

## Tribunal rules in favour of Dufferin Wind

The Environmental Review Tribunal has upheld ministerial approvals of the 100-MW Dufferin Wind Power (DWP) wind farm in Melancthon.

The approvals include not only the turbines but also the 230 kv transmission line along the rail corridor. DWP also has Ontario Energy Board ?leave to construct? the power line but lacks agreement with Dufferin County and other property owners for necessary easements, and is seeking permission to expropriate.

In upholding environmental approvals, the tribunal essentially rejected claims of adverse effects on human and animal health and of irreparable damage to the environment.

?The Tribunal finds that the Appellants have not established that engaging in the Project as approved will cause serious and irreversible harm to plant life, animal life or the natural environment.

?The Tribunal finds that the Appellants have not established that engaging in the Project as approved will cause serious harm to human health.

?The Tribunal finds that the Appellants have not established, on the facts of this case, that the renewable energy approval process violated the Appellants' right to security of the person under section 7 of the Charter,? reads the decision.

The case is listed as Bovaird v. Director, Number 13-070 to 13-075. It will be posted on the ERT website although it hadn't been this week.

The Director is Vic Schroter of the Ministry of Environment. He had issued DWP's Renewable Energy Approval on June 10, 2013. Roselyn Bovaird, CORE (Conserve Our Rural Environment), VanDerZagg (farms), John Maguire and Kathleen Kurtin appealed on the basis of irreversible harm to the environment and animal health on June 25, as did Dennis Sanford on the basis of serious harm to human health.

Then, on July 14, Mr. Sanford was joined by the other parties in raising the Section 7 challenge.

The ERT issued its 127-page decision on the morning of Monday, Dec. 23 following 26 days of evidence.

The decision cites three main issues, but the hearing actually dealt with five ?sub-issues? at great lengths: effects on soil and productive farm land generally, especially Honeywood loam; water resources; the Niagara Escarpment Plan; and bats and other animals.

The decision may be subject to appeal but Dennis Sanford said in a phone interview Tuesday that, because of the holidays, it might be difficult to meet the 15-day deadline for an appeal.

Mr. Sanford, represented by anti-wind lawyer Eric Gillespie, heads Wind Resistance Melancthon. He had not spoken with his committee or lawyer at the time of the interview.

Noting that there has been only one instance of the ERT over-ruling a wind turbine approval, he said adverse health effects are difficult to prove. The one instance of over-ruling involved the habitat of a Blanding's (Emydoidea bandingil) turtle at the site of a proposed Gilead Power wind farm in Prince Edward County.

In fairness to the tribunal with respect to timing, Chair Heather Gibbs had stated at the outset that it had to meet a deadline.

The individual sub-issues are covered in separate stories below:

**By Wes Keller**

**Title**

**By Wes Keller**

Issue 2: Whether engaging in the Project in accordance with the REA will cause serious harm to human health [283] In the discussion of Issues 2 and 3, the term "Appellants" includes all of the Appellants, including Mr. Sanford.

Overview

[284] The test under s. 145.2.1(2) (a) of the EPA, is whether engaging in the

renewable energy project in accordance with the renewable energy approval will cause

serious harm to human health (the "Health Test"). Pursuant to conditions imposed in

the REA, noise generated by the Project cannot exceed 40 dbA measured at the

exterior of buildings which are non-participating receptors as this term is defined in the

regulations. Residential homes are an example of such non-participating receptors.

The setback distance from Project components is 550 m. Section 145.2.1(3) of the EPA

states that the onus of proving that such serious harm will occur rests with the

Appellants. Therefore, they must demonstrate that serious harm to human health will

occur in circumstances where these conditions have been met. If the evidence

suggests that serious harm will occur only in circumstances where noise levels exceed

40 dbA at a non-participating receptor and/or at a distance less than 550 m from a

receptor, then the Health Test will not be satisfied.

[285] The Appellants were represented in two groups. CORE, D&C Vander Zaag

Farms Ltd., Ms. Bovaird, Mr. Maguire, Dr. Crysedale, and Ms. Kurtin (collectively

referenced as the "CORE Appellants?"), and Mr. Sanford. However, these two groups

relied on the evidence adduced by each other, and filed joint written submissions

regarding the Health Test in this proceeding.

[286] The Tribunal heard extensive evidence on this issue, and, as well, extensive

written submissions from the parties numbering several hundred pages. While the

Tribunal has reviewed and considered the evidence and submissions in detail, it is not

feasible to include a detailed synopsis of all of the evidence or the submissions within a  
  
decision of reasonable length.

[287] During the course of the hearing, the parties made several references to the  
  
Tribunal's decision in APPEC. In this regard, the Tribunal notes that many of the same  
  
witnesses testified in both this proceeding and APPEC, and, particularly with respect to  
  
the same or similar issues that have been raised in both proceedings. The Appellants  
  
dispute an assertion made by the Director that the case presented by the Appellants is,  
  
in essence, a duplicate of the case presented in APPEC. The Tribunal finds that,

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although the evidence, issues, and submissions are very similar, this case is not a duplicate of APPEC. The Tribunal has undertaken its own deliberation of the evidence and submissions of parties in this proceeding, and has independently arrived at its own conclusions respecting the issues raised. However, as the Tribunal's findings are similar to those in APPEC, the Tribunal has structured its analysis and discussion in a manner similar to the approach adopted by the Tribunal in APPEC. In this regard, the Tribunal accepts that its analysis of Issue 2 should be addressed under three sub-issues:

? 2A. Whether the Appellants have established a causal link between wind

? 2B. Whether engaging in this Project in accordance with the REA will cause

? 2C. Whether Sarah Laurie should be qualified as an expert to give opinion

turbines and human health effects where there is a 550m setback and 40 dBA

noise limit;

serious harm to human health; and

evidence.

[288] In this proceeding, the Appellants approached the test outlined in s. 145.2.1(2)

(a) of the EPA as building on the groundwork laid by APPEC and *Erickson v. Director*

(Ministry of the Environment), [2011] O.E.R.T.D. No. 29 (?Erickson?).

[289] As stated in the Appellants' joint submissions on the Health Test:

187. The following findings were made in *Erickson*, on a much more

fulsome record with far more expert evidence available:

The Known Effects of IWTs Are Serious: Para. 640 - In this case,

there is apparent agreement that many of the medical conditions

discussed by the witnesses are serious (the debate on those is,

therefore, confined to whether they will result from the Project).

Mechanism Is Not Required: Para. 819 - For the purposes of this

Decision, the Tribunal finds that the Appellants can attempt to satisfy

the section 145.2.1(2) test even if there is uncertainty about the

specific mechanism that causes the alleged health effects.

IWTs Can Cause Harm to Human Health: Para. 872 - While the

Appellants were not successful in their appeals, the Tribunal notes

that their involvement and that of the Respondents, has served to

advance the state of the debate about wind turbines and human

health. This case has successfully shown that the debate should not

be simplified to one about whether wind turbines can cause harm to

humans. The evidence presented to the Tribunal demonstrates that

they can, if facilities are placed too close to residents. The debate

has now evolved to one of degree. The question that should be

asked is: What protections, such as permissible noise levels or

setback distances, are appropriate to protect human health?

[Emphasis added]

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188. The Appellants submit that the Tribunal's decision in the within

proceedings should be reflective of the Erickson findings. These are

fundamental issues that were fully considered and determined in

Erickson. For many reasons, they should not be relitigated in this or

future ERT hearings. The time and costs alone of revisiting each of these

issues would be extremely onerous and unmanageable. Erickson allows



the process to move forward, to look at the real question that must be

determined in each subsequent case, which the Tribunal clearly

articulated above.

?

[290] The evidence on causation, as described in Erickson and subsequent Tribunal

decisions, can be described as falling within one of two general categories. The first is

described as a direct effect such as hearing loss. The second category is described as

an indirect effect. This refers to health effects alleged to result from annoyance, stress

and sleep disturbance associated with living in proximity to a wind turbine or related

components.

[291] Under either of these two categories, there are two bases on which the

Appellants seek to establish that engaging in the Project in accordance with the REA

will cause serious harm to human health. The first basis is to show that current experience with wind farm projects, both in Ontario, and elsewhere in the world, demonstrates that it is sufficiently predictable that some or all persons living within the vicinity of wind project components (wind turbine(s) being the prominent component) will experience serious health effects. This may be generally described as a generic approach, as it does not seek to establish causation with respect to specific identified individuals. To support their position in this regard the Appellants adduced evidence regarding the incidence of annoyance, which they assert will be caused by wind turbine projects, as well as evidence that environmental noise and annoyance cause stress and sleep disturbance. The Appellants also adduced evidence of persons living in the vicinity of existing wind turbine projects, both in Ontario and elsewhere in the world, who report adverse health effects attributed to their exposure to these wind turbine projects.

[292] The second basis on which the Appellants seek to establish that the Health Test

is met is to show that specific individuals have suffered serious harm to their health as a result of living in proximity to wind project components. In this case, the Appellants have adduced evidence of persons living in the vicinity of existing wind turbine projects in Ontario who report adverse health effects which they assert are caused by these wind turbine projects (?the post-turbine witnesses?).

[293] In overview the Appellants assert that they have established causation on both bases. Based on the generic approach, they maintain that it is predictable that a certain

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percentage of the persons living in proximity to the Project will suffer adverse health

effects. Based on the approach respecting the experience of specific individuals, they

maintain that the evidence of the post-turbine witnesses establishes that wind turbines

do cause harm to human health, and, more specifically, that wind turbines exacerbate

certain types of pre-existing medical conditions. The Appellants then argue that this

evidence will establish causation with respect to this Project. In this regard, they point

to evidence they have adduced respecting individuals who will live in the vicinity of wind

turbines in the Project (the "pre-turbine witnesses"), asserting that each of these

individuals currently suffers from medical conditions that will be exacerbated by

exposure to wind turbines. The Appellants maintain that the evidence of these pre-

turbine witnesses "is highly relevant to establish a causal link between the proposed

Project and the more likely than not probable effect on those living nearby.?"

[294] In summary, it is the Appellants' position that this evidence, considered in the

context of the Erickson and APPEC decisions, demonstrates that engaging in the

project in accordance with the REA will cause serious harm to human health.

Issue 2A: Whether the Appellants have established a causal link between wind

turbines and human health effects where there is a 550m setback and 40 dBA

noise limit.

[295] Paragraph 88 of the Appellants' written submissions states: "The causal links

between the risk of harm and IWTs are amply established in the evidence." Implicitly,

their argument is that this risk, if established, will be sufficient to meet the Health Test in

this case. As discussed below, the Tribunal finds that the Appellants have not

established this causal link. Consequently, it is unnecessary for the Tribunal to address

whether such causal link, if established, would be sufficient to satisfy the Health Test as

it applies to the Project under appeal in this proceeding.

[296] The Appellants seek to establish the causal link between wind turbines and

human health based on the following evidence:

? The evidence of the ?post-turbine witnesses?, who each report that they have

? The medical opinion evidence of Dr. Robert McMurtry which supports the

experienced adverse health effects. They assert their conviction that these

symptoms are caused by wind turbines.

views of the post-turbine witnesses. Dr. McMurtry also provides his own

opinion respecting the causation issue.

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? The evidence of Ms. Laurie regarding her work with persons in Australia living

in proximity to industrial wind projects, who have also reported that they

experience some of the health effects listed above.

? The evidence of Brian Howe respecting annoyance.

[297] The Tribunal has structured its analysis and findings in two sections: the

Appellants' case based on the evidence of the post-turbine witnesses; and the

Appellants' case based on the evidence of Ms. Laurie, Dr. McMurtry, and Mr. Howe.

Appellants' Case Based On The Evidence Of The Post-Turbine Witnesses

Appellants' Evidence

[298] The Appellants' submissions summarize the evidence of the post-turbine

witnesses, stating that they gave testimony:

? regarding their debilitating and enduring experiences with sleep

disturbance, vertigo, nausea, tinnitus, heart palpitations, memory and

concentration loss, mood swings, chronic fatigue, breathing difficulty,

headaches/migraines, and even suicidal thoughts. Those with pre-

existing medical conditions such as back pain, chronic fatigue,

fibromyalgia, and high blood pressure, spoke of how these conditions

worsened with the turbines becoming functional.

They also testified that when away from their homes, they gained respite

from their various symptoms.

[299] The Appellants characterize these health effects as falling within the category of

indirect harm. As stated at paras. 72 and 73 of the Appellants' submissions:

72. There is therefore undisputed evidence before this Tribunal that

at sound levels at or below those approved for the operation of this

Project, 6-20% of people will be very annoyed. There is a causal chain

between annoyance, stress, sleep disturbance, and adverse health

effects.

73. This causal chain is evidenced by the adverse health effects



suffered by the post-turbine witnesses who testified in this case?

[300] All of the post-turbine witnesses provided a witness information form which

essentially sets out their responses to a list of questions regarding their medical history,

self-reported health symptoms, and other personal information. They each provided

medical records that they were able to obtain in time to present at the hearing. Some of

these medical records included documents setting out medical opinions respecting

specific conditions. None of these witnesses provided a medical opinion which

attributed exposure to wind project components as the cause of their complaints. Dr.

McMurtry has expressed an opinion in this regard. The Tribunal addresses his

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evidence below. Despite any pre-existing medical condition these witnesses may have,

they each testified that, after the wind turbines became operational in their environs,

they have experienced adverse health effects which they had not experienced before.

