

Open Letter

Preliminary Submission

Health Canada Wind Turbine Noise and Health Study

Submitted by Carmen Krogh, BScPharm

August 5, 2012

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Submitted by Carmen Krogh, BScPharm

August 5, 2012

To:

David S. Michaud, PhD
Principal Investigator
Consumer and Clinical Radiation Protection Bureau
Healthy Environments and Consumer Safety Branch
Health Canada
Email: wind.turbine.health.study@hc-sc.gc.ca or david.michaud@hc-sc.gc.ca

Copy:

The Right Honourable Stephen Harper
Prime Minister of Canada
pm@pm.gc.ca

The Honourable Leona Aglukkaq
Minister of Health
minister_ministre@hc-sc.gc.ca

Dear Dr. Michaud,

Re: Health Canada Wind Turbine Noise and Health Study [the Study]

1 Summary

1.1 Author's note

This preliminary submission provides initial high level comments regarding the proposed Health Canada Wind Turbine Noise and Health Study [the Study].

I will be presenting three papers at the August 19 to 23 InterNoise 2012 conference where there will be further opportunities to participate in the Study design peer review process.¹

I intend to prepare and submit a final comprehensive peer review document after the InterNoise 2012 conference.

My brief biography is provided at the conclusion of this submission (*Appendix*).

1.2 Disclaimer

The contents of this preliminary submission should not be used to infer any bias for or against wind energy.

This submission is not to be associated with and/or used to characterize any individual and/or organization.

I have received no financial support for the research, authorship, and/or publication of this submission.

1.3 Purpose

The purpose of this submission is to provide my initial comments on the Health Canada Wind Turbine Noise and Health Study [the Study].

Members of the international public and scientific communities have requested my initial comments about the Study.

I have provided a copy of my comments to The Right Honourable Stephen Harper, Prime Minister of Canada, The Honourable Leona Aglukkaq, Minister of Health and the public.

The comments provided in this preliminary submission are intended to contribute my

knowledge and expertise on the health effects of industrial wind turbines.

1.4 Basis for comment

On July 10, 2012 Health Canada announced the Study.

Study design peer review comments have been given a submission deadline of September 7, 2012. Attendees at conferences have the additional opportunity to participate in the peer review process.

Study design information provided by Health Canada appears to be limited ² primarily to a few web pages and a paper authored by David S. Michaud, Stephen E. Keith, Katya Feder, Tara Bower and entitled "*Health Impacts and Exposure to Wind Turbine Noise: Research Design and Noise Exposure Assessment*" [Michaud et al (2012)] which is to be presented at InterNoise 2012. ³

As of the date of this submission some requests for clarification from Health Canada regarding the Study remain outstanding. Health Canada has suggested requests for information and/or clarifications should be referred to the Access to Information and Privacy (ATIP) request process. ATIP requests have been initiated and can be expected to take some time to obtain.

Therefore, the preliminary comments expressed in this document are based on the limited information currently publicly available.

In addition, meetings and communication since 2009 and my professional background has contributed to this preliminary submission including:

- § Over 40 years experience as health care professional;
- § Career expertise in project management;
- § Career expertise in process management;
- § Career expertise in peer review publication process;
- § Four years of independent research and review of published literature on industrial wind turbines;
- § Interviews and communications with individuals reporting adverse health effects;
- § More than three years of meetings and / or communications with federal representatives including Health Canada, Natural Resources Canada, the Public Health Agency of Canada and other federal representatives;
- § Meetings with Federal MPs and Senators; ⁴
- § Meetings with provincial MPPs;
- § More than three years of meetings and / or communications with Ontario government representatives;

- § A meeting with former Minister of Environment John Gerretsen and staff;
- § Meetings with Arlene King, Chief Medical Officer of Health or other with representatives of the CMOH Office;
- § Several years of meetings and / or communications with authorities in other jurisdictions including internationally;
- § Three years of providing public education (Ontario, Quebec, Saskatchewan, Alberta, California, Vermont);
- § Over three years of scientific discourse with other experts internationally;
- § Author of peer reviewed and other references relevant to industrial wind turbines and health effects;
- § A meeting with representatives of the Canadian Wind Energy Association;
- § International contact with government officials, organizations, citizens; and
- § Other

I have offered to share my expertise and participate on the Study Team. For information, attached is the *CONFIDENTIAL Draft Proposal Researching Human Health and Industrial Wind Turbines: A Dose Response Relationship, Prepared by Carmen Krogh, May 4, 2012*⁵

1.5 Initial comments

- § Based on existing evidence a 2011 Ontario Environmental Review Tribunal found that wind turbines can harm to humans if facilities are placed too close to residents. The debate has now evolved to one of degree.⁶
- § At least two published case studies^{7, 8} have documented reports of adverse effects from individuals exposed to Canadian industrial wind turbine facilities;
- § In some cases affected Canadians have effectively abandoned their homes and/or negotiated financial agreements with the wind energy developer.⁹
- § In 2009, The American Wind Energy Association and The Canadian Wind Energy Association "...established a scientific advisory panel ..." ¹⁰ and funded a literature review, Colby et al. (2009). Colby et al acknowledges the symptoms documented in Dr. Pierpont's case study (which includes Canadian subjects) and states the 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 ..." ¹¹
- § References produced by¹² or for¹³ the Ontario Ministry of Environment report adverse effects or health impacts can be expected at typical Ontario wind turbine setback and noise levels;
- § It is reasonable to assume that reported health effects from wind farms are going to proliferate in the future;¹⁴
- § Health Canada's apparent acknowledgement of the need for research is a positive development;
- § The Study is not expected to be completed until 2014;¹⁵

