Subject: Application for Investigation
Section 115, Nova Scotia Environment Act

Name of Applicant: Eco Awareness Society

Address of Applicant: 408 Browns Mountain Road, Bailey's Brook, Nova Scotia

Date of Applications: March 31, 2009

Alleged Offence: Providing false or misleading information pursuant to a requirement under this Act to provide information [Environment Act, subsection 158(b)].

Alleged Party: Shear Wind Inc.

Statement of Evidence:

The attached document "Shear Wind Environmental Assessment Addendum Health Section Evidence of False and Misleading Statements" details six alleged offences and their supporting evidence. Eight additional documents are attached as material referenced by the first document.

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Signature of person submitting application

Kristen M. Overmyer
President, Eco Awareness Society

Shear Wind Environmental Assessment Addendum Health Section

Evidence of False and Misleading Statements

Eco Awareness Society
March 31, 2009

Summary

The following summarizes six alleged counts of false and misleading statements in the health section of Shear Wind's addendum to their Environmental Assessment for the Glen Dhu Wind Power project:

- 1.5 km distance from wind facility at which medical symptoms exhibited by residents falsely reported as 457 meters (addendum page 16)
- World Health Organization noise levels of 30 db(A) or lower for avoiding sleep disturbance falsely reported as 55 and 45 db(A) (addendum page 13)
- Typical rural background noise levels of 20 db(A) falsely reported as 40 db(A) (addendum page 16)
- Referenced literature stating further noise research recommended falsely reported as no further research justified (addendum page 13)
- 1,700 feet ice throw distance falsely reported as 500 feet (addendum page 15)
- Apparently plagiarized material falsely represents Shear Wind author as expert (addendum multiple pages)

The allegedly offending material was authored by a consultant acting as agent for the accused Shear Wind Inc. However, Section 163 of the Nova Scotia Environment Act states,

> "163 In any prosecution for an offence under this Act, it is sufficient proof of the offence to establish that it was committed by an employee or agent of the accused, whether or not the employee or agent is identified or has been prosecuted for the offence, unless the accused establishes that the offence was committed without the knowledge or consent of the accused. *1994-95, c. 1, s. 163."*

Details of these six offences were provided January 14th, 2009 as public input to Shear Wind's addendum submission and Shear Wind has since stated that they have read all public input. Consequently, Shear Wind has knowledge of the offences. The Nova Scotia Environment website for the Glen Dhu Wind Farm shows no indication of any action by Shear Wind to withdraw or correct the material nor has Shear Wind made any public statements that seek to correct the information. The offending material remains as is with Shear Wind's full knowledge and consent and, in our opinion, this fact is a tacit endorsement of the material.

Evidence for these alleged six offences is provided in the remainder of this document. Red text highlights the essential material that illustrates the difference between what Shear Wind states and what the technical literature actually says.

1.5 km distance from wind facility at which medical symptoms exhibited by residents falsely reported as less than 500 meters

In the last paragraph of page 15, Shear Wind's addendum lists the following medical symptoms experienced by residents living in the proximity of wind farms and attributes the material to Dr. Pierpont's website.

> "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 pulsations or quivering which arise while awake or asleep"

This material is from the abstract to Dr. Nina Pierpont's upcoming book *Wind Turbine Syndrome: A Report on a Natural Experiment* [Pierpont 2008] (see attached) and demonstrates that Shear Wind had access to her abstract. In the same abstract, Dr. Pierpont describes the range of distances the residents in her study lived from wind farms stating,

> "The study is a case series of 10 affected families, with 38 members age 0-75, living 305 m to 1.5 km (1000 to 4900 ft) from wind turbines erected since 2004."

However, regarding the same case study distances, Shear Wind states in paragraph 1 on page 16,

> "The individuals or "subjects" or her book are stated to live between 1000 to 1500 feet (304 to 457 metres) from wind turbine facilities."

Shear Wind reports the minimum distance accurately as 1000 feet demonstrating that they had access to the correct information. However, Shear Wind misrepresents the maximum distance from a wind turbine facility as only 457 meters instead of 1.5 km; this is more than three times closer than what the abstract actually states.

In addition to being false, this statement is misleading. According to page 6 of Shear Wind's addendum, there are seven homes closer than 1.5 km to turbines in Shear Wind's Glen Dhu project. Shear Wind's representing the maximum distance in Dr. Pierpont's health study to be 457 meters instead of 1.5 km misleads the reader into believing that these homes are well outside the range of concern and therefore protected when, in fact, these homes are well within the range of concern and will be exposed to the same conditions that produced the deleterious symptoms that were reported by Dr. Pierpont's research.

