Environmental Review Tribunal

Case Nos.: 13-124/13-125

Kroeplin v. Director,
Ministry of the Environment

In the matter of appeals by Kenneth George Kroeplin and Sharon Anne Kroeplin filed October 23, 2013 for a hearing before the Environmental Review Tribunal pursuant to section 142.1 of the *Environmental Protection Act*, R.S.O. 1990, c. E.19, as amended, with respect to Renewable Energy Approval No. 4544-9B7MYH issued by the Director, Ministry of the Environment, on October 9, 2013 to SP Armow Wind Ontario GP Inc. as general partner for and on behalf of SP Armow Wind Ontario LP under section 47.5 of the *Environmental Protection Act*, regarding the construction, installation, operation, use and retiring of a Class 4 wind facility consisting of 92 turbines with a total name plate capacity of 180 megawatts in the Municipality of Kincardine, County of Bruce; and

In the matter of a hearing held on December 19-20, 2013, and January 6-7, 9-10, 13-14 and February 21, 2014, at the Best Western Plus Governor's Inn, 791 Durham Street, Kincardine, Ontario, at the Public Hall, Municipal Administration Centre, Municipality of Kincardine, 1475 Concession 5, Kincardine, Ontario, and at 655 Bay Street, Toronto, Ontario.

Before: Maureen Carter-Whitney, Panel Chair
Marcia Valiante, Member

Appearances:

Asha James	-	Counsel for the Appellants, Kenneth George Kroeplin and Sharon Anne Kroeplin
Danielle Meuleman, Jeremy Glick, Andrea Huckins and Daniel Huffaker	-	Counsel for the Director, Ministry of the Environment
Alexandria Pike, Sarah Powell and James Bunting	- -	Counsel for the Approval Holder, SP Armow Wind Ontario GP Inc.
Maeve Mungovan	-	Student-at-law for the Approval Holder, SP Armow Wind Ontario GP Inc.
William Palmer	-	Participant, on his own behalf

Elizabeth Bellavance	-	Participant, on her own behalf
Jutta Splettstoesser	-	Participant, on her own behalf
Stephana Johnston	-	Presenter, on her own behalf
Norma Schmidt	-	Presenter, on her own behalf
Matthew Sheridan	-	Presenter, on his own behalf
David Fritz	-	Presenter, on his own behalf and on behalf of the Presenter, Pat Fritz
Dan Norman	-	Presenter, on his own behalf
Greg Schmalz	-	Presenter, on his own behalf
Susie Stoeckli	-	Presenter, on her own behalf
Dennis Morris	-	Presenter, on his own behalf and on behalf of the Presenter, Dilsa Morris

Dated this **22nd** day of **April, 2014.**

REASONS FOR DECISION

Background

[1] On October 9, 2013, Vic Schroter, Director, Ministry of the Environment ("MOE"), issued Renewable Energy Approval No. 4544-9B7MYH (the "REA") to SP Armow Wind Ontario GP Inc. (the "Approval Holder"), as general partner for and on behalf of SP Armow Wind Ontario LP, for the construction, installation, operation, use and retiring of a Class 4 wind facility, known as the Armow Wind Project, with 92 wind turbine generators with a total name plate capacity of 180 megawatts. The location is bounded by Highway 21 to the west, Concession 4 to the north, County Road 1 to the east and North Line to the south, in Kincardine Municipality, County of Bruce, Ontario (the "Project").

[2] The REA was issued pursuant to Part V.0.1, s. 47.5 of the *Environmental Protection Act* ("*EPA*").

[3] On October 23, 2013, Sharon Anne Kroeplin and Kenneth George Kroeplin ("the Appellants") filed appeals with the Environmental Review Tribunal (the "Tribunal") with respect to the REA. The Appellants own and reside on a 100-acre family farm close to the site of the Project. They appeal the REA pursuant to s. 142.1(3)(a) of the *EPA*, on the ground that the Project will cause serious harm to human health.

[4] The Appellants also filed a notice of constitutional question, pursuant to which they seek to challenge the Director's decision as a deprivation of their right to security of the person not in accordance with the principles of fundamental justice, contrary to s. 7 of the *Canadian Charter of Rights and Freedoms* (the "*Charter*").

[5] On November 21, 2013, the Tribunal held the preliminary hearing in Kincardine, Ontario. The Tribunal subsequently issued an order, dated November 29, 2013, which: granted participant status to Elizabeth Bellavance (as a representative of an unincorporated group known as "We're Against Industrial Wind Turbines – Plympton-Wyoming" ("WAIT-PW")), William Palmer and Jutta Splettstoesser; granted presenter status to Sheila Burr (who ultimately did not appear at the hearing), Stephana Johnston, Greg Schmalz, Norma Schmidt, Matthew Sheridan and Susie Stoeckli; prohibited the participants and presenters from raising issues that have not already been raised by the parties; dismissed a motion to add six new appellants; and dealt with other procedural matters.

[6] The preliminary hearing was continued on December 10, 2013, following which the Tribunal issued an order on December 12, 2013 that: granted presenter status to Dan Norman, David and Pat Fritz, and Dennis and Dilsa Morris; prohibited the presenters from raising issues that have not already been raised by the parties; accepted and adopted a resolution agreed to by the parties with respect to some aspects of the constitutional issue; and accepted and adopted a resolution, in the form of a consent order, agreed to by the parties regarding disclosure.

[7] The hearing began on December 19, 2013. The Tribunal heard evidence and submissions over nine days in December 2013, and January and February 2014.

[8] Several procedural rulings were made over the course of the hearing. They are found at Appendix A.

[9] For the reasons that follow, the Tribunal dismisses the appeals.

Relevant Legislation

[10] The relevant legislation can be found throughout the body of this decision except for the following provisions:

> *Environmental Protection Act*
>
> 142.1(1) This section applies to a person resident in Ontario who is not entitled under section 139 to require a hearing by the Tribunal in respect of a decision made by the Director under section 47.5.
>
> (2) A person mentioned in subsection (1) may, by written notice served upon the Director and the Tribunal within 15 days after a day prescribed by the regulations, require a hearing by the Tribunal in respect of a decision made by the Director under clause 47.5 (1) (a) or subsection 47.5 (2) or (3).
>
> (3) A person may require a hearing under subsection (2) only on the grounds that engaging in the renewable energy project in accordance with the renewable energy approval will cause,
>
> (a) serious harm to human health; or
>
> (b) serious and irreversible harm to plant life, animal life or the natural environment.
>
> 145.2.1 (2) The Tribunal shall review the decision of the Director and shall consider only whether engaging in the renewable energy project in accordance with the renewable energy approval will cause,
>
> (a) serious harm to human health; or
>
> (b) serious and irreversible harm to plant life, animal life or the natural environment.
>
> (3) The person who required the hearing has the onus of proving that engaging in the renewable energy project in accordance with the

renewable energy approval will cause harm referred to in clause (2) (a) or (b).

(4) If the Tribunal determines that engaging in the renewable energy project in accordance with the renewable energy approval will cause harm referred to in clause (2) (a) or (b), the Tribunal may,

(a) revoke the decision of the Director;

(b) by order direct the Director to take such action as the Tribunal considers the Director should take in accordance with this Act and the regulations; or

(c) alter the decision of the Director, and, for that purpose, the Tribunal may substitute its opinion for that of the Director.

Constitution Act, 1982

7. Everyone has the right to life, liberty and security of the person and the right not to be deprived thereof except in accordance with the principles of fundamental justice.

24. (1) Anyone whose rights or freedoms, as guaranteed by this Charter, have been infringed or denied may apply to a court of competent jurisdiction to obtain such remedy as the court considers appropriate and just in the circumstances.

52. (1) The Constitution of Canada is the supreme law of Canada, and any law that is inconsistent with the provisions of the Constitution is, to the extent of the inconsistency, of no force or effect.

Issues

[11] The issues are:

Issue No. 1: Whether engaging in the Project as approved will cause serious harm to human health.

Issue No. 2: Whether the Appellants' rights to security of the person have been violated under s. 7 of the *Charter*.

Summary of the Evidence

[12] The evidence heard over the course of the hearing pertains to both of the issues and is summarized in this section.