They state their views that exposure to the wind farm project in the vicinity of their

residences has caused these adverse health effects. They maintain that they had no

negative perceptions or expectations respecting the impacts of wind turbine projects

prior to experiencing adverse health effects.

[301] They cite one or both of the following reasons to support their assertion regarding

causality:

? The adverse health effects they have experienced manifested when the wind

? They have gained respite from their various symptoms when they leave their

farm project commenced operation, or shortly thereafter, and they have been

unable to find any other explanation for their condition; and

homes, more specifically, when they are no longer in the vicinity of the wind

farm for a period of time (where symptom relief is either immediate or

gradual). Their symptoms resume upon returning to their homes either

immediately or shortly thereafter.

[302] Inherent in the views expressed by the post-turbine witnesses are two major

premises: (i) for the post-turbine witnesses with pre-existing conditions, the adverse

health effects they experience are in fact, different from the health effects associated

with their pre-existing conditions, or potential side effects from the medication they are

currently taking; and (ii) their inability to find another cause for their symptoms,

considered together with the relief they experience when they remove themselves from

exposure, is, in their view, conclusive evidence that their adverse health effects are

caused by wind turbines. Both these premises are challenged by witnesses called by

the Director and the Approval Holder.

Respondents' Evidence

[303] The Director and the Approval Holder called the following witnesses:

? Dr. Robert McCunney, who was qualified as medical doctor specializing in

? Dr. Cornelia Baines, who was qualified as an epidemiologist with special

occupational and environmental medicine with particular expertise in health

implication of noise exposure;

expertise in design measurement and evaluation of research studies.

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? Dr. Kieran Moore, who was qualified as a physician with expertise in family

and emergency medicine, public health, and preventative medicine.

[304] For ease of reference, the Tribunal collectively describes these witnesses as the

respondents' health experts. Each of them has testified in Erickson, APPEC, or both.

The Tribunal's decisions in these cases already provide detailed summaries of their

evidence. Much of the evidence they gave in those cases has been repeated in this

proceeding. Therefore, the Tribunal does not find it necessary to provide a detailed

synopsis of all of their evidence in this decision.

[305] In summary, the evidence of these witnesses is that the reliable determination of

causality with respect to adverse health effects is a very complex exercise.

[306] In addressing both premises, they note that many of the symptoms reported by

the post-turbine witnesses are known to commonly occur in the general population and

have numerous causes. Considerations related to medical causality assessment are

discussed in paras. 75 to 82 of Dr. McCunney's witness statement:

#### Causality Assessment

75. The information in the Information Forms is insufficient to

conduct formal individual causality assessments, most notably because

of limited diagnostic work ups and the absence of noise measurements.

The collection of statements is also not appropriate for a group analysis,

in part, since they represent different sites and different times of

exposure that may not be representative of each particular site.

76. A proper causality assessment includes a thorough review of

symptoms and past medical history with appropriate diagnostic studies.

The determination of causality is an important exercise in health care,

but it is customarily only undertaken after diagnosis and treatment. A

causality assessment should also consist of a thorough review of noise

measurements conducted in the vicinity of the home along with a

comparison of the symptoms, diagnosis and noise levels in light of what

has been published in the peer reviewed scientific literature.

77. As noted above, the symptoms reported in the Information

Forms are common in the general population and have numerous

causes. ? Other groups of symptoms, such as fatigue, loss of energy

and poor concentration, reported in the Information Forms strongly

suggest depression as the appropriate diagnosis.

78. Sleep disturbance, one of the symptoms described in the

Information Forms, can be due to many factors ranging from stress and

medications to potential serious medical diagnoses such as sleep apnea.

Vertigo, another symptom reported in the forms, has numerous causes; it

must be appropriately diagnosed before attributing causal links to any

potential environmental concern. ?

79. It is important to distinguish the medical activities necessary in

(1) forming a diagnosis of symptoms and (2) assessing the cause of the

symptoms. A causality assessment customarily begins with a thorough

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medical evaluation that leads to a diagnosis. The cause can be

determined thereafter based on consideration of the scientific literature

and alternative explanations.



80. Another key aspect of conducting a causality assessment is the

determination of biological plausibility; in essence, does the proposed

link make sense from a biological perspective? ? Since noise is the

potential hazard associated with the operation of a wind turbine, it is not

appropriate science to link these conditions to wind turbines if the

conditions have not been definitively linked with noise exposure in other

settings. Furthermore, many of the health conditions reported originated

before the installation of wind turbines, thus making any causal

connection with wind turbines implausible.

81. In any causality assessment, it is necessary to establish a

diagnosis based on accepted medical criteria. ? Based on the

information presented, it is not possible to determine whether the asthma

reported in the symptom statements was made according to widely

accepted medical criteria.

?

82. The symptoms and conditions described in the Information

Forms need to be properly evaluated by a physician in the context of

appropriate diagnostic studies before one could reliably form specific

diagnoses or draw causal connections between the symptoms and living

in the vicinity of a wind turbine. Forming a diagnosis is the first step in

attempting to draw causal inferences between exposure to any type of

hazard and health related symptoms from the exposure.

83. The Information Forms represent the self-reporting of individuals

from various sites in Ontario who live in the vicinity of wind turbines.

They do not represent a defined group of people, who could be

evaluated in any systematic fashion, such as can be done in

epidemiological studies. ?

[307] The above comments are made in specific reference to the witness information

forms. The Tribunal notes that the medical records and oral testimony of the post-

turbine witnesses as well as the information provided in telephone interviews conducted

by Dr. McMurtry, are, for the most part, consistent with the information provided in these

witness information forms. It should be noted that the information provided by the post-

turbine witnesses in telephone interviews was not admitted into evidence by the

Tribunal, as noted below.

[308] This evidence underscores that determining the cause of an adverse health

effect requires comprehensive investigation in order to accurately ascertain symptom

etiology. In this regard, Dr. McCunney also noted that information regarding the level of

noise experienced by the post-turbine witnesses is absent. He explained that an

exposure assessment is critical to any evaluation of causality in order to assess how the

specific exposure compares with the dose-response results described in applicable

scientific literature.

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[309] Regarding the premise that a causal connection is demonstrated by the fact the

post-turbine witnesses experience relief from their symptoms when they remove

themselves from exposure to wind turbines, Dr. Moore also states in his witness

statement at para. 106:

106. Since multiple witnesses have stated they have depression, this

can be associated with somatoform disorders, which are characterized

by physical symptoms that have a psychological, as opposed to a physical, cause. Also, conversion is a common disorder where stress and anxiety are unconsciously expressed as physical symptoms, such as sensation of tingling or discomfort, fatigue, abdominal pain, headaches, back or neck pain, weakness, loss of balance, and hearing and visual abnormalities. This could explain some of the symptoms that individuals report when returning to their homes, which is part of the syndrome discussed by Dr. McMurtry.

[310] Dr. Moore also testified that it is understandable that if someone's symptoms started when a wind turbine project commenced, they could believe that this has caused their symptoms. However, he points out that a temporal association between these two events does not establish causation. In referring to sleep disturbance, he states at

paras. 22 and 23 of his witness statement:

22. Hence, sleep disturbance is a very common condition in the

general older adult population and especially in those with underlying

medical conditions. Sleep disturbance must be put in context and

investigated as to its etiology. Sleep disturbances increase with age.

23. By extrapolation of the population prevalence data of insomnia or

sleep disturbance, approximately one third of all adults exposed to wind

turbines will experience insomnia. A significant portion of these, due to

chance alone, could be temporally associated with the commencement

of a wind turbine development. If patients have any chronic medical

condition that causes pain, such as osteoarthritis the above study

suggests that up to seventy percent could report poor sleep.

[311] The respondents' health experts note that, as associations between events can

occur by chance, an epidemiological approach to assessment of causation is required.

They note that the most widely accepted criteria, referred to as the Bradford Hill criteria,

provide a reasonable framework to be applied when determining causal associations.

These criteria include strength of association, consistency, specificity, temporality,

biological gradient, plausibility, coherence, experimental evidence, and analogy. As

their evidence in applying these criteria to this case is both detailed and lengthy, the

Tribunal does not include a synopsis of this evidence in this decision. In summary, the

conclusion drawn by the respondents' health experts is that, in applying these criteria,

causation cannot be established based on the evidence adduced by the Appellants.

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## Findings

[312] The issue to be addressed by the Tribunal in respect of the post-turbine

witnesses is whether they have experienced adverse health effects that have been

caused by exposure to industrial wind turbines outside of the 550m regulated setback

and under 40 dBA noise limit. For the following reasons, as well as the Tribunal's

analysis and findings in respect of the other Appellants' health witnesses (discussed

below), the Tribunal finds that the Appellants have not done so.

[313] The Tribunal does not question the sincerity of the post-turbine witnesses in

giving their evidence. They acknowledge that the identification of their adverse health

effects is through their own self-diagnosis. They also acknowledge that they have

reached personal conclusions regarding the issue of causation. Several of them assert



that they have had to do so, because they maintain that medical professionals either have no knowledge regarding the effects of wind turbines, or are skeptical or dismissive of the possibility that wind turbines can negatively affect human health. Nevertheless, none of the post-turbine witnesses adduced any medical opinion from their health practitioners which confirms that they have experienced symptoms caused by wind turbines. The Tribunal does not question that the post-turbine witnesses have experienced the symptoms they have described. After all, only they can say how they feel. However, in order to arrive at a reliable conclusion respecting causation, personal assessments which do not consider the full range of potential causes of these symptoms, are incomplete. Furthermore, the exercise of arriving at a diagnosis requires a level of education, training and experience, which none of the post-turbine witnesses possess. In this regard, the Tribunal notes that in Kawartha Dairy, the Tribunal found

that confirmation of medical conditions requires the diagnostic skills of a qualified health

professional. This conclusion was accepted in APPEC, and the Tribunal accepts that it

applies in the circumstances of this case. As discussed below, the Tribunal also does

not find that Dr. McMurtry's opinion about each of the post-turbine witnesses

establishes they have experienced adverse health effects caused by wind turbines.

[314] The evidence adduced must support a conclusion that the post-turbine witnesses

have experienced serious harm that is caused by wind turbines or related components.

The Tribunal accepts that causality assessment is a complex exercise. The Tribunal

finds that the evidence adduced by Dr. McCunney, Dr. Baines, and Dr. Moore

respecting causality assessment has not been seriously challenged by the Appellants.

Therefore, the Tribunal accepts their evidence in this regard. Their evidence is that

there is a level of uncertainty regarding the conclusions reached by the post-turbine

witnesses in several areas including: (i) failure to obtain qualified medical investigation

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to rule out other potential causes of their symptoms, before arriving at the conclusion

that their symptoms must by default, be caused by exposure to wind turbines or related

components; (ii) failure to consider whether wind turbine noise is a plausible cause of

their symptoms by considering existing known effects of noise exposure; and (iii) failure

to consider the noise exposure levels experienced by these individuals. As a result, the

Tribunal finds that the evidence adduced by the post-turbine witnesses is insufficient to

support a conclusion that the post-turbine witnesses have experienced serious harm to

their health caused by wind project components.

[315] Even if the Tribunal accepted that causation is established, it is unclear whether

this evidence could be extrapolated to apply to the Project under appeal in this

proceeding. In this regard, the Tribunal has noted that the evidence adduced does not

include confirmation of the noise exposure levels experienced by the post-turbine

witnesses. As such, the Tribunal finds that it is has not been established that the

adverse effects they have described, if attributable to industrial wind turbines, are

caused by noise levels at or below 40 dbA.

[316] Finally the Tribunal notes that, although causation has not been established with

respect to these individuals, this does not preclude their evidence from being

considered as data in support of the Appellants' position that current evidence

demonstrates that it is sufficiently predictable that some or all persons living within the

vicinity of wind project components (wind turbine(s) being the prominent component) will

experience serious health effects. This is considered below in the Tribunal's analysis

respecting the evidence of Dr. McMurtry, Ms. Laurie, and Mr. Howe.

Appellants' Case Based On The Evidence of Ms. Laurie, Dr. McMurtry, and Mr. Howe

Appellants' Evidence

[317] As is discussed below, the Tribunal did not grant the Appellants' request that Ms.

Laurie be qualified to give opinion evidence. Dr. McMurtry is a practicing medical

doctor who was qualified to give opinion evidence as a physician and surgeon with

experience in the delivery of health care, health care policy, and health policy. Mr.

Howe was qualified to give opinion evidence as an acoustical engineer with specialized

expertise in sound from, and the effects of sound from, wind turbines.

Ms. Laurie

[318] Ms. Laurie is a non-practicing physician, who was called by the Appellant, Mr.

Sanford, to give evidence in this proceeding. He requested that she be qualified to give

opinion evidence, a request that was supported by the CORE Appellants, and opposed

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by the Director and Approval Holder. In an oral ruling, the Tribunal refused Mr.

Sanford's request, indicating that its written reasons for this disposition would follow. As

the Tribunal's written reasons for this disposition are lengthy they have been addressed

separately under Issue 2C below.

[319] Ms. Laurie's experience respecting health impacts of industrial wind turbines has

been gained primarily from her work for an organization known as the Waubra

Foundation. In summary, Ms. Laurie testified that she has not approached communities

to conduct surveys, and that she has not conducted formal structured research. She

states that she conducts an ongoing survey, where, to date, she has spoken with approximately 130 people in Australia who live in the vicinity of industrial wind turbine projects. She indicated that these people have identified themselves to her, by contacting her directly, or indirectly by contacting the Waubra Foundation. She explained that these persons describe their symptoms to her and request information. She testified that the symptoms reported to her are consistent with the adverse health effects identified as being associated with industrial wind turbines by other researchers, including Dr. Geoff Leventhall, Dr. Nina Pierpont, and Dr. McMurtry. She provided a number of published articles and papers, and copies of written statements to agencies in Australia and elsewhere.