World Health Organization noise levels of 30 db(A) or lower for avoiding sleep disturbance falsely reported as 55 and 45 db(A)

In paragraph 1 on page 13 of their addendum, Shear Wind cites World Health Organization (WHO) guidelines for outdoor noise levels stating,

> "The World Health Organization (2007) has developed guidelines for avoiding adverse effects from noise in readily audible range (greater than 20 Hertz) in the environment around houses. The guidance is based on measurements designed to best represent noise in the audible range. They recommend that outdoor daytime decibel levels should be 55 db(A) or less and night time outside levels should be 45 db(A) or less. At noise levels greater than these, effects such as sleep disturbance, inability to hear conversations completely and annoyance can be expected in some individuals."

These decibel values that Shear Wind mentions appear (since Shear Wind's WHO reference is inaccurate) to be coming from the World Health Organizations "Guidelines for Community Noise" Edited by Birgitta Berglund, et al., 1999, which states in section "4.2.7. Annoyance responses" on page 60,

> "During the daytime, few people are seriously annoyed by activities with LAeq levels below 55 dB; or moderately annoyed with LAeq levels below 50 dB. Sound pressure levels during the evening and night should be 5–10 dB lower than during the day."

However, as described in WHO section the 4.1Guideline Values Introduction on page 55,

> "In the following, guideline values are summarized with regard to specific environments and effects"

In other words, the guidelines are organized by section. Shear Wind's misrepresents the literature by including material from the specific environments in section "4.2.1. Interference with communication" and section "4.2.3. Sleep disturbance effects" with the section "4.2.7. Annoyance responses". These former two sections have different guidelines, which Shear Wind has omitted. Shear Wind's citing WHO as stating that levels as high as 55 db(A) during the day and 45 db(A) during the night will not interfere with sleep is false. As evidence, in section "4.2.3. Sleep disturbance effects", the WHO document actually reads,

> "Where noise is continuous, the equivalent sound pressure level should not exceed 30 dBA indoors, if negative effects on sleep are to be avoided. When the noise is composed of a large proportion of low-frequency sounds a still lower guideline value is recommended, because low-frequency noise (e.g. from ventilation systems) can disturb rest and sleep even at low sound pressure levels."

Given that each 10 db(A) of difference represents a doubling of perceived loudness, 50 db(A) is perceived to be 4 times louder than 30 db(A).

In addition to being false, Shear Wind's statement misleads the reader into believing that levels of 45 to 55 db(A) on Shear Wind's sound analysis maps will present no sleep disturbance problems when in fact such levels do.

Typical rural background noise levels of 20 db(A) falsely reported as 40 db(A)

On page 16, section 3.2.1 of their addendum, Shear Wind claims,

> "Local non-participant residences are located at distances greater than 1.4 km. At these distances, audible sound levels attributed to the wind turbines are below those levels which are considered to be normal background sound levels (40 db(A)) (see Figure 2.3)."

Shear Wind appears to be obtaining this number from paragraph 1 on page 4 of the Ohio Department of Health [Health 2008] source. In the last paragraph on page 12 in section 3.1.1 Audio Effects (background), Shear Wind has a sentence (no quotes or attribution) that is identical to one from this source which reads,

> "but slightly higher than night-time ambient background noise levels in the countryside (20-40 db(A))"

This is a broad range. Given that each increase of 10 db(A) approximates a subjective doubling of noise level, 40 db(A) is subjectively 4 times louder than 20 db(A). Shear Wind claims the higher level. However they provide no study, data or even rationale that would substantiate this value as being appropriate for the rural area surrounding the proposed Glen Dhu wind power plant. In fact, readily available studies cite much lower background values. On page 7, Figure 1 of Kamperman 2008, Kamperman et al., show background sound spectra data measured in rural Michigan near Ubly on a June evening (as described on pate 6). From their figure, the 3 hour 20 minute cumulative equivalent, A-weighted background value is approximately 17 db(A). Like Ubly Michigan, the Glen Dhu project area is far removed from highways, airports, and any source of industrial noise. Given that,

- the original background noise study that Shear Wind submitted in the original Environmental Assessment registration was fatally flawed and therefore irrelevant
- the subsequent addendum fails to repeat the background noise test
- the readily available literature reports rural levels lower than 20 db(A) for similar areas
- this author has measured background levels as low as 32 db(A) on a slightly breezy afternoon (perceptibly louder than a quiet evening) within 1.5 km of the project area

Shear Wind has no basis for claiming the background levels in the countryside surrounding their wind power plant to be 40 db(A) and such a claim is at best a guess and must be considered undependable until a credible background noise study is conducted and demonstrates otherwise.