[13] The Appellants called the following individuals to testify: the Appellants, Mr. and Ms. Kroeplin; four witnesses who have lived near existing wind turbine projects in Ontario ("post-turbine witnesses"); Heather Pollard; Dr. Philip Bigelow; and Richard ("Rick") James.

[14] In response to the evidence brought by the Appellants, the Director called Gemma Connolly, Dejan Zivkovic and Dr. Kieran Moore. The Approval Holder called

the following as witnesses: Debbie Raymond; Shant Dokouzian; Benjamin Coulson; Dr. Robert O'Neal; Dr. Kenneth Mundt; and Dr. Robert McCunney.

[15] The Tribunal also heard from several participants and presenters at the hearing, all but one of whom opposed the proposed Project. The following participants and presenters testified in opposition to the Project: Ms. Bellavance, representing the unincorporated organization, WAIT-PW; Mr. Palmer; Mr. Fritz; Mr. Norman; Mr. Sheridan; Ms. Schmidt; Mr. Schmalz; Ms. Stoeckli; Mr. Morris; and Ms. Johnston. Ms. Splettstoesser testified as a participant, in support of the Project.

Evidence of the Appellants

Ken and Sharon Kroeplin

[16] Mr. and Ms. Kroeplin testified as a panel. The Kroeplins own a family farm, which is approximately 100 acres in size and used for cash crops. They have owned the farm for 32 years and have lived in a house on the property for the past six years. Under the Project as currently proposed, there will be one turbine within 599 metres ("m") of the Kroeplins' home and 12 additional turbines within a two kilometre ("km") radius of their home. They testified that they volunteered to bring their appeals on behalf of the organization Huron-Kinloss Against Lakeside Turbines ("HALT").

[17] The Kroeplins first learned of the Project in 2006 when they were approached and asked to lease land to the Project. They refused the offer due to their concerns about wind turbines, which were based on their knowledge of complaints about negative health impacts experienced by residents in the area of the nearby Ripley Wind Project.

[18] Mr. and Ms. Kroeplin stated that they attended all public meetings relating to this Project to raise their concerns with the Approval Holder, and also raised concerns at Municipality of Kincardine council meetings. The Kroeplins testified that they are in good health, but Mr. Kroeplin noted that he raised his concerns about impacts of wind turbines on health with his doctor.

[19] The Kroeplins said that, in response to their concerns, the Approval Holder told them that the Project would not cause health problems. They stated, however, that they do not believe this because they know of too many people who have experienced problems with their health.

[20] After the Project received approval, Mr. and Ms. Kroeplin listed their property for sale and, while people viewed it, the only offer they received to purchase the property was from the Approval Holder after their appeal was launched. They declined that offer

because, while they still want to move from the area, they are concerned about the impacts the Project will have on their neighbours' health. At the time of the hearing, they had not sold their property.

Post-Turbine Witnesses

[21] The Appellants called four post-turbine witnesses, all of whom have lived in the vicinity of existing wind turbine projects in Ontario, and are referred to in this section as Witnesses No. 1, 2, 3 and 4. Two of the post-turbine witnesses testified in person; the evidence of the others was introduced, on consent of all parties, in the form of transcripts from the hearing in *Dixon v. Director, Ministry of the Environment*, [2014] O.E.R.T.D. No. 5 ("*Dixon*"), in which they testified, along with their witness statements and attached documents. All of these witnesses were questioned concerning their activities relating to their concerns about wind turbines, in addition to giving evidence concerning their heatlh concerns.

[22] Witness No. 1 lived near the Ripley Wind Project, which began operation on December 22, 2007 and included 38 wind turbines. The closest turbine was about 800 m from her home on a farm. She gave evidence that, prior to the turbines operating, her only diagnosed health concern was a slightly elevated level of blood pressure.

[23] Witness No. 1 testified that, after the turbines began to operate, she experienced numerous symptoms, including the following: sleep deprivation; humming and ringing in her ears; a sore hip; increased blood pressure levels; blurred vision; issues with memory; heart palpitations; and grinding her teeth at night. She visited her doctor, who sent her to see specialists, none of whom linked the turbines to her symptoms, nor suggested an alternative cause for her symptoms. Witness No. 1 stated that she had to leave the home due to sleep deprivation and other health effects, and that the wind developer had paid for her and her family to stay in hotels for months. She noted that her husband and daughter also experienced adverse health effects that forced them to find respite away from home. She said that their symptoms diminished when they were away from home.

[24] Witness No. 1 gave evidence that she lived in her home for 19 years and had not considered selling it prior to the introduction of the wind turbines. She testified that she and her family moved out of their home on April 30, 2008 and sold it on March 17, 2011, although her testimony indicated that she returned to the home for some period of time after April 2008. She gave evidence that the wind developer conducted a sound study in 2009, which determined that seven turbines were out of compliance and would be

reduced to half power, but no noise measurements taken at her property were provided in evidence.

[25] Witness No. 2 lived in proximity to Phase 2 of the Melancthon Wind Project, which included a total of 123 turbines. Phase 2 began operation in December 2008. Her home was located 456 m from the cloest turbine, 700 m from a second turbine and within a 1 km radius of five turbines. She testified that she and her husband purchased their home in 2005, intending to retire there.

[26] Witness No. 2 gave evidence that between 2005 and 2007, prior to the introduction of the turbines, she had been a liver donor, undergone a gallbladder procedure, experienced an incident of bronchitis and suffered from abdominal pain at one point. She said that she and her husband both began to experience a range of health effects after the turbines began to operate, which they had not experienced previously, including: sleep deprivation; ringing in the ears; heart palpitations; memory loss; feelings of disorientation; and dizziness.

[27] Witness No. 2 raised her concerns about these adverse health effects with her doctor, attributing them to the wind turbines, but he did not note her concerns in her medical records. She also raised her concerns with her gynaecologist and the specialist following up on her liver donation.

[28] Witness No. 2 noted in her witness statement that the wind company would turn off the closest turbines at times, providing some relief from the noise although the hum and vibration still occurred. She stated that she and her husband moved into a tent in the back yard and were able to sleep if the closest turbines were turned off. She said, however, that their symptoms returned as soon as the turbines were operational again.

[29] Witness No. 2 testified that the wind company conducted testing and measured noise to be between 60 and 70 dBA, but no noise measurements were provided in evidence. She stated that she and her husband moved out of their home on June 25, 2009, and no longer suffered from the health effects they experienced while living near the wind turbines.

[30] Witness No. 3 lived on a farm property near the Enbridge Ontario Wind Power project (“Enbridge project”) from 2006 to 2012. The wind project, which consists of 110 turbines, became operational on February 19, 2009. The home, which is owned by his partner, is approximately 1,848 m from the closest turbine, and there are eight additional turbines within a 3 km radius.

[31] Witness No. 3 stated that, after the turbines began to operate, he began to experience sleep disturbance but did not associate that with the turbines until he returned from an overseas trip in 2012 and noted the difference in his sleep patterns. He now believes that, as a result of living near the turbines, he has suffered severe sleep disturbance, vertigo, visual blurring and bloodshot eyes. He said that his partner also experienced bloodshot eyes but has not been greatly affected. He testified that he very rarely heard audible noise from the wind turbines but attributed his symptoms to infrasound.

[32] Witness No. 3 stated that, prior to the turbines operating near his home, he had experienced bouts of vertigo while working on a home renovation when his head was in an uncomfortable position. He sought medical attention for vertigo at that time. He distinguished the two bouts of vertigo, saying that they followed different patterns and the earlier bouts were more extended and severe. He stated that he did not seek medical attention for the vertigo he associated with the wind turbines, although he did mention the sleep disturbance to his doctor, who did not note it in his medical records.

[33] Witness No. 3 testified that he went back to sleeping at his own home in Kincardine, away from the turbines, as of April 1, 2012. Since that time, he no longer experiences any adverse health effects and is able to have a restful sleep. He said that wind turbine noise measurements have not been taken at his partner's house.

[34] Witness No. 4 lives on her dairy farm, which is located near the Enbridge project. Her home is located approximately 560 m from a wind turbine, with another ten turbines within a 2 km radius.

[35] Witness No. 4 testified that she began to experience adverse health effects soon after the turbines began to operate. She stated that she has experienced: disturbed sleep due to constant vibration in the house; painful muscle cramping lasting up to 25 minutes at a time; constant ringing in her ears; and bouts of vertigo. She also said that her son suffers from severe headaches, her husband experiences ringing in his hears, and a grandson who used to live in the house had severe earaches.