Dr. McMurtry

[320] Dr. McMurtry's evidence in this proceeding is, in part, similar to the evidence he

gave in APPEC. As noted at para. 74 of that decision:

74. Although Dr. McMurtry's witness statement from the Erickson

proceeding was referenced in his current witness statement and included

in his book of documents, the focus of Dr. McMurtry's evidence in this

proceeding centred on his proposed case definition as described in his

article "Toward a Case Definition of Adverse Health Effects in the

Environ of Industrial Wind Turbines: Facilitating a Clinical Diagnosis?",

which was published in the peer-reviewed journal Bulletin of Science,

Technology and Society, 2011 31 : 316.

[321] For purposes of this decision, this is referenced as the Case Definition.

[322] Since giving his evidence in APPEC, Dr. McMurtry testified that he has prepared

an update to the Case Definition. A copy of the Case Definition and this update are

attached to this Decision as Appendix B. Dr. McMurtry testified that the updated Case



Definition is intended to be used by primary health care physicians to diagnose whether

a patient who lives in the environs of industrial wind turbines is experiencing adverse

health effects. His update confirms that the deployment of the diagnostic criteria in the

Case Definition ?requires use by [a] health care practitioner licensed to take a history

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and make diagnoses.? His update also states that a ?probable' diagnosis ?indicates that

AHE/IWT [adverse health effects in the environs of industrial wind turbines] more likely

than not are the cause of the complaints. AHE/IWT is the working diagnosis. Other

diagnostic possibilities continue to exist and should be considered in the differential

diagnoses.?

[323] As noted in the Case Definition there are three categories of diagnosis: possible,

probable, and confirmed. The update indicates the following:

? ?possible? means that a diagnosis of such adverse effects is to be considered

? ?probable? indicates that it is more likely than not that living in the environs of

? ?confirmed? indicates other diagnosis is very unlikely, i.e., less than one

a potential diagnosis;

industrial wind turbines is the cause of the complaints. This becomes the

physician's working diagnosis. Other diagnostic possibilities continue to exist

and should be considered in the differential diagnosis;

chance in 20.

[324] Regarding a ?confirmed? diagnosis, Dr. McMurtry explained that other diagnoses

should be ruled out. As stated in the Case Definition, this is the responsibility of the

licenced clinician.

[325] In his witness statement, Dr. McMurtry lists several reasons supporting his

proposed diagnosis including:

? He notes that there are reports of adverse health effects in all countries where

industrial wind turbines are erected;

? There is convergent validity of reports of adverse health effects in different

cultures and languages;

? Infrasound and low frequency noise is a plausible mechanism for adverse

health effects;

? There is no medical evidence to support set back distances intended to

protect individuals from experiencing adverse health effects;

? There is a common finding that persons experiencing adverse health effects

prefer being away from their homes for restoration and in some cases even

abandon their home, and this is unique to persons in the environs of industrial

wind turbines who experience adverse health effects;

? A dose-response relationship has been confirmed in many studies;

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? Dr. Leventhall, an industry expert, acknowledges that ?always a few?

experience adverse health effects, and a ?non-trivial percentage? will be

highly annoyed; and

? The working diagnosis accords with principles of evidence-based medicine,

which is defined to be the conscientious, explicit and judicious use of current

best evidence in making decisions about the care of individual patients. The

practice of evidence based medicine means integrating individual clinical

expertise with the best available external clinical evidence from systematic

research.

[326] Respecting the post-turbine witnesses, Dr. McMurtry testified that he reviewed

their witness information forms and the medical records that they have provided. Dr.

McMurtry reported information that he obtained from these witnesses by conducting a

telephone interview with each of them. At the hearing, each of these witnesses testified

before Dr. McMurtry did. However, none of the witnesses disclosed that they had

participated in an interview with Dr. McMurtry. Consequently, the Tribunal did not admit

Dr. McMurtry's evidence obtained from these interviews. In making this finding, the

Tribunal noted that the best evidence regarding their medical condition is the testimony

they each provided in this hearing. However, the Tribunal further notes that there was

no substantive inconsistency between their oral evidence and what was reported by Dr.

McMurtry.

[327] Dr. McMurtry applies the diagnostic criteria as set out in the Case Definition, and

for each witness states his opinion that they satisfy the 'probable' criterion for

experiencing adverse health effects from living in the environs of industrial wind

turbines.

[328] Dr. McMurtry also provided his analysis of the Bradford Hill criteria, disagreeing

with the conclusion of the respondent health experts. His evidence in this regard is

summarized at para. 82 of the Appellants' submissions:

82. In his reply affidavit, Dr. McMurtry criticized Dr. Moore's comments

regarding criteria for causation, by stating in his affidavit, that these have

already been met in relation to IWTs through the Bradford Hill, Criteria

for Causation.

(a) Strength: A small association does not mean that there is not a

(b) Consistency: Consistent findings observed by different persons

causal effect, though the larger the association, the more likely

that it is causal.

in different places with different samples strengthens the

likelihood of an effect.

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(c) Specificity: Causation is likely if a very specific population at a

specific site and disease with no other likely explanation. The

more specific an association between a factor and an effect is,

the bigger the probability of a causal relationship.

(d) Temporality: The effect has to occur after the cause (and if there

is an expected delay between the cause and expected effect,

then the effect must occur after that delay.

(e) Biological gradient: Greater exposure should generally lead to

greater incidence of the effect. However, in some cases, the

mere presence of the factor can trigger the effect. In other cases,

an inverse proportion is observed: greater exposure leads to

lower incidence.

(f) Plausibility: A plausible mechanism between cause and effect is

helpful (but Hill noted that knowledge of the mechanism is limited



by current knowledge).

(g) Coherence: Coherence between epidemiologist and laboratory

findings increases the likelihood of an effect.

(h) Experiment: ?Occasionally it is possible to appeal to

experimental evidence?.

(i) Analogy: The effect of similar factors may be considered.

Unperceived stimuli of smell, touch, vision and taste are able to

harm human health so there is no reason to believe that noise

below the hearing threshold is harmless.

Mr. Howe

[329] Mr. Howe co-authored a report for the MOE, dated December 2010, entitled Low

Frequency Noise and Infrasound Associated with Wind Turbine Generation Systems, A

Literature Review (the ?MOE Review Report?).

[330] Mr. Howe testified that this report is a review of existing research papers on the topic, rather than being primary research. He confirmed that the statistics regarding the percentage of people very annoyed, and the decibel level of noise impacts, come from published studies.

[331] Mr. Howe testified that the relationship between the sound levels and annoyance is not clear; there are a number of non-acoustic factors that influence a reaction of annoyance, an important one being attitude toward the noise source. He testified that, if you do not like a source, you are more likely to find the sound from it to be annoying. In this regard, Mr. Howe agreed with the statement from the MOE Review Report at page 19, heading 3.10:

The wide availability of popular media items describing fears of direct health effects from wind turbine noise and infrasonic noise specifically

may result in fears of the wind turbines in some people leading to

increased annoyance with the sound. This may be exacerbated by

certain moderating factors (Leventhall, 2004; Job, 1999; Guski, 1999;

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Fields, 1993), including 'anxiety about the source' and 'suspicion of

those who control the sources'.

[332] Regarding the MOE Review Report, Mr. Howe's witness statement, at paras. 9

and 21, states:

9. The report concluded that, while the overall magnitude of the

sound pressure levels, including infrasound, produced by wind turbine

generators at the setback distances required in Ontario does not

represent a direct health risk, annoyance will likely be experienced by

some persons.

21. Based on research completed by HGC Engineering for the

Ontario Ministry of the Environment, at the sound levels experienced at

the receptor distances noted for this project, the audible sound from wind

turbines is expected to result in a small percentage of persons being very

annoyed. The largest and most comprehensive studies completed to

date suggest that at noise impacts between 35 and 40 dBA, 6% will be

very annoyed, while at noise impacts between 40 and 45 dBA, up to 20%

of persons will be very annoyed. As with sounds from other 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. These findings have been supported by papers and

general consensus of the Wind Turbine Noise 2011 conference held in

Rome, <http://www.windturbinenoise2011.org/> and a comprehensive

review by the Oregon Health Authority, 2013. The relationship between

the sound level and the prevalence of annoyance is complicated, and is

often influenced by other non-acoustic factors. Given the number of

receptors expected to be impacted at a sound level between 35 and 40

dB(A), it would be statistically invalid to predict the exact number of

persons expected to be very annoyed, other than noting that those

predisposed against the project are more likely to be annoyed.

Respondents' Evidence

Dr. McCunney

[333] The evidence of Dr. McCunney is summarized in the submissions of the

Approval Holder and the Director.

[334] On the issue of annoyance, the Approval Holder's submission states:

With respect to annoyance, Dr. McCunney testified that annoyance is a

subjective phenomenon that is usually self-reported. It is not considered

a health effect. Dr. McCunney noted that he could not find "annoyance"

in any medical dictionary and that annoyance is not part of the new

International Classification of Diseases (10th edition). He stated that

claims that "annoyance" is an adverse health effect reflect individual

opinions rather than the consensus of the international medical

community. He specifically noted that annoyance associated with wind

turbines has been found to be primarily related to attitudes about the

visual impact of wind turbines and financial interests, as reflected in the

various studies referred to by the appellants' noise expert, Brian Howe.

Dr. McCunney further explained that, given its subjective nature,

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annoyance in a given population is difficult to predict, and that even the

largest studies of annoyance associated with wind farms (the Pedersen

studies based on self-reports) are considered limited data sets by

epidemiological standards, such that any attempt to apply those data

sets to another population would be fraught with uncertainty and

potential errors.

and the Director's submission states:

Dr. McCunney categorically disagreed with the proposition that some

people will always exhibit effects, and provided examples where this was

not the case. He referred to the recent study by Dr. Simon Chapman

which showed large spatio-temporal variations in complaints about noise

and health from wind farms. Chapman found that 33 of 51 wind farms in

Australia had never been subject to noise or health complaints. Dr.

McCunney preferred the evidence in this study to the less current opinion

from Dr. Leventhall, and questioned whether Dr. Leventhall would have

the same view as he previously expressed, given this new information.

[335] Respecting Dr. McMurtry's updated Case Definition, the Approval Holder's

submission states:



108. Dr. McCunney was also critical of Dr. McMurtry's proposed case

definition, concluding that it was devoid of scientific validity and of no

value in assessing causal links between health effects and wind turbines.

His specific criticisms included:

(a) the flawed process by which it was developed and proposed for

use (proposed by one individual, through a process that did not

follow international standards for the development of consensus

statements);

(b) its lack of validation by any medical association (Dr. McMurtry

himself admits that his proposed case definition has not been

validated);

(c) its lack of any scientific support for the exposure metric (i.e.,

living within 5 km of a wind turbine);

(d) its lack of precision, which results in application difficulties (i.e.

3264 options for meeting second and third order criteria); and

(e) its lack of any peer-reviewed citations to support its conclusions.

[336] Respecting the effects of noise exposure, the Approval Holder's submission

states:

102. ...Dr. McCunney conducted a comprehensive literature search to

review scientific literature, government reports and other articles related

to potential health implications of living in the vicinity of wind turbines that

have been published since the expert panel report was released in 2009.

He testified that he has not identified any scientific support for a direct

causal link between chronic noise exposure of less than 40 dBA and

adverse health effects. Dr. McCunney highlighted field studies in the

vicinity of operating wind farms in many different countries. These

studies have demonstrated that infrasound and low-frequency sound

from wind turbines are not at levels that are harmful to human health. He

also highlighted human experimental studies conducted by NASA that

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found no adverse health effects of infrasound levels several orders of

magnitude higher than those measured in the vicinity of wind farms.

[337] Respecting the Appellants' post-turbine witness evidence, the Approval Holder's

submission states:

103. With respect to the post-turbine witnesses, Dr. McCunney

concluded that their evidence does not establish a causal link between

health effects and living in the vicinity of wind turbines. He explained that

to assess potential causal links between exposure to a hazard and an

illness, the first step is to confirm the diagnosis of the illness or disease.

Here, however, the information in respect of the post-turbine witnesses is

too limited, according to Dr. McCunney, to make a definitive diagnosis of

their symptoms based on contemporary medical standards. Dr.

McCunney noted, in particular, the absence of appropriate diagnostic

tests and results (such as sleep studies) in the medical records that had

been provided by the post-turbine witnesses. He also noted that there

were a number of inconsistencies between the self-reports of the

witnesses and their medical records, such as pre-existing conditions and

side-effects of medications that might explain the symptoms experienced

by the witnesses after the installation of wind turbines.

104. Critical exposure information ? the level of noise experienced by

the post-turbine witnesses ? was also absent. As Dr. McCunney

explained, an exposure assessment is critical to any evaluation of

causality in order to assess how the specific exposure compares with the

dose-response results described in applicable scientific literature.

105. Dr. McCunney further noted that many of the symptoms reported

by the post-turbine witnesses lack biological plausibility, based on his

experience in evaluating health effects from high noise level exposures

in industrial environments. Dr. McCunney explained that ?biological

implausibility? is one of the fundamental principles of occupational and

environmental medicine: as he put it, "if there is no link at high levels of

exposure to a hazard " it is virtually implausible that low levels would

cause an effect that is not noted at high levels." Dr. McCunney further

noted that in his 30 years of experience in occupational and

environmental medicine, he has never encountered so many symptoms

attributable to a single hazard.