The 40 db(A) background noise claim is also misleading. The wind industry postulates that wind turbine noise levels at background noise levels will be inaudible or nearly so. Consequently, the reader is led to believe that wind turbine noise levels below 40 db(A) on Shear Wind's noise analysis maps would be inaudible. In fact, Shear Wind does not bother to report levels below 35 db(A) in these maps. In actuality, noise levels as low as 20 db(A) (approximately 4 times quieter) could possibly be discernable.

Referenced literature stating further noise research recommended falsely reported as no further research justified

On page 13, paragraph 2 of Shear Wind's addendum, the following sentence misrepresents the sited literature.

> "Moorehouse et al. (2007) suggest that in the context of the issue of industrial noise, noise from wind farms is very low in incidence rate and in relation to other noise problems makes further research difficult to justify."

The cited literature "Research into Aerodynamic Modulation of Wind Turbine Noise: Final Report. Department for Business",by Moorehouse, A, M. Hayes, S. von Hernerbein, B. Piper and M. Adams, University of Salford, Manchester, United Kingdom, 2007, [Moorehouse 2007] on page 4 actually reads,

> "The low incidence of AM and the low numbers of people adversely affected make it difficult to justify further research funding in preference to other more widespread noise issues. On the other hand, since AM cannot be fully predicted at present, and its causes are not fully understood we consider that it might be prudent to carry out further research to improve understanding in this area."

Firstly, Moorehouse, et al. were speaking specifically about AM (amplitude modulated) noise not wind power plant noise in general. Secondly, they continue by saying "it might be prudent to carry out further research". This is contrary to Shear Wind's statement that "further research is difficult to justify". Regarding the comparison to "industrial noise" Moorehouse, et. al. actually state beginning on page 17,

> "It is clear that complaints about noise from windfarms make up an extremely small proportion of the total noise complaints: complaints about industrial noise exceed those from windfarms by around three orders of magnitude, and complaints about noise in general exceed those from windfarms by between four and five orders of magnitude. We would stress that this does not imply that individual complaints about windfarms are less important than about other noise sources, but rather that the scale of the problem in absolute terms is significantly smaller than for other categories of noise.
>
> Clearly a major factor in the small number of complaints relating to windfarms is the relatively small number of sites compared to, say, industrial sites in general. It would be interesting to make a comparison in terms of the proportion of sites of a particular type that attract complaints. However, whilst we know from this study that about one in five windfarms attracts complaints at some point, we do not have comparable figures for other types of site and we are not therefore able to compare in relative terms."

That is, they are not able to make a comparison to industrial sites in relative terms. Consequently, Shear Wind's claim that Moorehouse et. al. suggest that "in the context of the issue of industrial noise" further research is difficult to justify, is false. This statement is also misleading in that it leads the reader to believe that researchers, such as Moorehouse, et. al. do not consider wind turbine noise a serious enough matter to merit further research.

1,700 feet ice throw distance falsely reported as 500 feet

On page 15, in Section 3.1.3 Physical Effects, Shear Wind states,

> "Ice throw occurs when fragments of accumulating ice are thrown off an operating turbine due to melting combined with aerodynamic and centrifugal forces."

Except for the omission of the word "and" after "Ice throw", this sentence is identical to part of a sentence on page 8 of a report issued by the Ohio Department of Health [Health 2008]. However, in the ODH report, the sentence continues as follows,

> "… Ice Throw and occurs when fragments of accumulating ice are thrown off of an operating turbine due to melting combined with aerodynamic and centrifugal forces with chunks of ice allegedly tossed distances up to 1,700 ft away from the turbine site (Save Western NY website, 2007).

In contrast, Shear Wind ends the Physical Effects section with the following,

> "Ice throw appears to be the more severe hazard for the public. A distance of 150 m (500 feet) appears to be considered a "safe distance" based on operating experience."