[36] Witness No. 4 gave evidence that she did not experience the symptoms that she associates with the wind turbines prior to them becoming operational in 2009. However, she stated that she was diagnosed with diabetes in 2005 and takes a number of medications associated with it. She testified that she has not sought medical attention for the symptoms that she associates with the wind turbines.

[37] Witness No. 4 stated that she only experiences relief from these adverse heatlh effects when she is away from the farm, and tries to spend longer periods of time away visiting family members, but said that she and her family are unable to move out of their home. She testified that she has not had sound testing done at her home.

Heather Pollard

[38] Ms. Pollard was summonsed to give evidence on behalf of the Appellants. Ms. Pollard is the District Supervisor for the Owen Sound District Office of the MOE. She was asked to testify primarily with respect to the complaints made to the MOE about the Enbridge project by nearby residents and the MOE's response to those complaints. The Enbridge project, which received approval from the MOE in 2007 and began operation in 2009, is located near Kincardine. She was questioned about other wind energy projects within the district and stated that there are six other projects, and that the MOE has received complaints about all but one.

[39] Ms. Pollard testified that since 2009, an estimated 350 complaints about the Enbridge project have been received by the MOE, but that the majority of those had come from three residents. She stated that the nature of the complaints related to noise from the turbines and the health of residents. She testified that the residents complained that they were unable to sleep because of the noise, and the lack of sleep caused them to be unwell. The types of symptoms she identified from the complaints were headaches, vertigo, pressure in the ears and chest, and ringing in the ears.

[40] Ms. Pollard described how her office responds to such complaints. She stated that they follow the MOE's "Compliance Protocol for Wind Turbine Noise: Guideline for Acoustic Assessment and Measurement," ("Compliance Protocol"), which limits investigation of complaints to residents living within 1,500 m of a turbine. According to Ms. Pollard, when they receive a complaint, there are several steps that are followed including a site visit by an environmental officer who will take a hand-held noise measurement to determine whether the turbine is in compliance with the MOE limit of 40 dBA and whether there is a need to remodel the sound power levels from the turbine or do more detailed noise studies.

[41] With respect to the Enbridge project, Ms. Pollard provided evidence that MOE officers found that three turbines were built more than 20 m closer to residences than had been approved and that for two of those locations initial noise measurements indicated that the turbines may not have been in compliance with the 40 dBA limit, which led the MOE to request the operator to remodel noise emissions for the project in

accordance with the protocol in the MOE's "Noise Guidelines for Wind Farms: Interpretation for Applying MOE NPC Publications to Wind Power Generation Facilities," October 2008 (the "Noise Guidelines") and to conduct a noise study at two residences. Copies of internal MOE emails put into evidence indicated that the remodeling found 37 receptors closer than 550 m and 24 farther than 550 m from turbines to be out of compliance with the Noise Guidelines "to some degree". The report of the remodeling shows that modeled sound levels increased slightly, up to 1.2 dBA, at 267 receptors, while they decreased at others, in some cases more than 20 dBA lower, as compared with the modeling done in 2007 using the pre-2008 protocol.

[42] According to the evidence, voluntary abatement measures were taken by the operator at one turbine for a short period. Ms. Pollard also testified that the MOE required the operator to carry out an acoustic assessment based on the 2011 Compliance Protocol and that, after a series of delays, a report of those measurements was submitted to the MOE. She said that, in the meantime, the turbines have continued to operate and the MOE has ordered no abatement measures nor has the operator taken voluntary abatement measures.

[43] Ms. Pollard testified that even when the 40 dBA limit was found to be met, the MOE received complaints from certain receptors. In those circumstances, she said, her office has followed a "non-standard procedure" whereby when complaints are received from identified receptors, there is immediate notification of an environmental officer and a determination of whether the officer should attend at the location.

[44] Ms. Pollard stated that when her office receives health related complaints, they advise the complainants that they should contact their doctor or the local health unit. It was her evidence that the MOE is not required to share that information with the health unit, and does not do so on a routine basis, but does keep in contact with the health unit about new developments.

Dr. Philip Bigelow

[45] The Appellants called Dr. Bigelow to provide evidence before the Tribunal by way of a summons. They did not seek to have him qualified as an expert witness, so he could not give opinion evidence on the relationship between wind turbines and potential health effects. Dr. Bigelow, who has a Ph.D. in epidemiology, is a member of the University of Waterloo Ontario Research Chair in Renewable Energy Technologies and Health (the "Research Chair"). The Research Chair receives $300,000 annually from

the Government of Ontario to undertake multi-discliplinary research initiatives relating to both wind and solar energy.

[46] Dr. Bigelow described some of the research studies that have been undertaken by the Research Chair. He stated that the approaches taken depend on the study questions asked, and that the hypothesis in their large epidemiological study is that health, quality of life, annoyance, stress and sleep quality are related to distance from the closest wind turbine. He further stated that, in sleep-specific studies, they hypothesize that sleep quality is associated with exposure to wind turbine noise.

[47] In particular, Dr. Bigelow addressed a conference poster that reported on findings from a student's Master's thesis (the "poster study"). He stated that her thesis, which is part of the larger epidemiological study, used distance as a surrogate measure to investigate the impact of wind turbine noise on quality of life, in terms of both physical and mental health, and sleep disturbance in residents living close to wind turbines. Dr. Bigelow noted that the poster study shows a statistically significant relationship between distance from a turbine and both sleep quality and vertigo, when controlling for age, gender and county. To conduct the poster study, the student sent a questionnaire to 4,876 households and received 412 responses, of which 390 could be used.

[48] Dr. Bigelow noted limitations in the findings of the poster study and stated that caution is needed in the interpretation and application of the findings. He acknowledged that he had sent an email concerning the poster study, dated October 27, 2013, to T. Oleniuk and R. Secord, which stated that the "overall response rate of under 10% is very problematic and we recognize the opportunity for bias that would invalidate the findings reported on the poster."

Rick James

[49] Mr. James gave evidence for the Appellants regarding the issue of noise. The Appellants sought to have Mr. James qualified as "an acoustical engineer with expertise in environmental noise and noise modeling and with specific expertise in the field of wind turbine noise modeling and sound monitoring including low frequency noise and infrasound and the human response to noise." At the hearing, the respondents indicated that they did not object to Mr. James testifying but submitted that they intended to cross-examine him on his qualifications and address the issue in their closing submissions.

[50] The Tribunal considered the submissions of the parties on this issue and qualified Mr. James to given opinion evidence on matters related to acoustics and noise

control engineering and wind turbines. The Tribunal excluded from its consideration evidence provided by Mr. James concerning the health effects of wind turbines, and epidemiology. The Tribunal's reasons are set out below in Appendix A to this decision.

[51] Mr. James owns and acts as principal consultant for E-Coustic Solutions in Michigan. He has a B.Sc. in Mechanical Engineering and has practiced as an acoustical engineer for 40 years. He is a member of the Institute of Noise Control Engineers ("INCE"), but is not certified by the INCE as an acoustical engineer, nor is he a registered professional engineer in any jurisdiction.

[52] Mr. James testified that he reviewed the Armow Wind Farm Noise Impact Assessment ("NIA") report done on behalf of the Approval Holder by GL Garrad Hassan and identified a number of deficiencies in the information presented in the report. He focused on six categories of error in the report.

[53] According to Mr. James, the first error is that the sound power levels for the turbines as reported by the manufacturer were not adjusted as required by the applicable standard to include confidence limits to account for measurement error. Mr. James stated that sound power levels must be calculated in accordance with the standard "Wind Turbine Generator Systems – Part 11: Acoustic Noise Measurement Techniques," CAN/CSA C61400-11-07, October 2007 ("CAN/CSA C61400-11-07"), which he states is the equivalent of the international standard developed by the International Electrotechnical Commission, "Wind turbines – Part 11: Acoustic noise measurement techniques," IEC 61400-11, Edition 2.1, 2006-11 ("IEC 61400-11"). He submitted in his witness statement that IEC 61400-11 references "Wind turbines – Part 14: Declaration of apparent sound power level and tonality values," IEC 61400-14, First edition, 2005-03 ("IEC 61400-14") and that IEC 61400-14 requires an adjustment to the reported mean sound power levels to include a confidence level of 1.645 to result in a declared sound power level that Mr. James states would result in a total confidence level of greater than +/- 2 dB. However, when questioned, Mr. James conceded that IEC 61400-11 does not reference IEC 61400-14, nor do the MOE's Noise Guidelines. He also conceded that, as a result of questioning in two previous Tribunal cases, he knew this to be the case prior to drafting his witness statement in this case.

