km of a turbine installation reporting lower overall quality of life, physical quality of life, and environmental quality of life ... lower sleep quality and rated their environment as less restful."

p. 84 "The characteristic swishing or thumping noise associated with larger turbines is audible over long distances, up to 5 km and beyond in some reports. Van den Berg showed that sound is the most annoying aspect of wind turbines and is more of a problem at night. "

p. 84 " in the Netherlands it is reported that 440,000 inhabitants (2.5% of the population) are exposed to significant levels of wind turbine noise ... conclude that night time noise should be set conservatively to minimize harm, and on the bases of this data, suggest that setback distances need to be greater than 2 km in hilly terrain"

p. 94 Dr. Nina Pierpont " All turbine ordinances, I believe, should establish mechanisms to ensure that turbine developers will buy out any affected family at the full pre-turbine value of their home, so that people are not trapped between unlivable lives and destitution through home abandonment.

p. 95 JP Harrison – Physics Department Queens University Canadian Acoustics Sept 2009 – "a noise level of 40 dBA will result in annoyance for 20% of the population subject to that noise level ... the character of turbine noise makes it especially intrusive ... an intrusion of 15 dBA is too large. Germany has a nighttime noise limit of 35 dBA; this should be the international absolute limit

p. 97 " those living within 1.4 km of IWT have suffered sleep deprivation which is sufficiently severe as to affect their daytime functioning and mental health ... The current ordinances determining setback are inadequate to protect the residents and set backs of less than 1.5 km MUST be regarded as unsafe.

p. 98 Dr. Sarah Laurie, a physician in Southern Australia Symptoms of people affected by wind turbine noise

p. 99 The State Government of Victoria, Australia, established wind turbine "no-go zones" in August 2011. ... prohibits building wind turbines within 2 km of houses

p. 101 Ontario, Canada Thus the Ministry of the Environment is clearly aware of the risk to health of wind turbine noise for those living nearby. In July 2011, the Environmental Review Tribunal found that industrial wind turbines can harm people ... The evidence presented to the Tribunal demonstrates that they can (cause harm to humans) if facilities are placed too close to residents.

p. 106 Krogh IWT Development and Loss of Social Justice Bulletin of Science, Technology & Science - Good governance implies that governments have a responsibility to correct policies that result in harm. Governments have the power to halt development of IWT's in close proximity to humans until authoritative human health research has been completed. Facilities where there are reports of adverse health effects should be decommissioned and health and quality of life restored.

p. 114 ... provide for pecuniary damages to compensate families for the depreciation in the value of their homes equivalent to the value without the scheme.... Compensation should include the costs of moving to an equivalent location ... living within 3 km of industrial wind turbines.

Common fairness demands that when "The State has sequestered the persons security (home) by authorising persistent, continuous, prolonged environmental noise pollution that makes their homes unsaleable, or reduces their values to the point at which families cannot derive any benefit from their sales – the people should be compensated . p 114 -115

p. 116 ... property within 600 – 800 meters to be devalued by some 30%, property within 1 mile possibly 20% and property 2 miles possibly 10%

p. 140 The precautionary principle be invoked and applied so that ordinary families are duly protected when onshore wind turbine developments are promoted by an industry well-versed in the art of smoke and mirrors.

p. 141 – 142 Conclusions - stricter regulations on the wind energy industry in Denmark, Australia, Japan, WHO. Because the UK government, through it's agencies, ministers and civil servants, is aware of issues with wind turbine noise guidance, there are potential human rights violations...

p. 143 – 144 Recommendations - Denmark has introduced guidelines for wind turbine noise that reduces previous allowable levels ... these standards comply with the WHO reports and their findings

A design warrenty should be provide to the local authority that certifies that the wind turbine will not exceed the prescribed noise immission levels.... close down the

site ... or developer may arrange to purchase all neighbouring properties exposed to the environmental noise pollution, at their fair market value prior to the wind turbine scheme, plus compensation for moving home.

As you can see we are not alone in our request for a 2 km set back from non-participating residences and many are looking at ways to guarantee property values for people that will be affected because Industrial Wind Turbine projects were situated too close to non-participating homes.