- § The Study will not provide a definitive answer its own;^{16, 17}
- § Health Canada has not provided sufficient Study detail to the public and scientific communities on which to base comprehensive and meaningful peer review comments;
- § There remain Study uncertainties that require clarification;
- § The content of Michaud et al and Study Team suggests numerous issues including;
 - Questionable Study focus;
 - Composition of the Study Team;
 - Narrow focus on noise;
 - Perceived bias;
 - Perceived conflicts;
 - Perceived transparency issues;
 - Perceived lack of independence;
 - Perceived methodological gaps;
 - Perceived knowledge gaps;
 - Disclosure gaps;
 - Process in general;
 - Peer review process;
 - Ethics issues; and
 - Other

Some of these issues are discussed in the body of this submission. Where appropriate, documentation of communications, notes, and other references are provided.

1.6 Conclusions

Wind turbines can harm humans if placed too close to residents.

Adverse health effects have been reported by individuals, including Canadian residents, exposed to wind turbine facilities.

Plausible mechanisms of causation have been identified.

Adverse effects are expected to occur at typical setback distances and sound pressure levels experienced in Ontario.

There are Study issues that must to be resolved before as a peer reviewer I can support the Study.

There is sufficient evidence to warrant that precautionary and preventative steps be taken to avoid harm to human health.

1.7 Recommendations

Based on the information currently available I recommend that Health Canada:

- § Reconstitute the Study Team, address the issues raised in this submission and ensure independent subject expertise participation;
- § Conduct in-person interviews with the Canadian residents reporting adverse health effects before finalizing the Study design;
- § Draft a detailed meaningful Study design and proposal and provide an appropriate comment period;
- § Focus on prevention and invoke the precautionary principle;
- § Discontinue the placement of wind energy facilities in proximity to humans until definitive research confirms human health protection for all exposed individuals;
- § Investigate and resolve wind energy facilities where adverse effects are reported.

2 Details

2.1 Introduction

There is compelling evidence of adverse health effects associated with industrial wind turbines.

It is encouraging that Health Canada's apparently acknowledges there is sufficient evidence to merit a study; however, an increasing number of non consenting Canadian residents are expected to be exposed to industrial wind turbines in the next decades:

"Key Messages:

With wind capacity forecasted to expand significantly across Canada in the next 10-15 years, Health Canada will continue to monitor developments, in particular related to the noise emitted from wind turbine installations, in an effort to minimize the potential impact that this may have on Canadians."¹⁸

It is expected there will be a proliferation reported health effects from industrial wind turbine facilities. The Science Advisory Board (SAB) suggests in relation to the Study:

"Don't waste time on measuring the prevalence of reported health effects from wind farms; assume that they are going to proliferate in the future."¹⁹

The expectation of adverse effects from industrial wind turbines is supported by other references including a 2010 Ontario Ministry of Environment commissioned report:

"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."²⁰

An Ontario Ministry of Environment Freedom of Information request states:

"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..."²¹

2.2 Precaution and prevention

There are calls for a moratorium until definitive health research has been completed and guidelines established which ensure the protection of human health.

The Study results are expected to be available sometime in 2014 but will not be definitive or show causation.

The Science Advisory Board (SAB) states in relation to the Study:

"Health Canada's Policy and Research Approach to Wind Turbines

"Discussion:

... Specific aspects covered included the recommendation that all reference to "causality" be removed from the study description as no matter how good a design, it can only be expected to show associations."²²

There are calls for a moratorium from the public, municipalities²³, Members of Provincial Parliament (Ontario - MPP)^{24, 25, 26, 27} and Members of Parliament (Canada - MP)^{28, 29, 30, 31, 32, 33, 34, 35, 36}.

Since 2009, colleagues and I have met periodically with representatives from Health Canada, Natural Resources Canada, the Public Health Agency of Canada, and Ontario government representatives. We have provided references and evidence regarding reports of health effects at Canadian wind turbine facilities, including those at federally subsidized projects. We advised of the need to pause and stop building more wind turbine facilities in proximity to humans until the research has determined definitive guidelines that protect human health. As well, we advised of the urgent need to investigate and resolve the issues of reported adverse effects at existing sites.^{37 38 39 40 41 42 43 44}

In view of the Study timeline of 2014, the lack of definitive results expected, and “it can only be expected to show associations”, it is appropriate that precautionary and preventive measures be taken. The placement of wind energy facilities in proximity to humans should be discontinued until definitive research confirms human health protection for all exposed individuals. Existing reports of adverse effects should be investigated and resolved.

2.3 Study Process

Clarification is required on a number of Study process issues.

Examples of some of Study process issues are listed in this section.

2.3.1 Extension for comment

The issues surrounding the adverse health effects of industrial wind turbines are complex.

Originally, a 30 day period for public comment was established for the Study.