Shear Wind has apparently copied from the ODH material but falsely reported the ice throw distance as 500 feet; this is more than three times less than the source's stated value of 1,700 feet. The 1,700 feet value is actually in close agreement with a kinematic analysis performed by Professor Terry Matilsky, Department of Physics and Astronomy, Rutgers University [Matilsky]. In his introduction he states,

> "The bottom line is that ice, debris, or anything breaking off the wind turbine blades (including the blades themselves) can impact a point almost 1700 feet away from the base of the turbine."

In addition to falsely quoting the cited literature, the 500 feet ice throw statement misleads the reader into believing that ice throw is not a significant issue for the Glen Dhu project. According to Shear Wind's Figure 2.1, there are some 8 wind turbines within approximately 150 metres (493 feet) of non-participating properties. The falsely reported 500 foot ice throw would just reach adjoining properties. However, the 1,700 foot ice throw from the literature extends the zone of possible impact more than 1,200 feet into adjoining non-participating properties. This puts at risk hikers, campers, hunters, snowmobile riders, etc. on these properties.

Apparently plagiarized material falsely represents Shear Wind author as expert

Large blocks of text (100 words and more) in Shear Wind's health section are essentially identical to text in a report authored by the Ohio Department of Health (ODH) [Health 2008]. Paragraphs and phrases totaling more than 750 words appear to have been copied. While the ODH report is listed in Shear Wind's bibliography for the Health section, there are neither quotation marks nor any attributions to the original work in the actual text. Consequently, Shear Wind gives the reader no indication that the material is not of their authorship.

The Merriam-Webster Dictionary defines "plagiarize" as "to steal and pass off (the ideas or words of another) as one's own: use (another's production) without crediting the source." While the copied statements themselves may not be false, to plagiarize is to falsely represent the author as one who has the knowledge and understanding to have written the words themselves and as such misleads the reader into believing the author has weight and credibility which they, in fact, do not merit. From www.plagiarism.org, "In other words, plagiarism is an act of fraud."

The attached document "Shear Wind Addendum, Health Section, Annotated Document" [Overmyer 2009], details the apparently copied material by highlighting it. This document was prepared by converting the original Shear Wind health section PDF document to a Word document and then manually comparing its contents against the Ohio Department of Health document. Every effort was made to be accurate. Only the major instances of identical material are highlighted; others may exist. In some places the author adds or alters the apparently copied text. For example, in some places they change the reference notation to be consistent with their bibliography and in other places they introduce metric units equivalents for distances given in English units.

Both the original Shear Wind Health Section and ODH report are attached so that the reader may readily make his or her own comparison. The electronic PDF version of the Shear Wind Health Section "glen.dhu.wind.farm.Addendum.Section03.Human.Health.Assessment.pdf" can be found on the Environmental Assessment web site at http://www.gov.ns.ca/nse/ea/glen.dhu.wind.farm.asp The electronic version of the ODH report can be obtained on the Internet at http://www.odh.ohio.gov/ASSETS/C43A4CD6C24B4F8493CB32D525FB7C27/Wind%20Turbine%20SUMMARY%20REPORT.pdf By obtaining the original electronic versions, the reader may more conveniently compared the two documents using the word search features of a PDF viewing application.

Works Cited

Berglund, Birgitta, Lindvall, Thomas, and Schwela, Dietrich H. "Guidelines for Community Noise", World Health Organization, Geneva. April 1999. *

Health Assessment Section Bureau of Environmental Health Ohio Department of Health. "Summary Report Literature Search on the Potential Health Impacts Associated with Wind-to-Energy Turbine Operations". March, 2008

Kamperman, George W., P.E. and James, Richard R. "The 'How To' Guide to Siting Wind Turbines to Prevent Health Risks from Sound". October 28, 2008. *

Matilski, Professor Terry, "PART I---basic kinematics", Department of Physics and Astronomy, Rutgers University

Moorehouse, A, M. Hayes, S. von Hernerbein, B. Piper and M. Adams. "Research into Aerodynamic Modulation of Wind Turbine Noise: Final Report. Department for Business", University of Salford, Manchester, United Kingdom. July 2007 *

Overmyer, Kristen. "Shear Wind Addendum, Health Section, Annotated Document". March 31, 2009.

Pierpont, Nina, MD, PhD. *Wind Turbine Syndrome: A Report on a Natural Experiment*. Abstract (to yet to be published book). August 9, 2008.

Shear Wind, Inc. "Addendum to Glen Dhu Environmental Assessment and Registration Document, Human Health Assessment Section 3.0". November 27, 2008

* Only referenced pages provided.