Respectfully submitted,
Catherine Mitchell & John Dykstra

Wind Turbines and Proximity to Homes:

The Impact of Wind Turbine Noise on Health

a review of the literature & discussion of the issues

by

Barbara J Frey, BA, MA (University of Minnesota)

&

Peter J Hadden, BSc (Est Man), FRICS

January 2012

Health is a state of complete physical, mental, and social well-being, and not merely the absence of disease and infirmity.

~ The World Health Organization Charter

The objective of science is not agreement on a course of action, but the pursuit of truth.

~ John Kay (2007)

First, Do No Harm.

~ The Hippocratic Oath

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Acknowledgements

The authors were fortunate to have the critical support of many others, including experts in related fields, all of whom are concerned about the adverse health impacts of wind turbine noise on people. We are grateful for your input and interest, as you know.

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Carmen Krogh, BscPharm

And with thanks to all the many individuals and families who have persisted, against the odds, often at personal financial and emotional cost, and often for many years, to protect the health and quality of life for their families and their communities. Their perseverance benefits us all, by example and by accomplishment.

With special thanks to:

Mr and Mrs Julian Davis
Mr and Mrs Michael Hulme

Preface

In 2007, we published *Noise Radiation from Wind Turbines Installed Near Homes: Effects on Health*, a paper that examined the intersection of the science of acoustics and medicine in order to better understand why people experienced adverse health effects as a result of long-term exposure to wind turbine noise. The paper reviewed already published studies and reports, revealing a serious disparity between acousticians' predicted effects of wind turbine noise and the actual effects experienced by those living near wind turbines, even when developers adhered to government guidance. Internationally, there was evidence of sleep disturbance when industrial wind turbines were sited near people's homes, other sensitive living and working environments, and in some cases, broader communities.

We anticipated that these complaints and problems would escalate if more wind turbines were built near homes and communities, unless governments addressed the failure of wind energy policy to protect the public's health. Unfortunately, the worst-case scenario has unfolded, even as acousticians realise that predicting and controlling wind turbine noise is more complex than anticipated. As more wind turbines are sited without exercising due care and attention to the noise pollution and consequent health effects, more people are experiencing the negative effects of wind turbine noise. Moreover, the science of sleep and the adverse effects of noise on sleep and health continue to reveal just how damaging sleep disturbances and sleep deprivation are to health, learning, and quality of life.

Yet, governments have focused their policies on achieving wind energy targets while opting to ignore evidence demonstrating that when wind turbines are located too close to family homes, the prolonged exposure to the audible and inaudible range of acoustic characteristics of wind turbine noise adversely affects people's health.

As we and many others noted years ago, all these problems and discord, along with the expense of appeals and public inquiries, might have been avoided with the simplest of solutions: locate wind turbines at a distance from homes, sensitive facilities, and communities, at a distance that protects the occupants from prejudicial health consequences. Although this paper primarily reviews the policies in Britain, the unwanted health effects are universal.

Governments continue to rely on acoustic engineers to prepare official guidance both on exposure to wind turbine noise, including the upper limits of dosage and duration, and on the separation distances of wind turbines from homes. It is ironic that several experts on noise and health are on faculty at British universities -- yet perplexingly, Britain continues to rely upon acoustic engineers to advise on the complex problem of noise and health. Moreover, although the problem of wind turbine noise is well known to Government, there is no evidence that Government has planned or seeks to organise an independent academic, epidemiologic clinical study of these issues, even though it has been urged to do so.

The British and other governments aspire to human rights ideals, yet they indirectly endorse the inhuman treatment suffered by some families, stemming directly from Government policy that allows construction of wind turbines in close proximity to family homes. This illustrates also that the protection of family life and its amenity and health are less important to Government and its policy-makers than the protection of commercial development, landscape interests, and birds and bats.

We did not receive nor will we receive any remuneration by writing this paper. By reviewing the evidence from research by those with relevant expertise, we hope this paper helps those who seek to protect people's health and basic human rights and to prevent inappropriate, environmentally polluting, industrial development near homes and communities. That is our reward.