[54] The second error, in Mr. James' view, is that the NIA was done on the basis of a generic transformer unit rather than a specific model that may or may not represent the actual noise emissions for the transformer eventually installed. It was his opinion that even with application of a tonal penalty of 5 dB and installation of sound barriers, there

would be a high potential for noise complaints due to the transformer. He advised that the Project should be redesigned to enclose the substation components in a structure.

[55] The third error, according to Mr. James, is that the model used for predicting total sound levels at each point of reception did not include any adjustments for confidence limits, and thus did not conform to the international standard "Acoustics – Attenuation of sound during propagation outdoors; Part 2: General method of calculation," ISO 9613-2 ("ISO 9613-2"), or conform to good engineering practice. He disagreed with other witnesses that confidence limits need not be expressed because the MOE Noise Guidelines take a conservative approach. He stated that the Noise Guidelines require the model to represent the "predictable worst case" conditions, but in his view that was not done. He suggested that the predictions are based on data measured during the day and under ideal meteorological conditions. Mr. James stated that confidence limits of +/- 3 dB should have been added. This, he asserted, is required under ISO 9613-2 for predictions of total sound power levels at receptors between 100 and 1000 m from the noise source.

[56] The fourth error identified by Mr. James is the use of a ground attenuation factor that does not represent the predictable worst case scenario. He considers that a ground attenuation factor of 0.0, which would represent reflective ground such as hard-packed fields, should have been used and that the factor used, 0.7, underestimates the expected sound levels and is therefore not the worst case.

[57] The fifth error, in Mr. James' view, is that the manufacturer's acoustic emission data were not adjusted for average summer nighttime conditions, when wind shear is highest, or for increased noise due to real world operations, including bugs and dust accumulating on the turbine blades, and therefore do not represent the predictable worst case. Mr. James testified that field studies and his own measurements indicate that noise levels will likely be 5 dBA higher than predicted by the NIA. He also stated that the model should be adjusted to account for amplitude modulation.

[58] The sixth error, in Mr. James' submission, is that the NIA report was not prepared by qualified acoustical consultants as required by the Noise Guidelines. In addition, he contends that the preparers of the report did not incorporate findings from other acoustical experts and did not consider contrary research results or findings from other projects that could influence the models.

[59] Mr. James also offered several opinions. First, he submitted that the flaws in the models indicate that the Project will likely exceed the MOE's noise standard, result in

complaints and create adverse effects. It is his position that the Project should be either rejected or redesigned to provide an adequate margin of safety.

[60] Second, it was Mr. James' opinion that research on wind turbine projects in operation elsewhere indicates that the MOE's noise limit of 40 dBA will be exceeded. He accepted that 40 dBA is a reasonable standard for audible noise from this Project, even though he had argued for a standard of 35 dBA in a similar hearing in Ohio. He submitted that if the 40 dBA threshold were exceeded by only 5 dBA, at least 276 noise receptors in the community would be adversely affected. In his opinion, the Project as designed poses certain risk to people living near the Project and it should not be approved as designed.

[61] Third, Mr. James submitted that wind turbines create health risks due to very low frequency noise and infrasound and that these have not been adequately studied for the Project. In addition, he states that the failure of the MOE to have standards for low frequency noise and infrasound does not excuse a failure to consider the epidemiological research that associates health effects and acoustic energy in that range. Mr. James identified some studies, including the poster study from the University of Waterloo discussed by Dr. Bigelow, which he referred to as a "good" epidemiological study. He did concede that he is not an epidemiologist and was not aware of the limits of the Waterloo study identified by Dr. Bigelow. He also agreed that he did not include reference to epidemiological studies that came to differing conclusions in his witness statement.

[62] Mr. James testified that he considers the characteristics of low frequency noise and infrasound associated with wind turbines to be unique compared to other types of infrasound in the natural environment. He described them as pulses of very short duration within a very narrow frequency range, caused by the rotation of the turbine blades, which he referred to as "blade pass" effect. He stated that these pulses are similar to "gunshots". He conceded that the pulses do not in fact sound like gunshots, but that they are similar in duration. He stated that the peaks are in the audible range but that the average levels, below 1 hertz ("Hz"), are sensed by humans, rather than heard, and that most of the complaints about wind turbines relate to these physical sensations. It was his view that the MOE and the Approval Holder's consultants only studied the audible range of sound and did not have the equipment he has to be able to measure infrasound at extremely low frequencies. He criticized a number of studies relied on by the consultants on this basis as well.

[63] Mr. James relied on a set of field studies known as the “Shirley Wind Study” that were carried out in the vicinity of a wind farm in Wisconsin. The results of these studies have also been presented at conferences on wind turbine noise. One study, done by Dr. Bruce Walker, measured broadband sound down to 0.1 Hz indoors and 0.4 Hz outdoors, which is similar to the range that Mr. James has measured.

[64] Mr. James also criticized the MOE’s use of the A-weighted scale for measuring sound pressure levels. He stated that the A-weighted scale is appropriate for outdoor exposure to audible noise, but that the C-weighted scale is more appropriate for indoor exposure because it includes low frequency noise and infrasound and because the structure of a building shields other sound and frequencies.

[65] It was his opinion that the MOE setbacks will not protect people in the community from adverse health effects due to the Project; therefore, the Project should not be approved as designed. He did not have a position on what a reasonable setback would be, but he stated that research has shown adverse health effects should be expected if occupied homes are within 1.2 km of a wind project. He also testified that all the projects he had seen in Ontario were too close to people’s homes.

Evidence of the Director

Gemma Connolly

[66] The witness statement of Ms. Connolly was put into evidence, on behalf of the Director, by agreement of counsel and she did not testify in the hearing. Ms. Connolly is a supervisor in the Service Integration Section of the MOE’s Approvals Access and Service Integration Branch. Part of her role is to supervise REA pre-submission activities, project tracking and monitoring, and data analysis.

[67] At the request of counsel for the Director, Ms. Connolly compiled data within the MOE on the history of complaints by the Appellants’ witnesses and by presenters regarding six wind farm projects. Her witness statement included, with respect to each of the six projects, a “project receptor summary”, indicating the number of turbines and the number of receptors within 1,500 m, a “witness summary”, identifying the number of complaints, types of concerns and setback distances for the witnesses and presenters from this hearing, and summaries of incident reports identifying the number and percentage of reports originating from the witnesses and presenters and the nature of the complaints made. With respect to the Enbridge project, these summaries show that 95% of the complaints came from four residences, including 35% of the complaints coming from the residence of one of the presenters. With respect to the Ripley project,

76% of the complaints came from one of the Appellants' witnesses. With respect to the Melancthon project, 1.3% of the complaints came from one of the witnesses, while 33.1% of the complaints with the Clear Creek, Frogmore and Cultus projects came from one of the presenters.

Dejan Zivkovic

[68] Mr. Zivkovic gave evidence for the Director regarding the issue of noise. Mr. Zivkovic holds the position of Senior Noise Engineer with the MOE Environmental Approvals Branch and carried out the technical review of the Approval Holder's application for the REA. Mr. Zivkovic holds Bachelor's and Master's degrees in Electrical Engineering and is a registered Professional Engineer in Ontario. He was qualified by the Tribunal as a noise engineer having specific expertise with the application of the MOE's noise guidelines and the MOE Compliance Protocol.

[69] Mr. Zivkovic testified that, based on his review of the application, he developed noise mitigation measures and the acoustical conditions for the REA and concluded that the Project would satisfy the MOE requirements respecting noise. He recommended that the Director approve the Project.