Health Canada announced an extension to 60 days, with a new deadline of September 7, 2012.⁴⁵

The extension is appreciated; however there is insufficient public information on the Study to provide meaningful comment. Clarification is required on a number of Study issues.

I recommend Health Canada provide an extension beyond September 7, 2012.

2.3.2 Transparency

Clarification is required on the Study processes and transparency.

For example, it is unclear how Health Canada is going to inventory and respond to individual peer review comments. Are comments to be posted in “real time” and unedited for public viewing? Will the Health Canada responses to individual comments be posted in “real time” for public viewing?

I requested the Health Canada web link so that the public can view the Study comments and Health Canada’s responses.

Health Canada responded:

“...This will only be developed when the comments are collated and responded to - after the consultation process is closed.”⁴⁶

This appears to suggest Health Canada will draft a summary report of comments and responses.

I recommend Health Canada establish an online searchable database to capture all comments and facilitate public discourse regarding submitted comments and Health Canada’s responses in “real-time”.

Further clarification is required on the Study transparency process.

2.3.3 Rating criteria

Clarification is required on the Study process for rating submission comments.

The Study peer review comments are open to submissions from the international community.

Examples of sources of comments may include:

- § The scientific community who have conducted research or have subject expertise;
- § Other subject matter experts;
- § Researchers with peer reviewed published references;
- § Municipalities and other authorities;
- § Individuals who have reported adverse health effects in the past;
- § Individuals who are currently reporting adverse health effects;
- § Individuals with pending projects;
- § Citizens in general;
- § Members of the wind energy industry;
- § Wind energy proponents;
- § Wind energy opponents;

- § Impersonators of any of the above; and
- § Other

In order for the comment process to be of value it is necessary to evaluate the source, content and authenticity of all comments in order to assess how or if they are to be addressed in the Study.

I have requested clarification about the process for rating comments.

Examples of my inquiries include;

- § Whether Health Canada would know if some live near wind turbines;
- § Whether those living near wind turbines would be considered peer reviewers;
- § Whether Health Canada requires an indication of credentials / background in order to "rate" the level of subject expertise.⁴⁷

Health Canada responded:

"In response to your additional questions, the Department will not be requesting the credentials of those providing comment and Health Canada will receive all comments from interested stakeholders regardless of their proximity to wind turbines. The Department will only know if respondents live in the proximity of wind turbines should they self identify as such."⁴⁸

I recommend that Health Canada establish evaluation criteria for authenticating and rating the submitted comments. These criteria should be made public so that those submitting comments can include the information necessary for evaluating the source, content and authenticity.

Further clarification is required on the Study processes for rating submission comments.

2.3.4 Study conduct

It is unclear whether Health Canada is conducting the Study internally or if it has been contracted to an independent institution such as a university or research facility.

I have requested clarification on this issue; however I have not received clarification.⁴⁹

Clarification is required as to what institution is conducting the Study.

2.3.5 Study budget

The Study is reported to have a budget of \$1.8 million.

The Study team members appear to include a number of internal Federal personnel, i.e. Policy Advisors, Stats Canada, Natural Resources Canada, Public Health Agency of Canada and other representatives.⁵⁰ It is expected internal and infrastructure support personnel may be required.

It is unclear how the reported budget of \$1.8 million is allocated. For example how much of the budget is to be absorbed based on a cost recovery formula of the internal personnel versus the direct costs of conducting the Study.

Non-government members of the Study Team may also be compensated for time and expenses incurred regarding the conduct of the Study.

It is also unclear whether Health Canada has issued a Request for Proposal (RFP) for the competitive bidding process.

I have requested clarification about the issuance of a RFP but to date have not received a response.⁵¹

Clarification is required on the allocation of the Study budget.

2.4 Peer review process

Clarification is required on processes for the Study peer review.

In reference to the Study peer review process, Health Canada informed me:

“...the methodology will undergo peer-review with interested stakeholders, such as yourself, through the webposting consultation which is standard practice within the Department for studies of this nature. In addition, we are providing several opportunities for peer review through presentation and discussion at conferences attended by wind turbine noise experts and through oversight and review by the Noise Experts committee of the World Health Organization.”⁵²

I requested clarification about the range of eligibility for participating in the peer review process (see also *2.3.3 Rating criteria*). My inquiries asked:

“Does this mean anyone who comments through the consultation is considered to be a peer reviewer? Or would you require an indication of credentials / background in order

to “rate” the level of subject expertise. In other words, how would you rate the comments? Is everyone a peer reviewer? How will a presentation at a conference be considered peer review – will you be formally collecting comments from conference participants? Any clarification on this would be appreciated.”^{53 54}

The “Questions and Answers: Health Canada Wind Turbine Noise and Health Study” web site indicates the study methodology will be “presented at relevant international conferences for review.”⁵⁵

Dr. Michaud confirmed that as of July 18, 2012 Michaud et al (2012) will be presented at the InterNoise 2012 and no other conferences were currently scheduled. It is uncertain if Michaud et al (2012) will be presented at any other international conferences for review.

It appears InterNoise 2012 may be the only international conference that Michaud et al (2012) will be presented at prior to the comment period deadline of September 7, 2012.

If Michaud et al (2012) is presented at conferences subsequent to September 7, 2012, it will grant conference attendees the opportunity to influence the Study after the general public, including Canadians, are no longer permitted to comment. This raises process issues about equity.