[338] Dr. McCunney's opinion respecting the pre-turbine witnesses was that there was

no reason to conclude that they will be affected by the operation of the Project, having

regard to the medical information they provided and the scientific literature.

Dr. Baines

[339] At para. 14 of Dr. Baines' witness statement, she states:

14. With respect to demonstrating causation, six criteria are

applicable to wind turbines:

a. The first is an appropriate temporal relationship between cause

and effect, namely that the cause precedes the effect. It is claimed

the symptoms begin after exposure to wind turbines. However

when data are gathered in a biased fashion (sampling bias)

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together with the potential for suggestibility bias (filling out a

questionnaire labelled adverse health effects of IWTs, reading

media reports of illness due to IWTs, concern about loss of

property values) may all lead to heightened awareness of

symptoms previously ignored.

b. The second criterion is a strong association between the cause

and the effect. Unfortunately, the adverse effects reported are also

observed in the absence of wind turbines and only a minority of

those exposed experience symptoms.

c. The third criterion is specificity. Does the cause produce an effect

not seen in other situations? Clearly this criterion is not fulfilled.

d. The fourth criterion is constancy, the effect reliably follows the

cause, and we know that not all people exposed to IWTs

experience the adverse effects claimed. As well, people not

exposed experience the same symptoms reported by plaintiffs.

e. A fifth criterion is a dose-response effect meaning that the more

intense the exposure, the more severe the effect. This has never



been persuasively demonstrated in the anti-turbine literature.

f. The sixth criterion is biological plausibility. It is generally accepted

that a wide range of symptoms involving many body systems will

not be due to a single cause or, in the case of IWTs, arise from the

visual and sound consequences of their presence. With the wide

range of reported symptoms, virtually all of which are experienced

widely in the general population, the case for causality due to IWTs

is weak.

## Findings

Dr. McMurtry's qualification as an expert witness

[340] The Director and the Approval Holder opposed the Appellants' request that Dr.

McMurtry be qualified to give opinion evidence as a physician and surgeon with

expertise in the delivery of health care, health care policy and health policy.

Dr. McMurtry testified in APPEC, where a request for the same qualification was also

opposed. In APPEC, at paras. 72 and 73, the Tribunal provided a summary of the

submissions made in respect of this request for qualification, and the Tribunal's reasons

for granting the request:

72. The Approval Holder and the Director objected to the

qualification of Dr. McMurtry and to the admissibility of his evidence.

While the Approval Holder and Director took no issue with Dr. McMurtry's

expertise as requested, they argued that it was irrelevant to the issue to

be determined by the Tribunal. Specifically, he is an orthopedic surgeon,

not an epidemiologist or an expert in any of the illnesses allegedly

caused by exposure to wind turbines. Secondly, they argued the

evidence should be inadmissible as Dr. McMurtry could not be neutral

and unbiased as required of an expert witness under the Tribunal's

Practice Direction, due to involvement in wind turbine issues as an

advocate. Dr. McMurtry is a former Director of APPEC.

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73. The Tribunal found that, despite Dr. McMurtry's involvement in

wind turbine issues in general and with APPEC in particular, he could be

qualified as an expert. The reasons include that health impacts of wind

turbines is an emerging area of science with few experts at the ready to

testify; that Dr. McMurtry has engaged with more individuals alleging

these health effects than anyone in Canada; that Dr. McMurtry testified

as an expert in the Erickson hearing; and due to his demonstrated

personal integrity as an advocate of public health. The Tribunal found

that issues of bias would go to weight, rather than admissibility of the

evidence. With respect to the area of expertise, the Tribunal found Dr.

McMurtry to be an expert in the area requested, and that it was not able

to make a determination on relevance at the qualifications stage in the

proceeding. ?

[341] The Tribunal finds that these paragraphs adequately describe the submissions

made and the Tribunal's reasons for granting the requested qualification in this case.

Whether Dr. McMurtry's proposed reply evidence should be accepted

[342] As explained more fully in the Tribunal's order of November 27, 2013, it was not

possible to hear viva voce evidence from the Appellants' proposed reply witnesses

during the scheduled days for the hearing. The Tribunal therefore outlined a schedule whereby the Appellants' reply evidence would be filed by way of affidavits, along with the transcripts of the cross-examinations of those witnesses. As the Approval Holder and the Director submitted that the evidence was not proper reply, the Tribunal directed the parties to address this issue in their final written submissions. All parties did so.

[343] The Director and Approval Holder argue that Dr. McMurtry's reply affidavit is improper reply and should not be accepted by the Tribunal. The Director discussed bringing a motion to exclude the proposed reply evidence, but the Tribunal ruled orally on October 7, 2013 that it would receive the evidence via affidavit, and consider submissions on admissibility of the proposed reply evidence along with the final submissions of the parties.

[344] The Director and Approval Holder note that Dr. McMurtry's reply affidavit includes

reference to studies by Pedersen and a report by the World Health Organization

(?WHO?) (Europe), Burden of Disease from Environmental Noise: Quantification of

Healthy Life Years Lost in Europe, 2011 (the ?WHO (Europe) 2011 Report?). They

argue that, if Dr. McMurtry was relying on them, he should have included them in his

original witness statements and during oral testimony before the Tribunal. They argue

that the reply affidavit does not reply to constitutional evidence adduced by the Director.

[345] The Appellants argue that Dr. McMurtry has been qualified as an expert in health

care policy and his reply affidavit is within his expertise, and responds to the Director's

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evidence asserting that the purpose of the renewable energy approval provisions is

constitutional. It is thus Charter-related reply, they submit, and is proper.

[346] The Tribunal finds that paras. 6, 7 and 8 of Dr. McMurtry's reply affidavit discuss

Ontario's energy mix and its electricity generating capacity. These are clearly not within

Dr. McMurtry's area of expertise and the Tribunal does not admit them as evidence.

[347] Paragraphs 9 to 13 of Dr. McMurtry's reply affidavit respond to Dr. Moore's

comments regarding criteria for causation, and evidence entered during the Approval

Holder's case regarding annoyance. An excerpt from the WHO (Europe) 2011 Report

referred to in para. 13, for example, was entered into evidence during Dr. McCunney's

testimony. For this reason, the Tribunal allows those paragraphs into evidence, along

with the documents they refer to, as reply evidence on the health case.

Dr. McMurtry's opinions respecting the post-turbine witnesses

[348] As noted earlier in the description of his evidence, Dr. McMurtry states his

opinion that each of the post-turbine witnesses satisfies the 'probable' criteria for experiencing adverse health effects from living in the environs of industrial wind turbines. The Tribunal notes that he did not expressly state that this was his diagnosis respecting each of these individuals. However, as he noted in his update to the Case Definition, a 'probable' diagnosis 'indicates that AHE/IWT [adverse health effects in the environs of industrial wind turbines] more likely than not are the cause of the complaints. AHE/IWT is the working diagnosis. Other diagnostic possibilities continue to exist and should be considered in the differential diagnoses.'

[349] The Tribunal notes the purpose of opinion evidence is to assist the Tribunal in making its decision respecting the statutory test under the EPA, which is a legal determination. Dr. McMurtry is clearly asserting that it is more likely than not that each of the post-turbine witnesses has suffered adverse health effects caused by industrial wind turbines. Consequently, the nature of this opinion evidence is to be assessed in



this legal context, and not the context of how a health practitioner may differentiate

between commenting on whether a post-turbine witness satisfies the criteria of the Case

Definition and making a diagnosis. In the legal context, the Tribunal finds that any such

differentiation is artificial.

[350] The Tribunal also notes that Dr. McMurtry's updated Case Definition sets out

diagnostic criteria intended for use by primary health care physicians to diagnose

whether a patient who lives in the environs of industrial wind turbines is experiencing

adverse health effects. As such, this Case Definition is based on the presumption that

adverse health effects are caused by being in proximity to industrial wind turbines.

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Therefore, the Case Definition, in and of itself, does not establish causation. As stated

in Dr. Moore's witness statement at para. 142, "Case studies and the associated

methodology is a particular way of defining cases, and not a way of analyzing cases or

a way of modeling causal relations.?"

[351] The basis on which Dr. McMurtry concludes that industrial wind turbines cause

adverse health effects is summarized in the Introduction to the Case Definition, which

states:

These [adverse] health effects appear to correlate with proximity to IWTs

[industrial wind turbines], the frequency of the noise, the time of

exposure, and individual response. The pattern of individual's

complaints demonstrates a striking similarity internationally in media

reports and in physician-generated case series. [emphasis added]

[352] The Tribunal notes that evidence of the post-turbine witnesses, and Ms. Laurie's evidence respecting her survey of 130 Australians, provide data in support of this statement. However, while correlation can be indicative of causation, it is not synonymous with causation, because, as noted in Dr. Moore's evidence, associations between events can occur by chance. The evidence adduced by the respondents respecting causality assessment and the accepted use of the Bradford Hill criteria for assessing causal associations indicate that more than correlation is required in order to establish causation.

[353] The Tribunal recognizes that the reasons advanced by Dr. McMurtry also include his observation respecting the incidence of reports of adverse health effects in all countries where industrial wind turbines are erected, and that the reports of adverse health effects are similar despite differing culture and languages (described as

convergent validity). While these considerations are not to be discounted, the Tribunal finds that it has received insufficient evidence to establish that a causal association can be made, based on this information alone. While it is Dr. McMurtry's opinion that such a conclusion is established, the respondents' health experts clearly express their opinion that all of the Bradford Hill criteria must be satisfied, and, in this case, that these criteria have not been met.

[354] As is discussed in greater detail below, the evidence here is closer to the hypothesis generating phase of scientific research than it is to the point where conclusions can be made on causation. Consequently, the Tribunal finds that the Case Definition does not establish causation. In reaching this conclusion, the Tribunal also relies on its analysis and findings, described below, respecting Dr. Leventhall, and the evidence respecting annoyance.

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[355] In light of the above finding, it follows that any diagnosis based on the

assumption that adverse health effects are caused by living in the environs of industrial

wind turbines, also does not establish causation.

[356] As the Tribunal has found that the Case Definition does not establish causation,

the Tribunal finds that it is unnecessary to address the respondents' submissions

challenging other aspects of the validity of the Case Definition.

Appellants' Submission respecting evidence of Dr. Leventhall in Erickson

[357] The Appellants assert that there is a causal chain between annoyance, stress,

sleep disturbance, and adverse health effects. In their submissions in support of this

position, they maintain that the evidence of Dr. Leventhall, as reported in Erickson, that annoyance is a psychological effect, predominantly somatoform disorders, which occur in small numbers of people. The Appellants further maintain that: (i) he stated that the effects of extreme annoyance include symptoms such as sleep disturbance, headache, tinnitus, ear pressure, dizziness, vertigo, nausea, visual blurring, tachycardia, irritability, problems with concentration and memory, panic episodes; and (ii) he acknowledged that sleep disturbance is an adverse health effect.

[358] The Appellants state, that, in APPEC, the Tribunal found that if the approval holder disagreed with how Dr. Leventhall's evidence was interpreted in Erickson, or wished to have him give different or updated evidence, it had the opportunity to do so.

The Appellants assert that the Tribunal, therefore, inferred that Dr. Leventhall's evidence from Erickson was not contested. The Appellants point out that the Approval Holder could have called Dr. Leventhall to give evidence in this proceeding and has not

done so. Therefore, the Appellants submit that the Tribunal should draw the same

inference in these proceedings as they assert was drawn in APPEC.

[359] The Tribunal notes that the reference quoted from Erickson is with respect to the

evidence of Dr. Leventhall, not any finding made with respect to this evidence.

Nowhere in Erickson did the Tribunal make a specific finding in respect of this evidence.

At paras. 832 and 836, the Tribunal in Erickson stated:

832. Given the current level of science, the Tribunal finds that it is not

necessary to make major findings regarding the weight that should be

attached to each witness' testimony.

836. In many cases, the evidence (as opposed to the conclusions)

was simply different, but not divergent. To use an example, the

Appellants put forward a non peer-reviewed study that showed an

association between distance from turbines and reports of effects. The

Director and Suncor did not counter with a similar study that did not find

an association (a point that was generally made by Dr. Shepherd).

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Rather, they provided expert evidence on some of the apparent

weaknesses in the study and conclusions on why definitive causal

correlations could not be found. They also provided evidence about what

the existing peer-reviewed articles have studied (for example, perceived

impacts, such as 'annoyance?', 'high annoyance?', etc.) and contrasted

them with what the legal test asks for. This type of evidence added to the



evidentiary picture presented to the Tribunal. In very few instances did the scientific evidence run in completely opposite directions. Indeed, the Tribunal heard evidence from Dr. Mundt that many of the applicable peer-reviewed articles are about the perception of noise from wind turbines and not necessarily health effects. This, in part, led to the significant debates about the applicability of words like "annoyance" in the perception of noise studies to the test used in this proceeding, which focuses on health. Obviously, the Tribunal would have preferred clear evidence from peer-reviewed studies that actually measured health effects and their relation to wind turbines, but research in that area is still quite limited. [emphasis added]

[360] Secondly, in APPEC, the Tribunal did not make a finding accepting Dr.

Leventhall's evidence. Instead, the Tribunal in APPEC addressed an issue regarding

the interpretation of Dr. Leventhall's evidence in Erickson. At para. 49, the Tribunal

stated:

Dr. Leventhall testified for the approval holder in Erickson, and although

originally on the witness list for the Approval Holder in this proceeding,

he was never called. If the Approval Holder disagreed with how Dr.