[70] Mr. Zivkovic testified that he applied the MOE Noise Guidelines. The Noise Guidelines set out the sound level limits for wind farms and discuss the information required in the preparation of the NIA report for the Project. In carrying out the detailed assessment for each "point of reception", the Noise Guidelines require that the assessment represent the maximum rated output of the wind farm and require that the assessment reflect the principle of "predictable worst case" noise impact, as defined in MOE publication, "Sound Level Limits for Stationary Sources in Class 3 Areas (Rural)," Publication NPC 232, October 1995 ("NPC 232").

[71] Mr. Zivkovic testified that in his view the predictable worst case was used in this case. He testified that the parameters in the Noise Guidelines result in a conservative approach because they require assessment of the cumulative impact of all the turbines from all projects within 5 km of a receptor as if all were operating at the same time and all were located upwind of the receptor. In addition, he stated that the sound level is calculated at the centre of a house or building, which excludes the impact of any shielding from terrain or vegetation. He also disagreed with Mr. James' testimony, stating that the NIA done here used the highest expected sound levels in relation to the standard, that is, those expected to be associated with the highest degree of wind shear, in summer during the night. He added that he used the maximum sound profile

for each turbine model as provided by Siemens, the manufacturer. He stated that the NIA used a ground attenuation factor of 0.7, which was, in his opinion, appropriate because the residential receptors are located primarily on farm land, best represented by a value of 1.0, but 0.7 would better reflect the period of highest expected sound levels, rather than in winter conditions. He also testified that he added sound barriers for the transformer station as a conservative approach.

[72] One requirement in the Noise Guidelines is that predictions of total sound level at each point of reception be carried out according to the method described in ISO 9613-2, subject to specific parameters. Mr. Zivkovic was questioned about his application of confidence limits with the predicted maximum sound levels, which in ISO 9613-2 are stated as "estimates of accuracy" of +/- 3 dB. Mr. Zivkovic testified that he did not add 3 dB to the modeled maximum sound levels because the uncertainty in the model is accounted for through the requirements to model for predictable worst case impact and to include a number of conservative assumptions. In addition, the MOE's noise guidelines NPC-232 and Publication NPC-205: "Sound Level Limts for Stationary Sources in Class 1 & 2 Areas (Urban)," October 1995, do not require the inclusion of uncertainty and, based on his prior experience, the model's predictions as tested against measured results have been an accurate predictor of the maximum sound levels, so adding 3 dB was not necessary. He added that the REA includes conditions requiring the Approval Holder to engage an independent acoustic consultant to conduct 19 acoustical audits to verify the predicted results once the turbines are in operation.

[73] Mr. Zivkovic testified that the Noise Guidelines also require acoustic emission information from the turbines to be determined and reported in accordance with the standard CAN/CSA-C61400-11-07. He stated that this standard is the same as IEC 61400-11, as approved in Canada by the CSA and adopted by the MOE. He was aware that a newer standard was developed by the IEC and was approved by the CSA in October of 2013, but noted that it is under review by the MOE and has not yet been adopted by regulation or added to the Noise Guidelines. He disagreed with Mr. James' evidence regarding the calculation of uncertainty with respect to apparent sound power levels for the Siemens' turbines using IEC 61400-11. He noted that, contrary to Mr. James' witness statement, IEC 61400-11 does not reference IEC 61400-14. Mr. Zivkovic agreed that one of the differences between the two IEC standards is that the newer standard contains more detailed calculations for determining uncertainty and the requirement to indicate "declared apparent sound power level", not just the mean apparent sound power level. According to Mr. Zivkovic, the uncertainty and the

apparent sound power level guaranteed by Siemens were appropriate for use in the model. His view was that this guaranteed level must be met by the Approval Holder or it will be out of compliance with the REA and that the REA requirement for acoustical audits will verify whether the measured sound power levels meet the guaranteed levels.

[74] Mr. Zivkovic agreed that the MOE has no standard for low frequency noise or infrasound, but disagreed that this means the MOE neglects the issue. The Noise Guidelines cover a portion of the low frequency spectrum, the octave band with a centre frequency of 63 Hz, and thus a range of 44 to 88 Hz, and MOE sound measuring equipment can measure down to 6.3 Hz. He testified that during the preparation of the Noise Guidelines in 2008, the issue was raised, which led the MOE to commission a literature review of low frequency noise and infrasound associated with industrial wind turbines. In Mr. Zivkovic's view, the report of this review, carried out by HGC Engineering, entitled "Low Frequency Noise and Infrasound Associated with Wind Turbine Generator Systems: A Literature Review," December 10, 2010 (the "HGC Report"), found that the MOE's approach was appropriate but recommended that the MOE continue to monitor research on this topic and track regulatory developments in other jurisdictions, and the MOE has done so.

[75] Mr. Zivkovic disagreed with Mr. Palmer's evidence that the manufacturer's specified calculated sound power level was incorrect and that the sound power level data used in the NIA should be adjusted to take into account increased turbulence associated with the close spacing of the turbines. Mr. Zivkovic also gave evidence that in his opinion there was no need for an adjustment in the calculated sound power levels to take account of amplitude modulation. He stated that "normal amplitude modulation" or "blade swish" is associated with operation of all wind turbines and its temporal quality is not dissimilar to other sounds for which no adjustment is made. According to Mr. Zivkovic, the A-weighted equivalent sound pressure level adequately addresses normal amplitude modulation and that adjustments for special quality of sound found in MOE Publication NPC-104: "Sound Level Adjustments", n.d. ("NPC-104") were not designed to apply to sounds with such temporal quality. He also noted that NPC-104 was developed for use by municipalities for compliance purposes and that the MOE had never used it to make adjustments. He went on to testify that "other" amplitude modulation has been reported with some wind turbines, but he considers the likelihood of it occurring to be low and, even where it has reportedly occurred, it has been intermittent. In his view, there is insufficient knowledge of "other" amplitude modulation to be able to quantify it objectively. Mr. Zivkovic commented on recent work in the

United Kingdom, which is the first attempt to develop an objective method to quantify it, and noted that the MOE will continue to review the scientific work in this area.

[76] Mr. Zivkovic agreed that the MOE Noise Guidelines express sound pressure limits only in accordance with the A-weighted scale. He was asked about the statements in IEC 61400-11, Annex A (informative), para. A.3, that the "annoyance caused by noise dominated by low frequencies is often not adequately described by the A-weighted sound pressure level," that noise can be characterized as having a low frequency component "if the difference between the A and C-weighted sound pressure levels exceeds 20 dB," and that in such "circumstances, low-frequency noise may be quantified by extending the one-third octave band measurements described in the main body of the text, down to 20 Hz. For one-third octave bands, the 20, 25, 31.5 and 40 Hz bands should additionally be determined." He replied that the MOE does compare the A and C-weighted sound pressure levels as measured down to 6.3 Hz and will take action if the difference is more than 20 dB, but that this is done at the compliance stage. In his view, the MOE standard, expressed as A-weighted sound pressure levels, is adequate to account for the impacts of wind turbine noise.

[77] Mr. Zivkovic testified with respect to the MOE Compliance Protocol. He described the purpose of the Compliance Protocol as the tool used by district office staff in responding to noise complaints regarding wind turbines. He stated that the "acoustic assessment" procedure requires detailed quantitative measurements once an acoustic audit by MOE staff indicates that one or more turbines may be out of compliance with the REA. He testified that the REA requires that the Approval Holder comply with MOE sound pressure limits at all times and that if there is non-compliance, this is not dealt with in the REA, but is responded to in accordance with the Compliance Protocol.

Dr. Kieran Moore

[78] The evidence of Dr. Moore, on behalf of the Director, was entered on consent of all parties by way of witness statement and a transcript of his evidence in *Drennan v. Director (Ministry of the Environment)*, [2014] O.E.R.T.D. No. 10 ("*Drennan*"), in which he was qualified as a physician with expertise in family and emergency medicine, public health and preventative medicine. Dr. Moore is a medical doctor who is certified with the Canadian College of Family Physicians, and has met the requirements of Special Competence in Emergency Medicine. He also has a Master of Public Health degree. Dr. Moore is currently Program Director in the Queen's University residency program for Public Health and Preventive Medicine, and works as an Associate Medical Officer of

Health in Ontario, a core function of which is to review epidemiological data and perform environmental risk assessments on human health.