The international conferences for Michaud et al (2012) presentation should have been clearly identified and made public prior to the announcement of the Study.

The peer review process issues regarding range of eligibility for participation, rating and criteria require clarification from Health Canada.

2.5 Study design

The basis for public comment⁵⁶ is Michaud et al (2012) being presented at the Noise Conference, 2012 being held in New York City, NY.⁵⁷

A Health Canada document obtained through an ATIP request states:

“Presenting at InterNoise 2012 will provide an opportunity to receive feedback from renowned international noise experts in addition to having a 6-8 page summary of the research design/methodology published in the conference proceedings.”⁵⁸

It appears the proposed a 6-8 page summary of the research design/methodology has not been disclosed to the public. The disclosed Michaud et al is 8 pages long (effectively 6 pages of content excluding the reference section), Section 2 which details the design and methodology,

is approximately one and half pages and provides few details.

Michaud et al (2012) lacks sufficient detail required to provide comprehensive and meaningful scientific peer review comments.

It is recommended that Michaud et al (2012) be expanded and include sufficient detail required to provide comprehensive and meaningful scientific peer review comments.

2.5.1 Perceived bias

Michaud et al (2012) contains suggestions of bias including:

- Understatement of evidence and references;
- Omission of important references;
- Descriptors and language not normally expected in a scientific study design proposal;
- Preconceived applicable noise limits for industrial wind turbines; and
- Other

Further details will be provided in a final peer review submission after the InterNoise 2012 conference.

2.5.2 Health measurements

Michaud et al (2012) does not sufficiently detail health outcomes measured by the Study.

Details will be provided in a final peer review submission after the InterNoise 2012 conference.

2.5.3 Confounding factors

The issues surrounding the adverse health effects of industrial wind turbines are complex.

From my years of research, contact with international researchers and those experiencing health problems, a number of confounding factors such as pre-existing medical conditions, turbine array, terrain and other have been identified which need to be captured and addressed.⁵⁹

Michaud et al (2012) lacks sufficient detail describing how the range of conditions and confounding factors will be addressed.

Further details will be provided in a final peer review submission after the InterNoise 2012 conference.

2.5.4 Timing and timelines

Michaud et al (2012) does not detail timing criteria for when the objective evaluation of sleep and health measures collection will be undertaken.

The rationale for selecting a period of 7 consecutive days for objective evaluation of sleep is not disclosed.

Timing and / or other factors can affect the findings of the Study resulting in a conclusion of no effect shown when the outcome is that statistical significance was not achieved.

Michaud et al (2012) lacks sufficient detail describing the timing criteria and rationale for when the objective evaluation of sleep and health measures collection will be undertaken.

Further details will be provided in a final peer review submission after the InterNoise 2012 conference.

2.5.5 Study Sample

Michaud et al (2012) does not detail the selection criteria of the Study Sample.

Michaud et al (2012) suggests the Study will be conducted at various locations in Canada.

Due to the variability of various provincial guidelines and regulations and other factors, more detail regarding selection criteria of the Study group is required.

Further details will be provided in a final peer review submission after the InterNoise 2012 conference.

2.5.6 Control Sample

Michaud et al (2012) does not detail the selection criteria of the Control Sample. i.e. "... in communities that are not situated near WT installations"⁶⁰ for purposes of comparison.

It is unclear if there the Study includes a Control Sample or if comparisons will be made to existing statistical data.

Industrial wind turbines are typically sited in quiet rural environments where the population density is low in comparison to that of urban populations. Other demographics in rural Canada may impact statistics.

Therefore, the Study and its Control Sample must be conducted in well matched Canadian rural locations comparable to those of the Study Sample.

Michaud et al (2012) lacks sufficient detail describing the selection criteria of the study Control Sample.

2.5.7 Prevalence

Clarification is required on the Study objectives and methodology related to determining prevalence.

Michaud et al (2012) has a number of statements about prevalence which suggest its value to research:

"Prevalence data on community reaction and self-reported health concerns would allow a better understanding of the relative magnitude of the public's concern about WTN. This could then be compared to the prevalence of other community health concerns and also to the prevalence of similar health concerns in communities that are not situated near WT installations."

"2.1 Research objectives

§ To investigate the prevalence of health effects or health indicators among a sample of Canadians exposed to WTN using both self-reported and objective health measures."

"Health Canada's ability to provide advice on noise impacts from WTs has been challenged by limited peer-reviewed scientific research related to both the character of WTN, in particular low frequency noise, and a lack of Canadian prevalence data on community complaints and self-reported health impacts from studies with rigorous methodological designs."

"The prevalence of chronic illness and symptoms collectively referred to as "WTN syndrome" are also included in the questionnaire." ⁶¹

However, the Science Advisory Board suggested:

“Don't waste time on measuring the prevalence of reported health effects from wind farms; assume that they are going to proliferate in the future. There doesn't seem to be value in trying to gauge the annoyance factors associated with aesthetics of the turbines, rather the important thing is to measure the health effects due to noise.”⁶²

It is unclear if or how “prevalence” will be evaluated in the Study.

Further clarification is required on the Study objectives and methodology related to determining prevalence.