Leventhall's evidence was interpreted in the earlier decision, or wished to

have him give different or updated evidence, it clearly had the

opportunity to do so. The Tribunal therefore infers that Dr. Leventhall's

evidence, as reflected in Erickson, was not contested.

[361] In any event, Dr. Leventhall did not testify in this proceeding. Consequently, his

work in this area is relevant only to the extent that it has been referenced by the experts

who have testified in this proceeding who rely on his work in support of the opinions

they have expressed.

Annoyance

[362] The Tribunal now turns to the Appellants' submissions regarding annoyance.

They rely on Mr. Howe's evidence as described above. They submit that, there is,

therefore, undisputed evidence before this Tribunal that, at sound levels at or below

those approved for the operation of this Project: (i) 6 to 20% of people will be very

annoyed, and (ii) such persons will experience adverse health effects, as there is a

causal chain between annoyance, stress, sleep disturbance, and adverse health effects.

[363] For the following reasons, the Tribunal does not accept the Appellants' assertion

that this evidence is undisputed, or that it has been conclusively established that such

persons will experience adverse health effects.

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[364] The Tribunal first notes that it accepts, as stated in Erickson at para. 630, that

?sometimes a causal link can be established, even if the specific mechanism

responsible for that link has not been identified with certainty within a suite of plausible

pathways.? However, to establish causation, there is still a requirement to demonstrate

that annoyance will result in the adverse health effects listed by the Appellants, even if

the exact mechanism is not identified.

[365] Supporting the Appellants' position is the evidence of Mr. Howe, who is a

professional engineer specializing in acoustics. While the Tribunal accepts that the

nature of his work as an acoustician includes consideration of whether noise can cause

annoyance, it has not been suggested that he has the qualification to comment on the

health effects that can be expected to result from annoyance. Instead, in his witness

statement, he states that research has shown that annoyance associated with sound

from wind turbines can be expected to contribute to stress-related health impacts in

some persons. Mr. Howe included as part of his evidence, a report he authored for the

MOE, the MOE Review Report noted above, which indicates that the referenced

research is primarily the published work of Dr. Leventhall. Mr. Howe also refers to a

2013 review conducted by the Oregon Health Authority, entitled Strategic Health Impact

Assessment on Wind Energy Development in Oregon (the "Oregon Study"), and a

recent study conducted by the University of Scotland. Dr. McMurtry's evidence on

these issues refers to Mr. Howe's MOE Review Report.

[366] The Director and Approval Holder do not agree with the Appellants' position.

They rely on the evidence of the respondents' health experts, and in particular, the

evidence of Dr. McCunney described above, wherein he disputes that some people will always exhibit effects, and refers to a study which indicates that some wind projects had never been subject to noise or health complaints.

[367] Based on the evidence adduced in this proceeding, the Tribunal finds that the proposition that annoyance will occur as a result of exposure to noise levels between 35 to 40 dBA has not been clearly established, as the expert opinion on this issue is divided. In this regard, for example, Mr. Howe relies on the work of Dr. Leventhall, as well as a 2009 study by a group of researchers (Pedersen et al.) that states that close to 20% of people were "very annoyed" by wind turbine sound levels. Dr. McCunney refers to a more recent report by Dr. Chapman which showed large spatio-temporal variations in complaints about noise and health from wind farms. Dr. Chapman found that 33 of 51 wind farms in Australia had never been subject to noise or health complaints. While the information respecting these studies has been provided to the Tribunal, no evidence

has been provided to indicate that one study should be relied on over another. For

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example, when challenged in cross-examination as to whether Dr. Leventhall would

accept the Chapman study, Dr. McCunney testified that Dr. Leventhall would have to

testify to indicate how this more recent study would affect his views.

[368] The divergence of opinion in this area is also documented by the WHO (Europe)

2011 Report referenced by Dr. McMurtry. This report includes a chapter on

'Environmental Noise and Annoyance', which highlights the debate and uncertainty

respecting noise annoyance. At page 91 the report states:

Noise annoyance is widely accepted as an end-point of environmental noise that

can be taken as a basis for evaluating the impact of noise on the exposed

population. As a consequence, EU Directive 2002/49/EC recommends

evaluating environmental noise exposures on the basis of estimated noise

annoyance.

As discussed in Chapter 1, WHO defines health as 'a state of complete

physical, mental and social well-being and not merely the absence of disease or

infirmity'. This implies that noise-induced annoyance may be considered an

adverse effect on health. People annoyed by noise may experience a variety of

negative responses, such as anger, disappointment, dissatisfaction, withdrawal,

helplessness, depression, anxiety, distraction, agitation or exhaustion.

Furthermore, stress-related psycho-social symptoms such as tiredness,

stomach discomfort and stress have been found to be associated with noise



exposure as well as noise annoyance. Some public health experts feel that

severe forms of noise-related annoyance should be considered a legitimate

environmental issue affecting the well-being and quality of life of the population

exposed to environmental noise. The most important issue in the present

context is to what extent health (according to the broad definition given above) is

reduced by noise and whether a DW that expresses this reduction, when

combined with the prevalence of annoyance, leads to a significant burden of

?disease?. The other possibility would be that noise annoyance does not

significantly contribute to disability and, hence, should not be taken into account

when considering the noise-induced burden of disease. (emphasis added)

[369] At page 93, this report also confirms that data below 45 dBA was not considered

?because the risk of unreliable noise data is high at very low levels ?? This report

further notes, at page 97, that:

Uncertainty with respect to the exposure?response relationship

One cause of doubt regarding the predictability of noise annoyance is

that the studies show a large variation in individual annoyance reactions

to the same noise exposure level. The other cause of doubt is that

attempts to integrate the results from different studies show that there is

a large variation in the relationships found in different studies. The large

individual variation and the large study variation suggest that it is difficult

to predict annoyance with sufficient accuracy. Indeed, the annoyance

response of a particular individual or group of individuals can be

predicted on the basis of the exposure only with a large amount of

uncertainty. ?

[370] The Tribunal notes that it is also unclear whether adverse health effects will

occur only at elevated levels of annoyance. In this regard, there is nothing in the

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evidence to indicate how levels of annoyance would be measured. In addition, Mr.

Howe, in his witness statement, notes that "it would be statistically invalid to predict the

exact number of persons expected to be very annoyed, other than noting that those

predisposed against the project are more likely to be annoyed." Furthermore, if there is

any consensus to be found among the experts who testified, it is that annoyance is not

likely to result solely from exposure to noise, but includes other factors affecting an

individual's attitude toward the project.

[371] If the intent of this evidence regarding annoyance is to support a generic approach to establish causation, i.e., where causation is not in relation to specific identified individuals, then it is clear that the epidemiological framework set out in the Bradford Hill criteria is relevant. Dr. Baines was qualified to give opinion evidence as an epidemiologist. As noted above, in para. 14 of her witness statement, she reviews these criteria and concludes that, in respect of wind turbines, none of these criteria have been fulfilled. The opinion evidence respecting the application of the Bradford Hill criteria is conflicting. Dr. McMurtry's analysis of these criteria is clearly at odds with the conclusions of Dr. McCunney, Dr. Moore, and Dr. Baines. While the Tribunal does not conclusively reject Dr. McMurtry's evidence, the Tribunal finds that it is not sufficiently compelling to lead the Tribunal to conclude that the opinions of Dr. McCunney, Dr. Moore, and Dr. Baines should be rejected. Consequently, in weighing this evidence, the most that can be said is that the preponderance of this opinion evidence favours the

position of the Director and the Approval Holder. Based on these conclusions, the

Tribunal finds that the evidence is inconclusive respecting whether industrial wind

turbines would cause annoyance. Assuming that the evidence established that

annoyance will be caused, the Tribunal also finds this evidence is inconclusive

regarding the degree of annoyance which would be caused, and, in turn, whether such

annoyance will result in adverse health effects.

[372] The Appellants assert that the causal chain between annoyance, stress, sleep

disturbance, and adverse health effects, is evidenced by the adverse health effects

suffered by the post-turbine witnesses who testified in this proceeding. The Tribunal

does not accept that this has been established by the Appellants. Instead, the Tribunal

finds that, based on the evidence adduced in this proceeding, the symptoms reported

by the post-turbine witnesses may be evidence of the causal chain between annoyance,

stress, sleep disturbance and adverse health effects. In this regard, the Tribunal notes

that the Appellants did not adduce any opinion evidence by a qualified health

practitioner to confirm that the symptoms reported by the post-turbine witnesses

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resulted from annoyance, manifested through a somatoform or other disorder or

condition.

[373] In summary, the Tribunal finds that the evidence is inconclusive on the issue of

whether wind turbine noise at 40 dBA or less, and other associated factors, such as

being predisposed against a wind turbine project, can be expected to cause annoyance

that will result in serious harm to human health for a small percentage of the population

that will be exposed to the Project under appeal. In this regard, Tribunal finds that the

Tribunal's finding in Erickson, at para. 838, also applies here:

838. To summarize, the evidence in this Hearing on serious indirect

harm was largely exploratory. The evidence on a lack of serious indirect

harm was also limited (the evidence on a lack of serious direct harm is

much stronger, however). The Tribunal is not giving significant weight to

the latter and little to the former in reaching its conclusion. That is

because the legal test itself tilts the balance in one direction. The onus is

on one side (in this case, the Appellants). That side has provided

evidence that the Tribunal finds to be exploratory in nature, even if given

significant weight. Put another way (using the wording of Dr. Mundt), the

present situation is closer to the hypothesis generating phase of scientific

research than it is to the point where conclusions can be made on  
causation (with respect to the sound levels expected at the Project's  
receptors). Or, using the approach of Dr. Shepherd, it is clear that we are  
not yet at the third stage of research on a new condition where intensive  
research has been completed so as to determine causation. We are at a  
much earlier stage, where there have been adverse event reports and  
some exploratory studies, such as the Nissenbaum Study. It is,  
therefore, no surprise that the legal test, which requires proof of harm,  
has not been satisfied when the applicable scientific evidence is in such  
an early stage of development.

Low Frequency Noise and Infrasonic (?LFNI?)

[374] Mr. Howe's evidence briefly touched on LFNI. Both Dr. McMurtry and Dr.

McCunney addressed the issue of LFNI in greater detail in their witness statements.



The Tribunal has not found it necessary to include a synopsis of this evidence in this decision, as they both testified in Erickson on this issue, and much of their evidence adduced in this proceeding is as described in that decision. Regarding Dr. McMurtry's evidence in this proceeding, he relies on his witness statement which was filed in Erickson in 2011. In this proceeding, Dr. McCunney's witness statement further addresses LFNI, providing reference to studies published after 2011. In summary, there is a clear difference of opinion between them regarding whether LFNI generated by wind turbines will cause harmful effects to humans.

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[375] The Tribunal notes that the Appellants' submissions did not address LFNI

separately from the issue respecting the health effects resulting from annoyance. The

Tribunal also notes that para. 193 of the Appellants' submissions states:

? there remain key gaps in the information available about the

relationship between IWTs and human health:

? Sleep disruption and health effects from long-term exposure to

low levels of low frequency sound and infrasound.

[376] In light of the divergent expert opinions on this issue, and the current status of

the research in this area, the Tribunal finds that the present situation still remains closer

to the hypothesis generating phase of scientific research than it is to the point where

conclusions can be made on causation. Consequently, the Tribunal finds that the

Appellants have not established that LFNI generated by wind turbines will cause serious

harm to human health.

## Conclusion on Issue 2A

[377] For the above reasons, the Tribunal finds that the Appellants have not

established a causal link between wind turbines and human health effects where there

is a 550m setback and 40 dBA noise limit.

## Issue 2B: Whether Engaging in This Project in Accordance with the REA Will

### Cause Serious Harm to Human Health

[378] As the Tribunal has noted earlier in this decision, the Appellants seek to establish

causation by establishing that specific individuals have suffered serious harm to their

health as a result of living in proximity to wind project components, maintaining that this

evidence establishes that wind turbines will exacerbate certain types of pre-existing

medical conditions. The Appellants maintain that the pre-turbine witnesses who have

testified in this proceeding, are vulnerable people living in the vicinity of the Project who

have such pre-existing medical conditions. The Appellants assert, therefore, that their testimony respecting their pre-existing medical conditions is highly relevant to establish a causal link between the proposed Project and ?the more likely than not probable effect on those living near the Project?.

[379] The pre-turbine witnesses each testified that they had or have a pre-existing medical condition. They each expressed their concern that, due to their proximity to the proposed wind turbines in the Project, they could experience a resumption or exacerbation of their symptoms, or suffer additional adverse health effects. They each produced medical records that they were able to obtain regarding their past medical history. However, none of them presented opinion evidence from a qualified health

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practitioner to confirm that their concerns will occur. In the absence of such medical

opinion, the Appellants rely on the evidence of the post-turbine witnesses to establish

their assertion that exposure to wind turbines will exacerbate pre-existing medical

conditions.

[380] In light of the Tribunal's findings above that the Appellants have not established a

causal link between wind turbines and human health effects, and, in particular, that

causation has not been established in respect of the post-turbine witnesses, the

Tribunal finds that the Appellants have not established that any of the pre-turbine

witnesses will suffer serious harm to their health as a result of the Approval Holder

engaging in the Project in accordance with the REA. As such, the Tribunal finds it is

unnecessary to engage in a detailed review of the medical evidence respecting their

pre-existing conditions. However, the Tribunal will address the evidence of one pre-turbine witness, as her evidence includes an assertion of direct causation, namely, that shadow flicker will cause her to experience epileptic seizures. For ease of reference, the Tribunal will refer to this pre-turbine witness as 'PTW'.