Introduction

Successive UK Energy Ministers have failed to acknowledge that the historic method of controlling the distance between people's homes and wind turbines, ETSU-R-97, published in 1997, is obsolete and no longer protects the amenity of those living near wind turbines. ETSU-R-97, written more than 15 years ago, is no longer 'fit for purpose' and does not provide adequate health protection to neighbouring families. When ETSU was published, wind turbines were maximally 60 metres tall. Today's wind turbines are 125 – 150 metres tall to blade tip, with massive spatial surface areas covered by the circumference of the blade swing, which creates significant vortices of air turbulence in back and in front of the blades. While there are improvements in the technology of wind turbine design, the sheer increase in size produces new dynamics in altitude wind turbulence and physical acoustic problems. By far the greatest problem for people is the increase in acoustic radiation, which pollutes the living and working environments of those who live near the wind turbine sites. [ETSU for the Department of Trade and Industry (Dti). ETSU-R-97: The Assessment & Rating of Noise from Wind Farms: Final Report. Dti (UK), September 1996 http://webarchive.nationalarchives.gov.uk/+/http://www.berr.gov.uk/energy/sources/renewables/explained/wind/onshore-offshore/page21743.html]

This paper addresses not only the issues of wind energy policy where it violates the basic living environment of families and the adverse health effects of wind turbine noise, but also assesses the considerable number of anecdotal reports from people living with wind turbine noise. As noted in the authors' 2007 paper, although there are many who dismiss anecdotal reports as inconsequential or meaningless, these reports are from real people, living with real problems, often with no recourse: they put 'the human face on science'. The authors also examine how this translates into a human rights issue, as government policy assigns more credibility to acousticians' reports than to medical evidence, and assigns more importance to renewable energy policy than to the individual lives injured by that policy.

The paper begins with a review of the acoustic impact of wind turbine noise reported by families and communities in the UK as well as similar cases in Japan, Australasia, the United States, Canada, and throughout Europe. This first chapter collates and details some of the evidence of recent reported cases and the extent of discomfort, distress, and health problems suffered by those families with prolonged exposure to wind turbine noise.

Chapter 2 examines the views of leading acoustic experts on the reasons that the acoustic 'bombardment' impacts people physically. This chapter also reviews the problems and complexities in interpreting the UK ETSU-R-97 guidance and subsequent apparent difficulty enforcing noise conditions that emerge from ETSU.

Chapter 3 discusses peer-reviewed medical research and reports from internationally recognised authorities, e.g., the World Health Organization, supporting the anecdotal evidence of health problems experienced by families living near wind turbines; these families endure the pulsating noise as well as prolonged exposure. There is also a growing body of evidence-based research substantiating the adverse health impacts of environmental noise pollution, particularly with extended exposure, of which wind turbine noise is an example.

As with many public health issues, the problems with wind turbine noise started with anecdotal reports where turbines were built too close to homes. These complaints emerged in a scattered pattern, because often the people affected did not associate the sudden onset of their sleep disturbances, headaches, or inability to concentrate with the noise. Most people were confident when told by the wind energy companies and their local officials that wind turbines were not intrusive, that the noise produced is easily masked by background noise, and that the noise compared favourably with familiar sounds, e.g., a home fridge, or a quiet conversation in the library. Initially, each affected person thought his or her new symptoms were unique.

As more complaints emerged from those who lived near newly operational wind turbine sites, and those who pinpointed the start of their newly identified health problems with the movement of the blades, some of those affected -- and a few health professionals -- suspected that the source of their problems might be associated with the noise generated by the wind turbines. This association seemed more likely because the victims' symptoms were relieved when they were away from their homes or farms. Moreover, the symptoms recurred once they returned home. These patterns

emerged only over time, and across many wind turbine areas, internationally. Chapter 3 also reviews several pilot studies conducted by physicians in order to assess the anecdotal reports of health effects from those living near wind turbines.