2.5.8 Sound measurements

Michaud et al (2012) provides limited detail on the sound measurement methodology for the Study.

Details will be provided in a final peer review submission after the InterNoise 2012 conference.

2.5.9 Definitions - wind power plants and installations

Clarification is required on the Study definitions regarding wind power plants and installations.

Michaud et al (2012) does not clearly define what is meant by:

“The sample will consist of 2000 dwellings at setback distances ranging from less than 500 metres to greater than 5 kilometres from 8–12 wind turbine power plants.”⁶³

“The study will be conducted on a sample of 2000 dwellings randomly selected from those located near 8 to 12 WT installations in Canada.”⁶⁴

Clarification is needed as to what the total number of participants/volunteers will be, i.e. 2000 dwellings with one participant/volunteer or 2000 dwellings times the number of residents in the dwellings.

Michaud et al (2012) lacks sufficient detail defining the total participants/volunteers sample.

Michaud et al (2012) does not clearly define what is meant by “... from 8-12 wind turbine power plants.”

Michaud et al (2012) needs to clearly define what is meant by “power plants” or “installations”. Does this refer to a wind energy project of multiple turbines or does it refer to a turbine?

Michaud et al (2012) needs to clearly define what is meant by “near ”.

Michaud et al (2012) does not provide a rationale for selecting “setback distances ... greater than 5 kilometres from 8–12 wind turbine power plants.” Michaud et al (2012) does not define an upper limit for the selection setback distances.

Further details will be provided in a final peer review submission after the InterNoise 2012 conference.

2.6 Composition of the Study Team

The current composition of Health Canada's Wind Turbine Noise and Health Study Research Design Working Group Members/Collaborators/Advisors (Study Team) appears to include a total of 26 members:⁶⁵

- § 11 - Health Canada;
- § 2 – Natural Resources Canada;
- § 4 – Stats Canada;
- § 1 – Canadian Transportation Agency
- § 3 – Medical physicians; and
- § 5 – External and other

Health Canada reports “The composition of the working group may change in accordance with the needs of the research.”⁶⁶

The Study Team appears to be a moving target.

For example Health Canada correspondence received April 13, 2012 defined the Study Team as:

“The study is being overseen by a committee of more than 22 individuals with expertise in areas including public health, epidemiology, statistics, acoustics, medicine and health effects of noise. External advisors on the study have been assembled from various sectors including academic and international jurisdictions.”⁶⁷

A Health Canada ATIP document listed 24 members on the Study Team as of April 30, 2012.⁶⁸

A comparison of the current Study Team list to that of March 1 2012 indicates some Study Team members have come and gone. The role and influence on the Study of previously listed

Study Team members is unclear. Perceived bias and conflicts of previous Study Team members requires clarification.

I have also inquired about a pilot phase which has been conducted for the Study questionnaire. The composition of the Study Team at the time of the pilot and the criteria established for its conduct is unclear.⁶⁹

2.6.1 Additional clarifications - Study Team

Clarification is required about the composition of the Study Team, past and present, including their roles, potential conflicts, credentials, expertise and other.

I have requested clarifications about:⁷⁰

- § Study Team roles, credentials and expertise on the subject of industrial wind turbines;
- § The selection methodology of the Study Team members (i.e. by application or invitation);
- § The criteria used to determine who would be on the Study Team;
- § Full disclosure of current and former affiliations of each Study Team member including consultants and advisors; and
- § Clarification whether the Study will be conducted through an academic institution and if so, which one.

I have not received clarifications on these points.

2.6.2 Perception of potential conflicts

Potential conflicts may be an issue with the Study.

Some of the perceived conflicts are identified below and are being investigated.

Further details will be provided in a final peer review submission after the InterNoise 2012 conference.

2.6.2.1 Health Canada

Potential conflicts associated with some Health Canada Study Team members may be an issue of the Study.

Michaud et al (2012) states:

“Health Canada's ability to provide advice on noise impacts from WTs has been challenged by limited peer-reviewed scientific research related to both the character of WTN, in particular low frequency noise, and a lack of Canadian prevalence data on community complaints and self-reported health impacts from studies with rigorous methodological designs.”⁷¹

However, Health Canada has provided “advice on noise impacts” from industrial wind turbines for a number of years through:

- § Correspondence and requests for information;
- § Requests for assistance from those reporting adverse health effects;
- § Federal Environmental Assessments; and
- § Other

For example the Study Principle Investigator, Dr. Michaud, and Study Team member Stephen Keith have published references that propose wind turbine noise levels of 45 dBA.^{72, 73, 74} These references have been distributed to the general public.⁷⁵

In a Health Canada response for a wind energy project Study Team member Allison Denning indicates Health Canada's acceptable threshold value is 45 dBA.⁷⁶

Since 2009, I have advised Health Canada, at meetings and through correspondence^{77, 78, 79, 80, 81, 82, 83} that Health Canada has provided, and is providing, advice and information to the public. Some of this advice refers to the above published references which support 45dBA. This advice has been distributed despite Health Canada's challenged ability to provide advice on noise impacts from industrial wind turbines.

I have advised Health Canada of issues with the above published references. To my knowledge these issues have not been addressed.