#### Evidence of Witness PTW

[381] PTW owns a 22 acre property in the Project area, and plans to retire in December 2013 and use this rural property as her primary residence. She believes the Project will cause serious harm to her health due to two health conditions: high blood pressure and epilepsy. She has been taking blood pressure medication for many years, having been hospitalized in the past due to high blood pressure. She testified that she monitors her blood pressure every day, and works hard to keep it at a reasonable level by, among other things, a daily fitness regime.

[382] She testified that she has suffered from epileptic seizures from the age of two.

PTW testified that she can recognize the onset of an episode with approximately two hours' warning, which has allowed her to live a fairly normal life. She states that each episode of an epileptic seizure is extremely physically taxing, and she fears ongoing damage to her health. She described episodes she has experienced, which she states have had a significant impact on her. She cites, for example, that a single seizure will leave her bedridden for days and take several weeks for a full recovery. Multiple seizures will require an even longer recovery process.

[383] PTW has become attuned to triggers throughout her life, and finds that nausea is a trigger, as well as illness and fatigue. She states that she attempts to minimize the likelihood of epileptic seizures through lifestyle, including a regular exercise regime and

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sufficient sleep. When she feels a seizure coming on, it is very important to find a quiet

place so she can "push it away".

[384] PTW makes use of her property for outdoor recreation, gardening, and tapping

maple trees in the early spring. She is concerned that the wind turbine project may

cause her a loss of sleep, headaches and nausea, all of which increase the likelihood of

suffering an epileptic seizure. In addition, she notes the shadow impacts will occur

during seasons when she is using the outdoor space, including tapping the maple trees

in early spring and gardening in the fall. She feels she cannot live on the property and

put herself at risk of seizures, should the Project proceed.

[385] In cross-examination, PTW agreed that flashing lights have never triggered a

seizure in the past, but she is not willing to test it. Her main concern is nausea



associated with moving shadows.

[386] PTW filed a review of the literature on health impacts of wind turbines, in a paper

prepared by Knopper and Ollson (2011). She notes that the authors state "in Ontario it

has been common practice to attempt to ensure no more than 30 hours of shadow

flicker per annum at any one residence" (page 6). She also notes that Germany has

regulations related to shadow flicker, and stipulates a maximum of 30 hours per year for

worst case scenario, and eight hours per year (30 minutes on any one day) actual

amounts of shadow flicker. She states that the United Kingdom ("UK") takes the

approach of a minimum setback (9 or 10 times the rotor diameter of the blade, and or

10 times the tower height to the hub) to reduce shadow flicker. According to her

calculations, the UK regulations would result in Turbines T1 and T2 of the Project being

set back 850 m to 1,030 m from her home, were they to apply in Ontario.

[387] Regarding shadow flicker, Steve Hilditch gave opinion evidence regarding the

time of the year that shadow flicker from the two turbines would affect PTW's property.

[388] In response, the Approval Holder called Shant Dakouzian to respond to Mr.

Hilditch's evidence. Both Mr. Hilditch and Mr. Dakouzian used computer simulation

modelling as the basis for their evidence. It was not disputed by Mr. Dakouzian that

PTW's property would be subject to shadow flicker at some times of the year, although

it is his opinion that, given the distance from the turbines, the intensity of the shadow

would be diffused. Mr. Hilditch's estimates of the amount of time each day that PTW's

property would be exposed to shadow flicker is higher than Mr. Dakouzian's estimates.

The Approval Holder also called Dr. McCunney to respond to PTW's health concerns.

His evidence is described below.

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#### Findings Regarding Evidence of PTW

[389] In summary, PTW asserts that she will experience increased risk of having epileptic seizures as a result of potential for sleep deprivation from noise, or as a result of nausea and risk of increased blood pressure caused by wind turbine shadow flicker from the two Project turbines to be located nearest her property. Regarding sleep deprivation from noise, this issue has already been addressed under Issue 2A, particularly in respect of the post-turbine witnesses.

[390] The Tribunal finds that it does not need to make specific findings respecting these areas of disagreement between the shadow flicker experts, because (i) they both agree that her property will be affected to some degree by shadow flicker each year;

and (ii) PTW's evidence is that she will be at risk of experiencing a seizure if she is exposed to any shadow flicker.

[391] The Tribunal notes that PTW has adduced some evidence that shadow flicker

affects people with photo-sensitive epilepsy. The Knopper and Ollson paper notes at

page 5, however, that "turbines are designed not to pose a risk of photo-induced

epilepsy". They state:

Harding et al. and Smedley et al. investigated the relationship between

photo-induced seizures (i.e., photo-sensitive epilepsy) and wind turbine

blade flicker (also known as shadow flicker). This is an infrequent event,

typically modelled to occur less than 30 hours a year from wind turbine

projects we have reviewed and would be most common at dusk and

dawn, when the sun is at the horizon. Both studies suggested that flicker

from turbines that interrupt or reflect sunlight at frequencies greater than

3 Hz pose a potential risk of inducing photosensitive seizures in 1.7

people per 100,000 of the photosensitive population. For turbines with

three blades, this translates to a maximum speed of rotation of 60 rpm.

The normal practice for large wind farms is for frequencies well below

this threshold.

[392] The practice in Ontario to attempt to ensure no more than 30 hours of shadow

flicker per annum on a residence, as referenced by PTW, is directed to reducing the

?annoyance? factor, rather than any likelihood of photosensitive epileptic seizures.

[393] In response to PTW's evidence, Dr. McCunney's uncontradicted opinion

evidence is as follows:

## 7. Concerns about the potential health impact of wind turbine

operations on people who have been diagnosed with epilepsy have been

addressed in the peer reviewed scientific literature. (Smedley et al, 2010

and Harding et al, 2008) The type of epilepsy that has been suggested

as possibly at risk from wind turbine operations is known as

?photosensitive epilepsy?. Photosensitive epilepsy, which occurs in

about 1 in every 4000 people (0.025%), may be precipitated by flickering

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sunlight. However, flicker that occurs at less than 3 cycles per second,

(180 revolutions per minute) such as occurs in wind turbine operations,

does not pose a risk of provoking photo-epileptic seizures. (Harding et al,

2008) As indicated above, there is no evidence in [PTW's] records that

she is part of the small fraction of the population that has photosensitive

epilepsy. This conclusion is corroborated by the fact that [PTW] had an

EEG on October 24, 2008 in which photic stimulation triggered no

results.

8. In my view, the evidence does not support the view that shadow

flicker from the wind turbines will pose a risk of provoking a seizure in

[PTW] because the evidence does not indicate that [PTW] has

photosensitive epilepsy. The type of her epilepsy - at the most recent

evaluation - appears, based on the records produced, very stable in that

she has had very few seizures since her early college days, and had a

normal EEG in 2008.

9. Even if [PTW] did have photosensitive epilepsy, the shadow

flicker from the wind turbines would not pose a significant risk of provoking a seizure. My opinion is based on a review of pertinent scientific studies (Harding, 2008; Smedley, 2010), and the technical Specifications for the GE turbines planned for the Dufferin wind farm which indicate that the rotating blade frequency will not exceed 16.18 revolutions per minute (rpm), which is less than 10% of the threshold proposed by Smedley et al as capable of provoking a photo-epileptic seizure. (Technical Documentation Wind Turbine Generator Systems GE 1.6-100-50 Hz/ 60 Hz and General Electric 2.75 MW Turbines) The turbine blades will not rotate at a sufficiently high frequency, i.e. > 3 cycles per second (180 revolutions per minute) to provoke a photo epileptic seizure. (Smedley et al, 2010) In a comprehensive report



prepared for the state of Massachusetts, the expert panel came to a

similar conclusion, finding that the scientific evidence suggests that there

is no risk of seizure from shadow flicker caused by wind turbines.

(MDPH, 2012)

10. Effect of shadow flicker on blood pressure. Apart from her

concern about epilepsy, in her witness statement [PTW] also raised

concern that shadow flicker has the potential to affect her blood

pressure. There is insufficient scientific evidence to suggest that shadow

flickering will cause blood pressure to elevate and cause hypertension,

and in fact experts have concluded that shadow flicker does not cause

any adverse health effects. (MDPH, 2012) As [PTW] herself has

observed, there is only one German study that indicates that prolonged

shadow flicker (more than 30 minutes) could result in stress--related

health: effects, (Pohl et al, 1999) A single study does not constitute

enough to prove a link. That is particularly true in light of the fact that

other studies conducted among people living in the vicinity of wind

turbines have not shown causal links between wind turbines and

hypertension. (Pedersen, 2011)

[394] The Tribunal notes that Dr. McCunney's uncontroverted evidence provides the

only qualified medical opinion respecting PTW's condition. While the Tribunal accepts

PTW's description of her symptoms, this evidence does not establish that: (i) she, in

fact, suffers from photo-sensitive epilepsy; (ii) the frequency of shadow flicker from wind

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turbines will trigger photo-epileptic seizures; or that (iii) shadow flicker will cause

elevated blood pressure resulting in hypertension. For these reasons, the Tribunal finds

that the Appellants have not established that PTW will suffer serious harm to her

health caused by the Project wind turbines that will be located near her property.

Evidence of the Other Party, Participant and Presenter

Joan Lever (Participant)

[395] Ms. Lever lives in the vicinity of the Project and expressed her view on the harm

that she believes will be caused by the Project. She has been a dedicated follower of

this proceeding, and she is a vocal opponent of locating wind project development close

to peoples' homes.

[396] Ms. Lever supports the position of the Appellants in this proceeding. Her

evidence touched on many, if not all of the issues before the Tribunal, including the

impact of wind turbine noise, and sleep disturbance on human health. She also spoke passionately regarding the social impact of turbine projects on communities.

[397] Ms. Lever's evidence included a sophisticated multi-media presentation that included excerpts from the CBC television documentary, "Wind Rush", as well as video footage from community demonstrations, and of a case of turbine fire. She appended many of the scientific documents that were also referred to by Ms. Laurie.

[398] Ms. Lever expressed concern about direct health effects from low-frequency noise and infrasound, as well as indirect effects from stress and sleep disturbance. She asserts that the current set-back distances are entirely insufficient, citing her understanding of set-back requirements in other jurisdictions, including Australia, New Zealand, and a number of US states. She maintains that, in all cases, they are well beyond Ontario's 550 m requirement.

[399] Ms. Lever is also concerned with safety issues, such as fires and ice throw. She

supports the submissions by the Municipality of Amaranth, with respect to the danger of

installing overhead transmission lines within this municipality.

Dr. William Crysedale (Party)

[400] Dr. Crysedale is a retired physician who, when in active practice, specialized in

children's health. He testified as a witness with respect to human health issues,

although he did not seek to be qualified to give opinion evidence. He stressed the

importance of recognizing that adverse health effects are serious.

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[401] Dr. Crysedale expressed his concern that the regulated set-back of 550 m is

insufficient and is becoming ever more insufficient, given the increasing size of wind

turbines. He asserts that Australia and New Zealand currently have established

residential setbacks of 1.5 to 2 km.

[402] Dr. Crysedale refers to several abstracts of studies and other papers supporting

the view that low frequency noise and infrasound may impact a person's health, and

that chronic annoyance is a risk factor for other types of diseases.

[403] Dr. Crysedale is particularly concerned with the impact of loss of sleep on children.

He asserts that independent research into the health effects of existing wind farms is

long overdue, and is alarmed that the current Health Canada study to better understand

health impacts of wind turbine noise, will not include anyone under the age of 18.

[404] Dr. Crysedale submits that "the precautionary principle is one of the central

concepts of modern environmental policy." He discussed a number of examples where

it has been applied. After examining factors used by an Ontario medical officer of health to apply the precautionary principle, Dr. Crysedale concludes, that "at least a moderate precautionary principle" approach should be adopted. In reaching this conclusion, he relies, in part, on his assertion that there is a "low societal need for the electricity produced".

[405] Dr. Crysedale also commented that he has proposed to the Hospital for Sick Children, where he worked until his recent retirement, that they undertake a study related to wind turbine noise and its impact on children's health.

Don MacIver (Presenter)

[406] Mr. MacIver is the mayor of the Corporation of the Municipality of Amaranth (the "Municipality"), in which the Project is located. He gave a detailed presentation of the Municipality's health and safety concerns regarding the Project's proposed overhead transmission line. As his presentation was extensive, the Tribunal will only highlight the

subject areas covered in his presentation:

? high voltage transmission lines impact human health;

? the multi-use of an elevated recreational trail within the Municipality will be

? electro-magnetic fields caused by transmission lines may be linked to a

severely limited, as a section of the Project overhead transmission line will be

situated in close proximity to a section of this trail, causing safety concerns;

variety of human health problems, impact property values, and effect

livestock.

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[407] Mayor MacIver testified that the Municipality wants the transmission line buried

throughout the Municipality.

Norman Wolfson (Presenter)

[408] Mr. Wolfson testified regarding both the health case, and concerns related to the

natural environment. In the portion of his presentation which addressed health issues,

he expressed significant concern about the potential for noise generated by 49 industrial

wind turbines, some of which, he stated, are to be built in close proximity to his home.

He further stated that this noise will disrupt his family's peaceful enjoyment of their

property and the surrounding area.

[409] Mr. Wolfson asserts that the area already has an inordinately high number of

wind turbines, and maintains that the Project area is much too small to accommodate

49 industrial wind turbines.