[79] In relation to previous REA appeal hearings, Dr. Moore had reviewed the medical records of two of the post-turbine witnesses in this matter, among others. Based on this review, he gave evidence that

> it is a challenge to come to any scientific conclusions regarding allegations that wind turbines are causing adverse health effects given the subjective nature of the symptoms, the limited documentation of overall exposures and limited medical histories available. The reported complaints are very common clinical conditions, especially those that refer to depression, sleep disorder, vertigo or dizziness,…this would be a normal list of patients presenting in a family doctor's office anywhere in Ontario, given the high prevalence of these symptoms in our population.

[80] Dr. Moore also applied the nine Bradford Hill causation criteria and determined that no causal link has been established between the reported health effects and wind turbines.

[81] Dr. Moore gave evidence that annoyance is not a medical condition or diagnosis, but is a psychological state that is under the control of an individual, noting that it is up to an individual to have coping mechanisms to deal with annoyance. He stated that many new technologies can cause annoyance or fear, including wi-fi, immunization and fluoridated water, in spite of a lack of scientific documentation of population harm.

[82] Dr. Moore provided his opinion, in his witness statement, that

> appropriate evidence-based regulations to guide industry and protect the population from any significant exposure or harm from wind turbine noise have been put in place. The purpose of the Ministry of Environment setbacks at 550 meters and 40 dbA hourly average exposure at the receptor is to minimize possible health effects from this exposure. To date, the scientific literature does not provide any convincing evidence of health effects, other than annoyance and indirect health effects, at current regulated setbacks and sound levels in Ontario. While a strong relationship has been found between annoyance and being able to hear the wind turbines, a strong relationship has also been found between annoyances and being able to see the wind turbines. This finding suggests it may not be the noise of the wind turbines causing the alleged health problems.

Evidence of the Approval Holder

Debbie Raymond

[83] The Approval Holder filed a witness statement from Ms. Raymond, Engineering Sales Manager of Siemens Energy Inc., which provides technical evidence with respect

to the Siemens SWT-2.3-101 wind turbine. By agreement of the parties, Ms. Raymond did not testify in the hearing and was not cross-examined.

[84] Attached to Ms. Raymond's witness statement is a Siemens document entitled "SWT Small Geared Turbine Fire Prevention" that describes the fire prevention features of the turbines to be used in the Project. It states that the turbine components are made of fire resistant materials to limit fires and their spread due to different causes. In addition, it states that the turbines are equipped with a fire detection and warning system that includes smoke detectors, a monitoring system and alarms, and with a control system that switches off the turbine, the fans and all motors in response to an alarm. It states that fire extinguishers are placed in the nacelle and the tower.

[85] Ms. Raymond attached two other documents to her witness statement, one describing the design and materials of the turbine blades, and one describing the Turbine Condition Monitoring System, which includes continuous monitoring of internal and external conditions, including vibrations caused due to icing of the blades. According to one document, the blades of this model of turbine are manufactured of fiberglass-reinforced epoxy in a process whereby they are "cast in one piece in a closed process, which eliminates the traditional weaknesses found at glue joints in other manufacturers' blades." It was Ms. Raymond's evidence that ice build up on the turbine blade, or on the anemometer or the wind direction vane on the nacelle would cause the turbine to automatically shut down. It would then have to be manually released, allowing the operator to verify that icing did not pose a hazard.

Robert O'Neal

[86] Mr. O'Neal gave evidence on behalf of the Approval Holder. Mr. O'Neal is a principal of Epsilon Associates, Inc. in Massachusetts. He has a Bachelor of Arts in Engineering Science and a Master's degree in Atmospheric Science and is a Certified Consulting Meteorologist. He has more than 25 years of experience in conducting noise impact assessments, meteorological studies and air quality modeling. Since 2004 his noise impact assessment work has focused on wind energy facilities and includes pre- and post-construction monitoring, low frequency studies and predictive modeling. He was the lead investigator on a study of low frequency sound and infrasound associated with wind turbines. The Tribunal qualified him as an acoustician and meteorologist with special expertise in low frequency sound, infrasound and wind turbine noise.

[87] Mr. O'Neal provided general comments on the evolution of wind turbine technology, emphasizing the changes in design and the different sources and characteristics of sound associated with wind turbines. He explained in some detail the nature of low frequency sound and infrasound and noted that these are not unique to wind turbines, but occur with many mechanical and natural sources. He stated, in relation to Mr. James' testimony, that there is a blade pass frequency that produces some variability in sound from a wind turbine. He noted that there can be spikes in sound pressure due to this variability but that they are not like gunshots and do not occur as frequently as claimed by Mr. James. Mr. O'Neal cited the Walker study referenced by Mr. James but noted that Dr. Walker concluded that there is little evidence of blade pass effect. Mr. O'Neal stated that this is consistent with his own studies of infrasound from wind turbines.

[88] Mr. O'Neal also responded to Mr. James' statement that his equipment would not be able to distinguish the pulses in the infrasound range, stating that his instruments measure to about 1 Hz and sample at a rate of 50 – 100 milliseconds. He asserted that his instruments are similar to those used by Mr. Hessler, one of the consultants involved in the Shirley Wind Study, and that Mr. Hessler compared his results with those of Dr. Walker, who used equipment similar to Mr. James', and found good coherence down to about 2 Hz, with a slight separation below that.

[89] Mr. O'Neal commented on a study he and his colleagues conducted, subsequently published in a peer reviewed journal, that included a literature search for guidelines and standards used to evaluate low frequency sound and infrasound, a field study to measure wind turbine noise at different distances, and a comparison between measured levels and standards. The measurements were done outdoors and indoors. He stated that they found that levels of low frequency sound and infrasound were below any standards identified and they concluded therefore that low frequency sound and infrasound would not impact residents at distances 305 and 457 m away from wind turbines. Mr. O'Neal noted that the study considered the perception of vibration due to low frequency sound and infrasound, but looked at vibration of building walls and windows, not vibration effects in humans.

[90] Mr. O'Neal testified that he attended the Wind Turbine Noise Conference in Denver in August 2013 and heard the presentations on low frequency sound and infrasound by Dr. Walker, Mr. Hessler and Mr. Yokoyama et al. He noted similar results from Dr. Walker and Mr. Hessler to those he had come to in his own work. He highlighted a few points, including that in the very low frequency range, there was

virtually no difference between when the turbine was operating and when it was not operating and that the levels measured at wind farms were not audible or perceptible to people. He conceded that in the Yokoyama paper, where test subjects were exposed to wind turbine noise, they were asked to respond only if they could hear or feel something "with their ears".

[91] Mr. O'Neal stated that he does include confidence limits when modeling turbine sound power levels to represent a safety factor in order to provide the worst case scenario. He noted that he does not do so when the sound power levels provided by the manufacturer are guaranteed.

Shant Dokouzian

[92] Mr. Dokouzian gave evidence on behalf of the Approval Holder. Mr. Dokouzian holds a Bachelor's degree in civil engineering with a major in structures and is a licensed Professional Engineer in Québec and Ontario. He has completed a Master's level course in Wind Energy and Turbines. Since 2006 he has worked as a wind farm analyst, and through his employment has been involved in noise assessments for nearly 50 wind farms. His current position is Team Leader for Project Development Services at GL Garrad Hassan Canada Inc. In that position he supervised the preparation of the NIA submitted on behalf of the Approval Holder. The Tribunal qualified him as an engineer with expertise in noise and post-construction monitoring of wind farms.

[93] Mr. Dokouzian testified regarding the work that he and members of his firm carried out in the preparation of the NIA for the Project. He discussed their general approach to doing the assessment and gave more detailed evidence regarding the calculations of sound power levels, as set out in Appendix E of the NIA report. He stated that there are several elements of conservatism worked into their predictions. For example, the Siemens specifications for noise are higher than the measured values; at the wind speed used in the model the turbines will not often operate at maximum power; and the numbers used in the model for the octave band spectra were those that gave the highest noise levels at the receptors, even though that was not required. He stated that all numbers were adjusted to take into account summer nighttime wind shear, using the coefficient of 0.42. According to Mr. Dokouzian, they modeled the cumulative effects of existing wind farms, using the current Noise Guidelines, not the guidelines under which these projects were approved, and using the "as built" turbine locations. He also explained that they chose to use 0.7 as the ground attenuation factor in the model because of the nature of the terrain and land use in the area. He

commented that 0.7 is appropriate even in winter conditions where the ground is snow-covered.