See section *2.6.2.6 Comments - perceived conflicts*

2.6.2.2 Health Canada - FPT Guidelines for Wind Turbine Noise

In 2010, Health Canada proposed the formation of a Federal-Provincial-Territorial (FPT) working group to contribute to the development of national guidelines on wind turbine noise.⁸⁴

Health Canada issued invitations to Federal-Provincial-Territorial members for the “Establishment of National Guidelines for Wind Turbine Noise”. The first meeting was held June

28, 2010.⁸⁵

Health Canada members of the FPT working group included:

- § Dr. Stephen Bly
- § Ms Tara Bower (Study Team member)
- § Mr. D'Arcy McGuire (Study Team member)⁸⁶

Health Canada personnel that contributed to, and / or participated in meetings of the FPT working group and / or other meetings included:

- § Dr. David Michaud (Principle Investigator of the Study)
- § Dr. Stephen Keith (Study Team member)⁸⁷

I have reviewed approximately 800 pages of ATIP documents related to the national guidelines. Portions of the ATIP documents of the "Interim FPT Guidelines for Wind Turbine Noise" are censored including discussions on:

- § "4. CHARACTERIZATION OF NOISE FROM WIND TURBINES
- § 5. RECOMMENDED SOUND LEVEL LIMITS FOR CANADA
- § 6. LOW FREQUENCY NOISE CONSIDERATIONS
- § 7. SETBACK DISTANCES
- § 8. NOISE ASSESSMENT REPORT"⁸⁸

A request to obtain access to the censored sections has been made.

ATIP documents currently available suggest some members of the Federal-Provincial-Territorial working group supported wind turbine noise limits of 45dBA.⁸⁹ Other members appear to have supported Ontario's existing wind turbine noise guidelines.

I have advised Health Canada there were issues regarding the draft national guidelines.^{90, 91, 92}

In February 2012, Health Canada advised that the draft national guidelines on wind turbine noise would not be released:

"... all members of this working group concluded that it would not be possible to complete their work at this time, as agreement was not reached by all members on the overall content of the draft voluntary Guidelines."⁹³

I will continue follow up on requests to obtain access to the censored sections of the ATIP documents.

See section *2.6.2.6 Comments - perceived conflicts*

2.6.2.3 Application of WHO noise guidelines to wind turbines

The authors of Michaud et al (2012) appear to have a preconceived bias that the WHO guideline of yearly averaged night time outdoor sound levels at the residence 40 dBA is applicable to industrial wind turbine noise.

Michaud et al (2012) states:

“Considering the scientific evidence on the lowest observed adverse effect level for sleep disturbance, the WHO identified an average annual outdoor nighttime sound level of 40 dBA as a recommended limit to protect public health from night noise, including that of the most vulnerable groups such as children, the chronically ill, and the elderly. Although the limits in the WHO's are based on transportation noise sources, current science shows that the same levels are applicable to noise emitted from WTs.”⁹⁴

This suggests the authors of Michaud et al (2012) have a preconceived bias that 40 dBA is applicable to industrial wind turbine noise. This appears to conflict with the Michaud et al (2012) statement “Health Canada's ability to provide advice on noise impacts from WTs has been challenged by limited peer-reviewed scientific research related to both the character of WTN, in particular low frequency noise...”⁹⁵

Health Canada representatives including Dr. Michaud have been advised that the WHO guidelines are not based on industrial wind turbine noise research.⁹⁶ Peer reviewed research has shown that industrial wind turbine noise is perceived to be more annoying than equally loud road, air and rail (“transportation noise sources”).⁹⁷

As well, the above representatives have been advised that references suggest 30 to 32 dBA.⁹⁸

“... the setback distances should be calculated using a sound level limit of 30 to 32 dBA at the receptor, instead of the 40 dBA sound level limit.”⁹⁹

“... a sound level of LAeq 32 dB outside the residence...”¹⁰⁰

Observations:

- § ATIP documents regarding the FPT national guidelines suggest some have a preconceived bias that 45 dBA and perhaps more is an acceptable limit.¹⁰¹
- § ATIP documents regarding the FPT national guidelines suggest some have a

- preconceived bias to support Ontario's wind turbine guidelines.
- § There are Study Team representatives who were also members of the national guidelines working group.¹⁰²
- § References authored by the Study Principal Investigator and / or other Study Team members support a 45 dBA limit and do not appear to be retracted.
- § Despite acknowledgements that the World Health Organisation's guideline of 40 dBA is not based on industrial wind turbine research, this continues to be identified by Study Team members as applicable for industrial wind turbine noise limits.

Study Team members with preconceived bias for wind turbine noise exposure limits should not be participating on the Study Team.

See section *2.6.2.6 Comments - perceived conflicts*

2.6.2.4 Natural Resources Canada

The Study Team includes representatives from Natural Resources Canada. Potential conflicts may be an issue with the Study.