[410] Mr. Wolfson states his understanding that the Approval Holder has not conducted

studies on possible impacts on human health, and states that he cannot understand

why the Approval Holder's application for the REA could not have been deferred until

the completion of the current study by Health Canada.

#### Findings Regarding Evidence of the Other Party, Participant, and Presenter

[411] The evidence of Ms. Lever, Dr. Crysedale, Mayor MacIver and Mr. Wolfson, has

been of assistance to the Tribunal in better understanding the issues to be addressed in

this proceeding. The Tribunal notes that much of the evidence presented by Ms. Lever,

Dr. Crysedale, and Mr. Wolfson, has been addressed by the other parties in this

proceeding, and as such, their concerns and submissions have been addressed by the

Tribunal elsewhere in this decision.

[412] Regarding the Municipality's evidence respecting the health and safety impacts

of above ground transmission lines, the Tribunal notes that a presenter may only give

evidence respecting the issues raised in the appeal. Some of the appeals, in referring to adverse health effects, do state that it is more likely than not that they are caused by a number of factors including stray voltage or electromagnetic fields. However, neither the Appellants' evidence nor their submissions in respect of the Health Test, have directly addressed this issue. Therefore, it is not entirely clear that this issue is before the Tribunal. However, assuming that it is, the Tribunal notes that no expert opinion evidence has been adduced to support the views expressed in Mayor MacIver's presentation. Consequently, the Tribunal finds that Mayor MacIver's evidence does not

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establish that serious harm to human health will be caused by high voltage transmission

lines.

#### Conclusion on Issue 2B

[413] The Tribunal finds that the Appellants have not established that any pre-turbine

witnesses will suffer serious harm to their health caused by the Project wind turbines.

[414] As noted above, the evidence in this proceeding does not establish a causal link

between wind turbines and either direct or indirect serious harm to human health under

the conditions imposed in the REA requiring a setback distance of 550 m, and a

maximum noise level of 40 dBA.

[415] Consequently the Tribunal finds that the Appellants have not established that

engaging in the Project in accordance with the REA will cause serious harm to human

health.

Issue 2C: Whether Ms. Laurie should be qualified to give opinion evidence

[416] The Appellant, Mr. Sanford, called Ms. Laurie as a witness to give opinion

evidence respecting the issue whether engaging in the Project in accordance with the

REA will cause serious harm to human health. As noted earlier in this decision, Mr.

Sanford requested that she be qualified as "a physician with experience in the delivery

of health care." In an oral ruling, the Tribunal refused Mr. Sanford's request, indicating

that its written reasons for this disposition would follow. The Tribunal's reasons are

provided below.

Ms. Laurie's Education, Training, and Experience

[417] The factual evidence regarding this witness' education, training, and experience

in support of the requested qualification is not in dispute. Ms. Laurie obtained a

Bachelor of Medicine, Bachelor of Surgery in 1995 from Flinders University, South

Australia, and subsequently practiced, and obtained a Fellowship with the Royal

Australian College of General Practitioners ("RACGP") awarded in 1999, and Fellowship

with the Australian College of Remote and Rural Medicine (?ACRRM?) in March 2000.

She stopped practicing medicine in April 2002 due to personal circumstances. Ms.

Laurie testified that in order to practice medicine, and more specifically, to diagnose and

treat patients, Australian law requires that she must be registered with Australian Health

Practitioners Registration Authority (?AHPRA?). She indicates that she let her

registration lapse approximately two and half years after she ceased practicing in 2002.

Ms. Laurie indicates that it is her intention to re-register with AHPRA. However, she

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stated that she must complete some self-study, particularly to update her knowledge

respecting medication regimes, before she will be ready to re-apply. She confirmed

that, to date, she has not done so. In light of these circumstances, Ms. Laurie

confirmed that she cannot diagnose patients or prescribe medication for them.

[418] As a result of a complaint filed with the AHPRA in 2013 that her current activities

(discussed below) constituted practice as a physician, she voluntarily agreed not to use

the title/honourific 'Doctor' or 'Dr.'. She states that she has done so, in order to avoid

any potential misunderstanding by members of the public regarding her status as a

practicing physician. Documentary evidence respecting the complaint was adduced in

evidence and marked confidential, i.e., it is not included in the public record in this

proceeding. Ms. Laurie was cross-examined on this evidence. The Tribunal finds that

this evidence supports Ms. Laurie's assertion that the AHPRA did not make any finding

in respect of the complaint made against her.

[419] In terms of her other professional training and experience, Ms. Laurie

acknowledges that she has no training or experience in conducting medical or scientific research. She further acknowledges that she also does not have any training or experience in research methodology and design, other than some undergraduate exposure when obtaining her medical degree, and does not have post-graduate experience in this area. She acknowledges that she is not a qualified acoustician, and she has no experience or training in acoustics generally, or, in particular, pertaining to noise generated by industrial wind turbines, although she has reviewed publications in the subject area of acoustics, and has consulted with acousticians.

[420] Ms. Laurie testified that she first became interested in the potential health impacts of industrial wind turbines, specifically resulting from noise generated by industrial wind turbines, in 2010, when a wind project was proposed to be a situated near her home (but subsequently never built). Since that time, she accepted an



invitation to be the medical director of foundation known as the Waubra Foundation, a

volunteer position, which has subsequently changed to her current volunteer position as

Chief Executive Officer. Ms. Laurie testified that the Waubra Foundation was formed in

March 2010 to facilitate research into the adverse health impacts being described by

neighbours to wind developments in Australia. She also stated that this Foundation has

a particular interest in the role of low frequency industrial noise from any source, and

resultant health problems.

[421] The majority of Ms. Laurie's work experience related to health impacts of

industrial wind turbines, comes from her work for the Waubra Foundation which is a full

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time volunteer position. In summary, Ms. Laurie testified that she has not approached communities to conduct surveys, and that she has not conducted formal structured research. She states that she conducts an ongoing survey, where, to date, she has spoken with approximately 130 people in Australia who live in the vicinity of industrial wind turbine projects. She indicated that these people have identified themselves to her, by contacting her directly, or indirectly by contacting the Waubra Foundation. She explains that these persons describe their symptoms to her and request information. She maintains that, when speaking with these people, she does not provide an individual diagnosis. She states that she has not ever taken a formal medical history, which is what a registered medical practitioner would do. She asserts that, instead, she provides information which people can choose to take to their health care practitioner, if they wish to do so, and that, sometimes, their practitioner will contact her for

information. Ms. Laurie states that she is interested in learning about their problems, so she can provide information to enable them to assist their own practitioners in working out whether or not their symptoms are related in any way to a source of noise, whether the source is an operating wind turbine, or some other source.

[422] Ms. Laurie explained that the Waubra Foundation is solely concerned with the human health consequences of exposure to operating industrial wind turbines and other sources of infrasound and low frequency noise. She states that she does not oppose industrial wind projects per se, but is concerned about the current practice of siting wind turbines in locations where, in her view, they are likely, on the basis of current knowledge, to cause harm to human health.

[423] Apart from interviewing self-identified individuals as described above, Ms. Laurie states that she also works with acousticians to advance multi-disciplinary research which she asserts is needed. She further testified that she has conducted reviews of

the published literature in this field, both in the subject area of noise impacts on human health associated with or caused by wind turbines or other sources, and in the subject area of noise acoustics. She also consults with other professionals who are working in this area, both in Australia and internationally, and, in this context, is familiar with the work of Dr. McMurtry, who has also testified in this proceeding.

[424] In her witness statement, Ms. Laurie, in describing her work in this area, makes

the following assertions:

My own field work, and knowledge of the field work of others including acoustic and psycho acoustic measurements and physiological research, is appreciated by those genuinely seeking to understand why people are becoming unwell living near wind turbines. My help, knowledge and advice is sought by doctors, acousticians and researchers working in this

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field in Australia and overseas. My ability to understand and

communicate the essence of the existing acoustic and human health

evidence, has contributed to the general community understanding of the

existing known pathophysiological pathways which make this condition

so devastating to a significant proportion of wind project neighbours.

Ms. Laurie's Proposed Opinion Evidence

[425] Ms. Laurie's opinion evidence is set out in her witness statement which has been

filed in this proceeding. Although the Tribunal has given careful consideration to each

of the opinions advanced in her witness statement, for the purpose of this decision, it is

sufficient to describe these opinions by way of a summary overview. Ms. Laurie's

opinion evidence falls into three main areas.

[426] First, Ms. Laurie reviewed the witness statements and other information

respecting Ontario residents who have testified in this proceeding. These witnesses fall

into two categories:

? The post-turbine witnesses who reside in the vicinity of existing wind turbine

projects who assert they have suffered harm to their health as a result of

exposure to operating wind turbines.

? the pre-turbine Witnesses residing in the vicinity of Project wind turbines.

[427] There are other persons referenced in Ms. Laurie's witness statement who did

not testify in this proceeding.

[428] In her witness statement Ms. Laurie states that she was retained to read the

witness statements from the people named in her witness statement, and comment on:

a) whether they conform with Dr. McMurtry's case definition (described

previously in this decision); and

b) whether they are in accordance with her own knowledge of the range and

pattern of health problems being reported by residents living near industrial

wind turbines.

[429] In this regard, Ms. Laurie also reviewed medical records provided by these

witnesses and questionnaires completed by them, and conducted a telephone interview

with each of the witnesses who testified in this proceeding.

[430] In her concluding remarks regarding the post-turbine witnesses, Ms. Laurie

states:

Despite the individual differences between these witnesses with respect

to the type, range and severity of the symptoms experienced, the speed

of onset of symptoms, there is a clear pattern of exposure to operating

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wind turbines being associated with the symptoms, which are relieved or

improve with cessation of exposure, ?

Overall, it is clear that all of them have experienced serious health

impacts as a result of exposure to wind turbines. This makes it probable

that others will experience similar effects if they are exposed to turbines.

[431] In her concluding remarks regarding the pre-turbine witnesses, Ms. Laurie states:

It is probable that each of these individual residents will have serious



adverse health impacts from wind turbine emissions from the proposed

wind development.

Each of them has one or more of the risk factors identified by Dr. Nina

Pierpont and Dr. Geoff Leventhall, being either at the extremes of age, or

a clinical history of migraines, motion sickness, or inner ear pathology.

In addition each of them have underlying medical conditions which make

them more likely to suffer the health damaging consequences of

exposure to wind turbine noise because of the well established effects of

sleep deprivation and physiological stress from exposure to infrasound

and low frequency noise.

[432] In her witness statement, Ms. Laurie describes a study by Dr. Pierpont, who is a

practicing medical physician. Ms. Laurie provides an overview of symptoms identified

by Dr. Pierpont, and she states that Dr. Levanthall, an acoustician, has acknowledged

that these symptoms have been known to him to result from exposure to environmental

low frequency noise. These symptoms are:

? Sleep disturbance and sleep deprivation

? Headaches

? Tinnitus (ringing in the ears)

? Ear Pressure

? Dizziness

? Vertigo

? Nausea

? Visual Blurring

? Tachycardia (fast heart rate)

? Irritability

? Problems with concentration and memory

? Panic episodes associated with sensations of movement,

? Quivering inside the body that arise when awake or asleep

[433] Ms. Laurie also describes four specific risk factors identified by Dr. Pierpont as

increasing the risk of developing characteristic symptoms from exposure to wind turbine

noise. These are:

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? The extremes of age ? babies and young children and older citizens

? History of migraines

? History of motion sickness

? History of pre-existing otological (ear) conditions including inner ear disorders

and industrial deafness

[434] Ms. Laurie also expressed opinions that each of the post-turbine and pre-turbine

witnesses who testified in this proceeding, satisfy the criteria for the 'probable' category

of diagnosis as defined in Dr. McMurtry's Case Definition. She also expressed further

opinions respecting these witnesses as described below.

Findings Regarding Mr. Sanford's Request to Qualify Ms. Laurie to Give Opinion

Evidence

[435] Tribunal Rule 170 regarding the production of witness statements, confirms that

the Tribunal requires that a witness who wishes to give opinion evidence must be

qualified to do so. Regarding the nature of these qualifications, the Tribunal has issued

a Practice Direction for Technical and Opinion Evidence (the 'Practice Direction?').

Paragraphs 5 and 9(c) of this Practice Direction state:

5. To give opinion evidence, a witness must have specialized

education, training, or experience that qualified him or her to reliably

interpret scientific or technical information or to express opinions about

matters for which untrained or inexperienced person cannot provide

reliable opinions. ?

9.(c) The witness should express an opinion to the Tribunal only when

the opinion is based on adequate knowledge and sound conviction. The

witness should be reluctant to accept an assignment to provide evidence

for use by the Tribunal if the terms of reference of the assignment do not

allow the witness to carry out the investigations and obtain the

information necessary to provide such an opinion. A witness who

accepts an assignment under these circumstances should advise the

Tribunal of the limitations that the terms of reference place on his or her

ability to provide the information necessary to assist the Tribunal in

making a sound decision.

[436] The Tribunal notes Rule 170(d) requires that a witness who proposes to give

opinion evidence, must complete Form 5, which requires that the witness acknowledge

that the witness' evidence will be fair, objective and non-partisan. Therefore, it is clear

that the witness' duty in this regard, is provide opinions which will assist the Tribunal to

make a sound decision.