[94] Mr. Dokouzian discussed his view of the conditions in the REA. He stated that there is a requirement to measure the sound power levels at every receptor after the turbines are constructed, which is not required elsewhere in North America. He was not aware of any such acoustical audits that had been completed in Ontario since the REA process began, but he noted that the MOE does not require consideration of audits of other projects in order to complete a noise impact assessment.

[95] Mr. Dokouzian reviewed Mr. Palmer's witness statement and the papers that Mr. Palmer relied on. Mr. Dokouzian testified that the documents referenced by Mr. Palmer do not indicate that there will be increased noise due to inflow turbulence or that the degree of increase will be in the order of 3 dB. Mr. Dokouzian stated that neither the standards nor the MOE Noise Guidelines refer to this concern and none requires any adjustment. He testified that turbulence is factored in to all noise assessments but that there is no adjustment required anywhere because of the wakes associated with upwind turbines because there is no belief that they cause increased overall noise levels. Mr. Dokouzian also noted that some of the documents relied on by Mr. Palmer suggest a shift in noise to the leading edge of the turbine, but not an increase in overall noise except perhaps at very low wind speeds, when the turbines do not operate at maximum power. He pointed out in particular the study "Influence of upwind turbines on wind turbine sound power output," by Jonathan Cooper and Tom Evans, Australian Acoustical Society, Proceedings of Acoustics 2012 – Freemantle ("Cooper and Evans"). It was his position that Mr. Palmer selectively referred to a few statements in that study and used them out of context, while ignoring the overall conclusion of the study, that is, that the wakes of adjacent turbines did not increase the level of noise from a wind farm. Mr. Dokouzian took issue with Mr. Palmer's view that the Cooper and Evans study was carried out too close to turbines to assess the effect of low frequency noise. He stated that noise from wind turbines is broadband and that it makes sense to measure close to them in order to measure the full range of frequencies. He also disagreed with Mr. Palmer that the study's failure to address wind shear would make any difference in Cooper and Evans' findings. He admitted that lower frequencies will become more dominant the farther from the turbine that noise is measured; however, he noted that overall noise will decrease and low frequency noise will not increase with distance.

[96] Mr. Dokouzian repeated the approach he used to calculate maximum sound power levels and took issue with Mr. Palmer's approach. He criticized him for "cherry-picking" the highest sound power level at each octave band, adding them and adjusting them to reach a figure that is higher than the maximum possible sound power level. He stated that such an approach is not indicated in any standard or guideline and is not justified with wind turbines. He explained that the specifications Mr. Palmer found for the Siemens models that were used in a wind farm in Nova Scotia were specifications from the 2009 models of those turbines, whereas for the Project, he used the specifications from the 2013 models, which indicate evolution in the certainty of their measurements, and somewhat lower sound levels as a result.

[97] Mr. Dokouzian explained that the sound power levels for turbines are measured in accordance with IEC 61400-11, by acoustical consultants for the manufacturer, and that they include an uncertainty factor of +/- 3 dB, however, he does not use those measurements when modeling. He relies instead on the specifications provided by the manufacturer, which are higher than measured results, and also include a small uncertainty factor of +/- 0.5. He stated that he did not use additional adjustments for uncertainty in the model because it is not required by the Noise Guidelines, is not standard practice, and because his goal is to provide the "most accurate result with conservative parameters." In his view, there are enough conservative parameters used to more than offset any error within the margin of uncertainty.

[98] Mr. Dokouzian also commented on Mr. James' evidence regarding low frequency noise and infrasound. He stated that all of the meaningful measured noise content is accounted for in the specifications provided by Siemens, including low frequency noise.

Benjamin Coulson

[99] Mr. Coulson appeared on behalf of the Approval Holder. Mr. Coulson holds Bachelor's and Master's degrees in Applied Science, Mechanical Engineering, with a specialization in atmospheric fluid flows. In addition, he has doctoral level training in atmospheric science. He is a registered Professional Engineer in Ontario and has worked for more than 15 years in the field of mechanical engineering specializing in air quality, atmospheric dynamics and acoustics. He has experience in completing noise assessments for wind energy projects in Ontario and other provinces and in conducting post-construction monitoring. He has previously been qualified as an expert in hearings before the Tribunal. The Tribunal qualified him as an expert in acoustics and noise engineering with experience with wind turbines.

[100] Mr. Coulson reviewed the NIA, the REA and the witness statements of Mr. James and Mr. Palmer. It was his opinion that the NIA was appropriately conducted, following the MOE's requirements. He disagreed with Mr. James regarding the calculations for sound power levels from the Siemens turbines. First, Mr. Coulson stated that IEC 61400-14 would not be applicable here, that the MOE Noise Guidelines do not require its use, and that it is not common practice among acoustical consultants in Ontario to use that standard. He also criticized the way Mr. James used the confidence limits in IEC 61400-14, commenting that Mr. James quoted the confidence level as 1.645, whereas it is in fact 1.645 times the total standard deviation. In addition, he stated that the measurement uncertainty from IEC 621400-11 should not simply be added to the IEC 61400-14 confidence level, as Mr. James did, but that it is included in the derivation of the confidence level.

[101] Mr. Coulson discussed the application of the confidence limits of +/- 3 dB stated in the NIA. He explained that confidence limits signal that there can be local changes in the atmosphere in a real world setting so that perfect accuracy is not possible. He agreed that adding those limits to modeled results could be a way of adding a safety factor, but he stated that there are numerous conservative factors already built in here, so to do so is not necessary.

[102] Mr. Coulson explained his view that the IEC 61400-11 test collects data over a short period of time, of at least one minute, and that the variability in sound levels over that period is reflected in the standard deviation of the measured results and the measurement uncertainty quoted by Siemens. He stated that the assessment period required by the MOE Noise Guidelines is 60 minutes, which decreases the variability in results and thus the standard deviation becomes smaller and the uncertainty quoted by Siemens becomes less significant. Mr. Coulson also stated that the REA conditions, requiring audits to verify the sound power levels emitted from the turbines and at the receptors, are robust and will ensure that the Project will be compliant with the MOE standards. He noted that his current post-construction monitoring at wind farms has shown very good agreement between the predicted sound power levels and those measured. He did not provide the results of that monitoring because they were done for his firm's clients, but he noted that the MOE has been provided with those results.

[103] Mr. Coulson disagreed with Mr. James on the uncertainty in ISO 9614-2. The standard refers to measures at a mean height between source and receptor of 30 m and, according to Mr. Coulson, this height is appropriate for the turbines in the Project and it accounts for all of the atmospheric factors of influence.

[104] Mr. Coulson also disagreed with Mr. James' evidence regarding the need for the transformers to be enclosed in a building, stating his view that the MOE noise limits can be achieved with the design, setbacks and sound barriers. He also testified that the NIA followed the requirements of the MOE Noise Guidelines, and ISO 9613-2, respecting the method for modeling noise propagation. He disagreed with Mr. James that hard-packed ground, and a ground attenuation factor of 0.0, should be considered for the Project as representing the predictable worst case condition. According to Mr. Coulson, the use of 0.7 is appropriate, given the nature of the ground cover in the area of the Project, and is consistent with the Noise Guidelines and ISO 9613-2. He discussed a technical presentation on the approach to ground absorption used in ISO 9613-2, and noted that all types of ground have some attenuation, and that ISO 9613-2 generally under-predicts the ground attenuation. He stated further that, contrary to Mr. James' evidence, the equations used to calculate ground attenuation in ISO 9613-2 vary with height and thus do in fact account for tall noise sources.

[105] Mr. Coulson also disagreed with Mr. James' evidence regarding wind shear. He stated that the Noise Guidelines require use of a wind shear coefficient reflecting summer nighttime conditions, where there are higher winds at the level of the turbine nacelle and lower winds at ground level where there is less wind to mask noise. Thus, in his view, this adjustment assesses a high sound power level against a lower sound level criterion, resulting in a predictable worst case condition, contrary to Mr. James' assertion. He added that other conservatisms in the application of ISO 9613-2 further ensure a predictable worst case is used.