Michaud et al (2012) notes:

- § "Since the announcement of the Government of Canada's renewable energy initiatives, there has been a steady rise in the number of WT installations across Canada."¹⁰³

Natural Resources Canada has policies and / or programs which promote wind energy. For example:

- § "ecoENERGY for Renewable Power will invest \$1.48 billion to increase Canada's supply of clean electricity from renewable sources such as wind, biomass, low-impact hydro, geothermal, solar photovoltaic and ocean energy."¹⁰⁴
- § "EDMONTON – The Honourable Gary Lunn, Minister of Natural Resources, has announced that the Chin Chute Wind Power Project will receive up to \$9.2 million in funding, over ten years, under the ecoENERGY for Renewable Power initiative. Minister Lunn made the announcement at the Rural Matters National Symposium in Edmonton."¹⁰⁵
- § It was reported that a \$59 million grant for the Wolfe Island ecoPOWER Centre owned by Canadian Hydro Developments was provided through the ecoFund.¹⁰⁶

Natural Resources Canada appears to have long term commitments to wind energy developers:

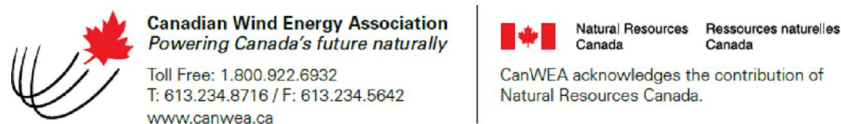
§ "The ecoENERGY for Renewable Power program was launched in April 2007 to encourage the generation of electricity from renewable energy sources such as wind, low-impact hydro, biomass, photovoltaic and geothermal energy. Although no new contribution agreements will be signed after March 31, 2011, many projects with contribution agreements will continue to receive payments as outlined in contribution agreements and up to March 31, 2021."¹⁰⁷

In 2009, colleagues and I had scheduled a meeting with Natural Resources Canada to discuss health effects reported by some individuals at an Ontario wind energy project. Without our consent Natural Resources Canada contacted the developer of the wind energy project and advised them of our scheduled meeting:

"... In advance of your meeting with [name deleted] we have contacted the proponents of the [name deleted] wind farm to solicit information that might be helpful or pertinent to the conversation. The proponents have in turn requested the names of the meeting attendees. While I'm sure you've been in communication with them regarding your concerns, we still require your consent to do so. Do we have your and [name deleted] consent to provide your names to them?"¹⁰⁸

In 2009¹⁰⁹ and 2011¹¹⁰ colleagues and I met with representatives from Natural Resources Canada and advised that:

- § Ontario residents were reporting adverse health effects and some had effectively abandoned their homes. This was occurring at a wind energy projects eligible for federal subsidies;
- § There were issues with the wind turbine Environmental Assessments process; and
- § There were issues with Canadian Wind Energy Fact Sheets which contained the Natural Resources Canada logo and "CanWEA acknowledges the contribution of Natural Resources Canada".



Natural Resources Canada does not appear to operate at arm's length from wind energy projects which may be included in, or excluded from, the Study Sample.

See section *2.6.2.6 Comments - perceived conflicts*

2.6.2.5 Who's missing from the Study team?

There are researchers that have conducted field work and other research relevant to industrial wind turbines, noise, and health effects.

Research has been conducted internationally in Europe, Australia, New Zealand, the United States and Canada.

Some of this research has been published in peer reviewed journals.

These international researchers have expertise which would contribute to the Study. Inclusion of researchers with subject expertise would strengthen the Study and avoid scientific and justifiable comments that could preclude the value of the research.

As well, it is essential that individuals who have reported adverse health effects be represented on the Study Team.

The composition of the Study team must be revised to include an equal balance of independent researchers and subject experts plus representation from the community drawn from those reporting adverse health effects.

2.6.2.6 Comments - perceived conflicts

The above examples of Health Canada and Natural Resources Canada participation and interest in wind energy project development indicate perceived conflicts.

Perceived conflicts may not be limited to Health Canada and Natural Resources Canada members.

Other listed members of the Study Team appear to have current or past associations with organizations which have policies to support or advocate for the development of wind energy.

As requested, it is required that Health Canada provide details about the Study Team member roles, credentials and expertise on the subject of industrial wind turbines; the selection methodology of the Study Team members (i.e. by application or invitation); the criteria used to determine who would be on the Study Team; full disclosure of current and former affiliations of each Study Team member including consultants and advisors; and clarification whether the

Study will be conducted through an academic institution and if so, which one.

Health Canada Team members must be replaced with members that are arms length without potential conflict. Natural Resources Canada personnel should not be participating on the Study due to perceived or actual conflicts regarding Policy and Contractual arrangements with industry proponents.

2.7 Ethics

The issues surrounding the adverse health effects of industrial wind turbines are complex.

Ethical issues require clarification which may include legal advice.

I have requested clarification about whether the Study has undergone ethics approval and if so, who undertook this. If not, who will do so.¹¹¹

The *CONFIDENTIAL Draft Proposal Researching Human Health and Industrial Wind Turbines: A Dose Response Relationship, Prepared by Carmen Krogh, May 4, 2012* was provided to Health Canada which considers some ethical issues:

"The proposed study on industrial wind turbines is analogous with early research for drug products e.g. clinical trials, which have explicit criteria that protect investigational subjects while considering dosage levels, side effects, ethics and other parameters:

"Good Clinical Practice (GCP) is an international ethical and scientific quality standard for designing, conducting, recording and reporting trials that involve the participation of human subjects. Compliance with this standard provides public assurance that the rights, safety and well-being of trial subjects are protected, consistent with the principles that have their origin in the Declaration of Helsinki, and that the clinical trial data are credible."¹¹²

Despite being challenged Health Canada has provided advice on wind turbine noise for several years. The Federal government is subsidizing wind energy projects which ultimately expose non-consenting individuals to industrial wind turbines. Now Health Canada may be studying these non-consenting individuals.