[437] The requirement set out in para. 5 of the Practice Direction, reflects the law of

evidence that, in order to give opinion evidence, a witness must have acquired special

or peculiar knowledge through study or experience that is beyond the knowledge of the

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common person. So long as the witness satisfies this requirement, the way in which a

witness has acquired the knowledge is immaterial (see *R. v. Kinnie* (1989), 450

B.C.L.R.(2d) 369 (?Kinnie?), and *R. v. Mohan* [1994] 2 S.C.R. 9 (?Mohan?), and cases

cited therein). As such, the fact that Ms. Laurie is not registered with the AHPRA, and,

therefore, cannot practice medicine (which includes making diagnoses and prescribing

medication), does not, in and of itself, preclude her from being qualified to give opinion

evidence. The test is whether she has the special or peculiar knowledge in respect of

the matters on which she undertakes to testify.

[438] However, the rationale for this requirement is to ensure that such opinions meet

a basic threshold of reliability. As noted in *Mohan* (at page 25), where the proposed

opinion evidence advances a novel scientific theory or technique, such evidence is to be subjected to special scrutiny to determine whether it meets the reliability threshold.

[439] Clearly, the obligation of the expert witness is to provide opinions which are not

subject to any limitation or deficiency which causes the Tribunal to question their

reliability. In this regard, the Tribunal observes that para. 9(c) of the Practice Direction,

is an example of such scrutiny. The underlying rationale for paragraph 9(c) is that

opinion evidence which is proffered subject to restrictions or conditions, will limit its

assistance to the Tribunal in making a sound decision.

[440] In this case, the terms of reference of Ms. Laurie's retainer do not place any

limits on her ability to provide the information necessary to assist the Tribunal in making

a sound decision. Instead, Ms. Laurie herself stipulates the limitation that her opinion

evidence cannot and does not include diagnostic opinion.



[441] The Tribunal accepts that Ms. Laurie, in her curriculum vitae and her oral

testimony during the qualification phase of her testimony, clearly indicates this limitation.

However, such acknowledgment, in and of itself, does not mean that the opinions she

proposes to advance are sufficiently reliable to assist the Tribunal in making a sound

decision. The Tribunal's decision in this regard is discussed below.

[442] The Tribunal has reviewed Ms. Laurie's proposed evidence in detail. For

reasons described below, the Tribunal finds that Ms. Laurie, in expressing her opinions

either:

? makes a diagnosis;

? applies diagnostic interpretation of pre-existing medical conditions to reach

conclusions that exposure to operating industrial wind turbines has

exacerbated such conditions, or has resulted in additional health problems; or

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? as in the case of the pre-turbine witnesses, includes the application of

diagnostic interpretation to formulate opinions as to the likelihood that these

individuals will suffer health damaging consequences if exposed to an

operating industrial wind turbine.

[443] The Tribunal has addressed Dr. McMurtry's evidence previously in this decision.

However, for the purpose of determining whether Ms. Laurie should be permitted to give

opinion evidence in this proceeding, it is sufficient to note that Dr. McMurtry has clearly

identified that the deployment of the diagnostic criteria set out in the Case Definition

should be conducted by a health care practitioner licensed to take a history and make

diagnoses.

[444] Ms. Laurie testified that she did not consider that she made diagnoses of any of the pre-turbine or post-turbine witnesses. Her witness statement indicates that she was asked to comment on whether the medical information she reviewed for each witness, conforms with the Case Definition. In cross-examination, she stated that she is not making a diagnosis in the sense of seeing somebody professionally, providing medical services, and providing a diagnosis on the basis of seeing the patient. She acknowledged that she clearly is not able to do this at the present time, and stated that she would not do so. She also maintains that the purpose of the Case Definition is to assist physicians in making a diagnosis. Respecting this latter statement, the Tribunal notes that Ms. Laurie did not dispute that the Case Definition does describe a medical diagnosis.

[445] In addressing this aspect of Ms. Laurie's evidence, the Tribunal first repeats its

earlier finding made in respect of Dr. McMurtry's opinion evidence. The purpose of opinion evidence is to assist the Tribunal in making its decision respecting the statutory test under the EPA, which is a legal determination. Consequently, the nature of the proposed opinion evidence is to be assessed in this legal context, and not the context of how a health practitioner may differentiate between commenting on conformity with the Case Definition and making a diagnosis. In the legal context, the Tribunal finds that any such differentiation is artificial. An opinion that the diagnostic criteria set out in the Case Definition are satisfied is a medical diagnosis. As Dr. McMurtry noted in his update to the Case Definition, a 'probable' diagnosis 'indicates that AHE/IWT [adverse health effects in the environs of industrial wind turbines] more likely than not are the cause of the complaints. AHE/IWT is the working diagnosis. Other diagnostic possibilities continue to exist and should be considered in the differential diagnoses.'

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[446] In any event, the Tribunal also finds that the opinions expressed by Ms. Laurie go well beyond mere commentary regarding conformity with the Case Definition. As noted earlier in this decision, her general opinion in respect of the post-turbine witnesses is:

Overall, it is clear that all of them have experienced serious health impacts as a result of exposure to wind turbines. Her opinion in respect of the pre-turbine witnesses is: In addition each of them have underlying medical conditions which make them more likely to suffer the health damaging consequences of exposure to wind turbine noise.

[447] The Tribunal does not consider that a detailed review of every opinion in Ms.

Laurie's witness statement is necessary. The Tribunal accepts that Ms. Laurie provided

a fair overview of her opinions when providing what she describes as her overall

conclusions. The Tribunal will, however, provide one example. In respect of the pre-turbine witness identified earlier in this decision as PTW, Ms. Laurie states:

For someone like [PTW] with epilepsy, known by her to be triggered by

sleep deprivation, she is rightly very concerned about the impact of wind

turbine noise on her health, and her ability to live on her property,

specifically because of the likely impact on her sleep, and therefore on

her epilepsy. . . .

Sleep deprivation is known by clinicians generally to lower the threshold

for seizures, . . .

She will have no control over the wind turbine infrasound and low

frequency noise emissions she is exposed to inside her home if the

project proceeds. In particular, there is no way of successfully preventing

the effects of the frequencies below 200Hz (infrasound and low frequency noise) from penetrating, resonating and potentially amplifying inside her home and causing disturbed sleep. It is predictable the proposed wind turbine project in this case will cause serious adverse health impacts if the project is allowed to proceed.

[448] Apart from the consideration that this opinion is, in part, based on assumptions regarding noise acoustics, the Tribunal finds that Ms. Laurie is clearly making a diagnostic interpretation of PTW's current medical condition, and applying this interpretation to formulate her opinion that PTW will suffer serious health impacts if exposed to noise from an operating industrial wind turbine.

[449] The Tribunal has considered whether it should find Ms. Laurie is qualified to provide such diagnostic opinions, notwithstanding that she has indicated that she

cannot provide such opinions. In this regard, the Tribunal notes that she has a medical

degree and has a number of years of past experience practicing as treating physician.

However, the Tribunal has found that most of the opinions expressed by Ms. Laurie do

require the making of a diagnosis, or the application of diagnostic interpretation.

Therefore, the Tribunal finds that it cannot ascribe sufficient reliability to these opinions,

in contradictory circumstances where diagnostic opinion is being proffered by the

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witness, while, at the same time, the witness stipulates that she cannot provide such

diagnostic opinion.

[450] The above analysis and findings address the opinions in Ms. Laurie's witness



statement which require the making of a diagnosis and/or the application of diagnostic

interpretation as described above.

[451] The Tribunal now turns to consideration of Ms. Laurie's opinions based on the

risk factors identified by Dr. Pierpont. The Tribunal notes that Ms. Laurie made specific

reference to these risk factors in her concluding remarks regarding the pre-turbine

witnesses, and that she included consideration of these factors in her individual

evaluation of each of these witnesses. Although she did not make express reference to

Dr. Pierpont's work in respect of the post-turbine witnesses, it is the Tribunal's

understanding that her acceptance of these risk factors also informed her conclusions

respecting these witnesses.

[452] The Tribunal finds that Ms. Laurie's evaluation of:

(i) whether any of the witnesses exhibited symptoms identified by Dr. Pierpont

as resulting from exposure to low frequency noise, and

(ii) whether the any of the witnesses exhibit the risk factors identified by Dr.

Pierpont,

again, requires the application of diagnostic interpretation. To find otherwise, would be

to conclude that no special expertise would, in most cases, be required to conduct such

an evaluation. In further support of this finding, the Tribunal also observes that these

symptoms and risk factors are similar to the adverse health effects identified in Dr.

McMurtry's Case Definition. Again, Dr. McMurtry has clearly identified that the

deployment of the Diagnostic Criteria set out in the Case Definition should be by a

health care practitioner licensed to take a history and make diagnoses.

[453] The Tribunal now turns to consideration of Ms. Laurie's experience in terms of

her survey work in interviewing and documenting the health symptoms reported by

people who have contacted her. As noted earlier in this decision, Ms. Laurie

acknowledges that she has no training or experience in conducting medical or scientific

research, nor has she any training or experience in research methodology. She states

that her only training in research design has been some undergraduate exposure while

obtaining her medical degree, but she provided no specific particulars of the education

or training that she received. She acknowledges that she does not have post-graduate

experience in this area. The Appellant, Mr. Sanford, did not seek to qualify Ms. Laurie

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as an expert in these areas. The Tribunal finds that, based on Ms. Laurie's

acknowledgements, she cannot be qualified to give opinion evidence in these areas.

Consequently, the Tribunal finds that Ms. Laurie is not qualified to give her proposed

opinion evidence based on expertise in medical or scientific research or research

methodology and design. However, for reasons discussed below, this does not

preclude her from describing the results of the survey work she has done, including

making comparisons to the similarity of the results from this survey work to the results of

similar surveys conducted elsewhere.

[454] The Tribunal now turns to another aspect of Ms. Laurie's witness statement,

namely her review of published literature on the subject of the health impacts from noise

exposure from a variety of noise sources, industrial wind turbines in particular. In her

witness statement, she summarizes information from some of these publications, which

includes publications in the subject area of noise acoustics. In her testimony, Ms.

Laurie has acknowledged that she has no expertise as an acoustician. However, she

has also stated that she consults with other experts in the areas of acoustics and

psycho acoustic measurements, to promote a multi-disciplinary approach in order to contribute to the general community understanding of what she asserts are the existing known pathophysiological pathways which make this condition so devastating to a significant proportion of wind project neighbours. Although she has undertaken self-study to inform herself on the issue of noise acoustics, Ms. Laurie did not suggest that her self-study is sufficient to qualify her to express expert opinion on noise acoustics. Consequently, the Tribunal finds that she is not qualified to give opinion evidence in the subject area of noise acoustics, and, in particular, opinions regarding the noise to be generated by the industrial wind turbines in the Project, and the noise levels at sensitive receptors in the Project area.

[455] The Tribunal accepts that it is appropriate for Ms. Laurie to consider existing published research or other literature in formulating her opinions. However, the Tribunal

has already found that Ms. Laurie cannot be qualified to give opinion evidence based on

formal medical or scientific research, or research design and methodology. The

Tribunal has also found that she cannot be qualified to give opinion evidence requiring

diagnostic opinions, or the application of diagnostic interpretation to formulate

conclusions on the potential health impacts of exposure to operating industrial wind

turbines. This raises the question whether she can be qualified to give her proposed

opinion evidence on the basis of the experience she has obtained through self-study of

the published research and other literature. The Tribunal accepts that the time Ms.

Laurie has devoted to this aspect of her work experience is not insignificant. However,

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Ms. Laurie's evidence does not indicate that she has conducted a comprehensive review of all literature, nor that she has the expertise to assess the sufficiency of the research methodology in individual research studies. Consequently, the Tribunal finds that her self-study of the published literature, as described in her witness statement, even if considered in conjunction with her survey of self-identified participants, is not sufficient to meet the basic threshold of reliability necessary to assist the Tribunal in making a sound decision.

[456] In summary, the Tribunal has found that the Appellant, Mr. Sanford has not established a basis on which Ms. Laurie can be qualified to give her proposed opinion evidence in this proceeding.

[457] The above finding, however, does not preclude Ms. Laurie from giving evidence.

As a fact witness, she can testify respecting her work in this area, particularly the

information she has obtained from the survey work that she has conducted. It may be

less clear whether other aspects of her evidence are strictly fact evidence. However,

the Tribunal notes that the Practice Direction recognizes that a witness who provides

technical evidence may, to some extent, interpret information that is essential to the

Tribunal's understanding of the issues. In this regard, the Tribunal finds that Ms.

Laurie's training, education and experience is certainly sufficient to qualify her to provide

this level of interpretation. Accordingly, the Tribunal is prepared to hear her evidence

regarding the similarity of health complaints obtained through her survey work, as

compared to the health complaints reported in similar surveys conducted elsewhere in

Australia and other jurisdictions.

[458] Similarly, the Tribunal has allowed her evidence respecting her review of

published research and literature to be submitted, as set out in her witness statement,

subject to the important caveat that none of the articles, studies, or reports attached to,



or described in her witness statement are being accepted as proof of the opinions and conclusions stated therein. This part of Ms. Laurie's witness statement has been accepted solely on the basis that it describes some of the current body of research and academic or other informed discussion which has been published in this field. In this regard, the Tribunal notes that the other parties did not object to the receipt of this part of Ms. Laurie's evidence, subject to this caveat.

[459] Finally, the Approval Holder and the Director opposed Ms. Laurie's qualification on the grounds of bias. As stated earlier in this decision, the Tribunal, in its oral ruling, confirmed that the Tribunal would consider the evidence and submissions of the parties

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respecting the issue of bias, as it relates to the weight to be given to Ms. Laurie's

evidence.