Chapter 4 considers basic international human rights, apparently sidestepped by Britain, as its environmental policy appears to assign greater priority to the protection of landscape, bats, dormice, and water voles (though the authors certainly applaud those efforts). The State appears to accord more importance to, and enforces with more stringency, those issues to the detriment of policy that protects the health and dignity of families. As a result, in their ambition to achieve renewable energy targets, public officials authorise what amounts to the degrading and inhuman treatment of families.

The influential wind energy industry and its lobbyists, public agencies, environmental organisations, and many media sources often employ pejorative labels, such as NIMBY – Not In My Backyard, to decry or stigmatise those who complain, as insensitive to environmental pollution and global warming, in order to dismiss these anecdotal reports. Yet, it is essential to remember that many of those affected by wind turbine noise were those same people who welcomed the wind turbine schemes and were skeptical of those who complained about potential or actual noise interference. Many early wind turbine noise studies focused on annoyance and identified sleep disturbance as a frequent problem, but these studies did not collect data on health effects. Public health problems often evolve gradually and become more evident only with the passage of time as more people are affected (duration of exposure).

UK government renewable energy policy has focused more on expanding the role of industrial wind turbines rather than ensuring the protection of the health of those exposed to wind turbine noise, i.e., the protection of the public's health. Thus, the voices of those affected by wind turbine noise have grown more insistent as more wind turbine sites are located near homes and villages. The solution has always seemed transparently straightforward: locate wind turbines further from homes and other sensitive structures. Of course, one must then determine the optimum distance, and there lies the rub, with industry pushing for minimal distances, while many others seek a more precautionary stance, in an effort to protect health, well-being, dignity, and quality of life.

Wind turbine noise is a form of and another cause of environmental noise pollution. Recent studies, both medical and acoustic, offer data to assist with the decision on where to site and how to design wind turbine arrays. Notably, wind energy developers often assert that there are virtually no studies on wind turbine noise and no evidence of its ill effects. However, there are not only studies specifically on the adverse effects of wind turbine noise, there are also studies on noise with similar or shared acoustic characteristics. Wind turbine noise is especially complicated because of the 'cocktail' of physical acoustic characters that comprise the noise pollution. The pulsating noise, characteristic of wind turbines, can be more intrusive than other types of noise, and the pulsations include both audible and inaudible components, i.e., low frequency noise, infrasound, and vibration. Noise with these characteristics is more intrusive, and the World Health Organization (WHO) guidelines recommend lowering the permissible decibel levels when noise contains these characteristics. WHO makes these recommendations not merely to reduce annoyance or nuisance. WHO makes these recommendations because epidemiological studies indicate clearly that environmental noise is prejudicial and injurious to health. [WHO 1999, 2010, 2011]

WHO's impartial reports are particularly compelling because they undergo periodic review and updating by its international panel of experts from diverse, related fields. Moreover, the panel's findings and reports undergo a process of stringent review internally amongst the panelists, as well as externally, by reviewers not on the panel. Most recently WHO issued Night Noise Guidelines for Europe 2009, and the Burden of Disease from Environmental Noise 2011, which, with EU directives and guidelines on noise, offer policy-makers and other invested parties with descriptions of how health is adversely affected by noise, as well as with methodologies to ameliorate or to prevent injury to health from environmental noise.

Those affected by wind turbine noise could be your relatives, friends, neighbours, and even -- at some point -- you. Often these are people who know austerity intimately, who understand the dilemma of balancing environmental issues such as energy supply and global warming with current policy and future demands. Instead, they are marginalised and made to feel doltish and

selfish. They also feel disenfranchised and abandoned by those in whom they have placed their trust. This cynicism is not unfounded, as many are left financially impoverished as they seek advice and support in order to make their voices heard. The issue of wind turbine noise is about real people, who are genuinely suffering degrading and inhuman treatment.

Planning for industrial estates near dwellings is more restrictive on noise control, with those facilities rarely operating daily, 24/7, than the noise controls on wind turbines. Selecting a minimum distance of 2km as a buffer between homes and the placement of a wind turbine – though an even greater distance may be required – is not excessive when the lives and well-being of those affected are taken into account. There is still ample opportunity for developers to site their schemes more appropriately and for government to redress errors in policy that allow these untoward, unpredictable, and unacceptable effects.