Subjecting non-consenting individuals to an exposure which is known, or suspected to have adverse health effects and then studying these individuals raises ethical issues.

Participants who host industrial wind turbines typically "agree" and/or are compensated to accept noise, nuisance and / or other effects through a contractual arrangement.^{113, 114} Non

participants typically have not agreed, nor are compensated for noise, nuisance and / or other effects.

Non-consenting individuals will be, or likely to be, exposed in the Study areas resulting in a living laboratory.

There are other ethical issues. For example, the Science Advisory Board suggested:

"11. Health Canada's Policy and Research Approach to Wind Turbines

... A study of a community post wind turbine development could assess habituation - i.e. whether after many years the annoyance level is reduced as one habituates to the noise levels. Are there any pre-wind farm communities for which HC could gather baseline data? Statistics Canada will provide much of the data that will be used in the study."¹¹⁵

It unclear if the Study includes the suggested objective to "assess habituation". The suggestion of a study conducted on non-consenting individuals and to "assess habituation" "after many years" of annoyance raises ethics issues.

There are other potential ethics issues which I will comment on after obtaining further clarification.

To summarise, this Preliminary Submission documents some of the issues which must be addressed before it the Study proceeds.

I am seeking clarifications and intend to prepare and submit a final comprehensive peer review document after the InterNoise 2012 conference.

Respectfully submitted,

Carmen Krogh, BScPharm
Ontario, Canada

Copy

The Right Honourable Stephen Harper
Prime Minister of Canada, Office of the Prime Minister
80 Wellington Street, Ottawa,
Ontario, Canada, K1A 0A2
pm@pm.gc.ca

The Honourable Leona Aglukkaq
Health Canada, Brooke Claxton Building
Tunney's Pasture
Postal Locator, 0906C
Ottawa, Ontario, K1A 0K9
minister_ministre@hc-sc.gc.ca

3 Attachment:

- Draft Proposal Researching Human Health and Industrial Wind Turbines: A Dose Response Relationship Prepared by Carmen Krogh, May 4, 2012

4 Appendix

Bio: Carmen Krogh, BScPharm

Carmen Krogh is a retired pharmacist with more than 40 years of experience as a health professional. Her career includes holding senior positions at: a major teaching hospital; a drug information specialist; a professional association and Health Canada (PMRA). She was the 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 on prescription medication in Canada.

Krogh is recognized in Ontario, Canada and internationally for her research, peer-reviewed articles, public information sessions and other educational activities regarding adverse health effects and industrial wind turbines (IWTs). Carmen Krogh offers her time and expertise to individuals, community groups, and to the public, private, and non-profit sectors, industry, government officials and others. Her research is grounded in the real-life experiences of people who live amongst IWTs in Ontario and other jurisdictions. Her goal is evidence-based siting of IWTs that protects human health. Her research and educational efforts are self-funded.

Results of her work over the past three years include:

- A number of peer-reviewed scientific articles on IWTs and adverse health effects; occupational risks; social - community; and environmental impacts;
- § With colleagues, a self-reporting health survey WindVOiCe (Wind Vigilance for Ontario Communities) for people reporting adverse health effects from IWTs, published in a peer reviewed journal and cited in the British Medical Journal;

- § Co-founder of the *Society for Wind Vigilance*, an international federation of physicians, acousticians, epidemiologists, and others encouraging research to determine guidelines that protect human health;
- Presentations in Canada and the United States including the Federal *Standing Senate Committee on Energy the Environment and Natural Resources*.

5 Publications (industrial wind turbines)

Industrial Wind Turbine Development and Loss of Social Justice? Carmen M.E. Krogh
Bulletin of Science Technology & Society 2011 31: 321, DOI: 10.1177/0270467611412550,
<http://bst.sagepub.com/content/31/4/321>

WindVOiCe, a Self-Reporting Survey: Adverse Health Effects, Industrial Wind Turbines, and the Need for Vigilance Monitoring Carmen M.E. Krogh, Lorrie Gillis, Nicholas Kouwen, and Jeffery Aramini Bulletin of Science Technology & Society 2011 31: 334, DOI: 10.1177/0270467611412551, <http://bst.sagepub.com/content/31/4/334>

Literature Reviews on Wind Turbines and Health : Are They Enough? Brett Horner, Roy D. Jeffery and Carmen M. E. Krogh Bulletin of Science Technology & Society 2011 31: 399. DOI: 10.1177/0270467611421849 <http://bst.sagepub.com/content/31/5/399>

Occupational Health and Industrial Wind Turbines: A Case Study Robert W. Rand, Stephen E. Ambrose, and Carmen M. E. Krogh Bulletin of Science Technology & Society 2011 31: 359 DOI: 10.1177/0270467611417849 <http://bst.sagepub.com/content/31/5/359>

Birds and Bird Habitat: What are the risks from Industrial Wind Turbine Exposure? Terry Sprague, M. Elizabeth Harrington, and Carmen M. E. Krogh DOI: 10.1177/0270467611417844 <http://bst.sagepub.com/content/31/5/377>

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