[106] Mr. Coulson also disagreed with Mr. James regarding the application of a 5 dB penalty to account for "blade swish", or "normal" amplitude modulation. He stated that this adjustment would not represent actual sound and would not improve the predictions of the model. He noted that the actual sound of blade swish is included in the sound power levels as determined in accordance with IEC 61400-11, and that Mr. James acknowledges this in his witness statement. Mr. Coulson stated that the MOE does apply a penalty for tonality in some situations, but that the thumping sounds referred to by Mr. James are not expected to occur with the Project because they are associated with older designs of "downwind" turbines and with turbines arranged in a regular pattern and rotating synchronously, and neither applies with respect to the Project. Mr. Coulson testified that there is a recent research study he has reviewed that identified a source of "other" amplitude modulation occurring as a stall effect along the turbine blades. He stated that the researchers found the conditions that create that effect to be

highly localized but rare, and they found that the sound from the turbine was no louder as a result of their occurrence. He suggested that modeling need not change to consider this, but that the audits, because they will be done under differing atmospheric conditions, may be able to identify the atmospheric conditions that contribute to it.

[107] Mr. Coulson discussed the issue of low frequency sound and infrasound. He agreed with the conclusion of the HGC study, which he considered to align with the "wide-ranging consensus in the literature that infrasound and low frequency noise are not concerns at wind farms." He stated that this conclusion is also consistent with his experience in measuring sound from wind turbines in the field. His results have shown that infrasound is "below thresholds of human perceptibility at distances typical of receptor setbacks in Ontario" and that low frequency sound is present but not in an amount necessitating special attention. He disagreed with Mr. James' statement that acoustical consultants do not have equipment to measure low frequency noise and infrasound.

[108] Mr. Coulson commented on the evidence of Mr. James regarding the pulses of infrasound in the level below 1 Hz, which Mr. James derived through taking the recordings from the study carried out by Mr. Walker and reprocessing them. According to Mr. Coulson, given the noise floor identified by Mr. Walker in his study, Mr. James' results are most likely reflective of instrumentation noise rather than infrasound in that range. It was his view that those results do not otherwise make physical sense, given the size of the source and the size of the wavelength of 1 Hz. Mr. Coulson stated his belief that the lowest likely range associated with turbines would be closer to 3 to 6 Hz, and that this range is consistent with what other researchers have found. He also criticized Mr. James for not showing an ambient condition, given that the wind itself is a significant source of infrasound in the atmosphere.

[109] Regarding Mr. Palmer's evidence, Mr. Coulson testified that wind turbine sound will not be adversely affected by any turbulence caused by the wakes of adjacent turbines. In his view, this is because wake turbulence from air passing around upwind turbines will not be expected to be more important than the ambient turbulence in the atmosphere, which is stronger and which is already considered in the calculation of noise emissions. Mr. Coulson pointed out that Mr. Palmer quoted from a report by Dr. Stefan Oelermans in which he states that "leading edge inflow turbulent noise can become the dominant noise source on airfoils in the presence of severe upstream turbulence," however Mr. Palmer left out Dr. Oelermans' qualification that the "level of turbulence in the tunnel was much greater than that which is usually experienced in the

atmosphere at typical rotor speeds. Therefore, it should not be concluded from these experiments that in the presence of atmospheric turbulence, leading edge noise would dominate wind turbine aeroacoustic emissions…" He considered there to be no basis for Mr. Palmer's suggestion of adding a 3 dB penalty to the modeled values to account for wake turbulence.

[110] Mr. Coulson disagreed with Mr. Palmer's view that under conditions of high wind shear the sound power levels should be taken as the maximum spectral values in each octave band over all wind speeds. According to Mr. Coulson, there is no justification for doing so. He explained that IEC 61400-11 requires the use of the turbine electrical power curve to determine average wind speed during noise measurements, based on sound emissions at hub height, because the turbine itself acts as an averaging device, rotating at a speed dictated by all the atmospheric influences across the blade swept area.

[111] Mr. Coulson also commented on the differences between the regulatory requirements for existing wind farms, cited by the Appellants, and for the Project. The regulation and guidelines to which the Project is subject differ from the earlier requirements, according to Mr. Coulson, on a number of issues including: minimum setbacks between turbines and receptors, vacant lot receptors, cumulative noise assessment, transformer noise assessment, summer wind shear, modeling parameters such as ground factors, sound character adjustments, and reporting. He stated that REAs under the new guidance generally include specific monitoring and auditing requirements, while investigations at existing wind farms are complaint driven. He concluded that these factors have strengthened the permitting regime and made it more restrictive.

[112] Mr. Coulson commented on the noise measurements undertaken by Mr. Palmer that were reported in the papers he has presented at conferences. Mr. Coulson identified a concern with the instrumentation used by Mr. Palmer as being not of high quality for acoustical measurements and having a large degree of noise associated with the equipment that Mr. Palmer did not account for. He also expressed concern about Mr. Palmer's lack of familiarity with the noise measurement standards and with some of the aspects of the locations he chose for carrying out his measurements.

[113] Mr. Coulson testified that the range of sounds associated with wind turbines is not unique, even in rural environments, where facilities such as grain driers would be used. He admitted that these other facilities would run for shorter periods of time, but noted that they do not have to meet as strict a noise standard as turbines do.

Dr. Kenneth Mundt

[114] The Approval Holder called Dr. Mundt, who was qualified to give opinion evidence on epidemiology. Dr. Mundt holds Master's and Doctoral degrees in epidemiology and serves an adjunct professor at the University of North Carolina and the University of Massachusetts. He is the Director of Epidemiology and Health Sciences Practice Area Leader at ENVIRON International Corporation, and has worked full-time in the field of epidemiology for almost 30 years.

[115] Dr. Mundt gave evidence that self-reported health problems do not constitute valid epidemiological assessments, and that "causal conclusions based solely on self-reported health problems are scientifically speculative and likely misleading." He stated that conclusions regarding causation require valid epidemiological evaluation.

[116] Dr. Mundt testified that his review of the literature indicated that there is not sufficient, clear and convincing evidence of wind turbine emissions causing any harm to human health. He said in his witness statement that,

> [a]t most, the literature reports an association between sound pressure levels and annoyance; however, these findings may reflect negative attitude towards wind turbines, or fears or perceptions of economic loss.… While some individuals may experience annoyance from wind turbine noise, there is no indication of a correlation between annoyance from wind turbine noise and adverse health effects in these studies – nor is there any indication of serious harm.

[117] Dr. Mundt stated that, although the literature associates turbine noise with annoyance inconsistently, the medical literature does not equate annoyance with disease. He noted that he could not find the term "annoyance" in any medical dictionary.

[118] Based on his literature review, Dr. Mundt concluded to a reasonable degree of scientific and epidemiological certainty that the noise emissions from the Project wind turbines will not cause serious harm to human health.

Dr. Robert McCunney

[119] The Approval Holder called Dr. McCunney, who was qualified to give opinion evidence as a medical doctor specializing in occupational and environmental medicine with particular expertise in the health implications of noise exposure. Dr. McCunney is a medical doctor, and is board certified in occupational and environmental medicine. He is a research scientist in Biological Engineering Medicine at the Massachusetts Institute of Technology, and was formerly the Director of Environmental Medicine there. He was

a co-author of the 2009 Wind Turbine Sound and Health Effects: Expert Panel Review, prepared for the American Wind Energy Association and the Canadian Wind Energy Association. Dr. McCunney has an active clinical practice in occupational and environmental medicine, and has evaluated and treated people who have been exposed to noise.

[120] Dr. McCunney reviewed and provided comments on the witness statements and medical records provided by post-turbine witnesses, including two of the presenters. He determined that the level of information provided in the medical records was insufficient to allow a medical practitioner to make definitive causal assessments between diagnoses, symptoms and wind turbines. He noted that the medical records made no diagnosis related to wind turbine exposure. He stated that the health effects claimed by the post-turbine witnesses in their witness statements were general in nature, self-reported and could relate to numerous conditions.

[121] Dr. McCunney stated that the information disclosed by the post-turbine witnesses is insufficient to conduct individual causality assessment, which would require a thorough review of symptoms, past medical history, and noise measurements taken inside and in the vicinity of the home.

[122] Dr. McCunney gave evidence, in his witness statement, that there are no scientific studies that demonstrate adverse health effects from sub-audible infrasound at the levels encountered in the vicinity of wind turbines. He reviewed the literature and concluded that wind turbines can generate infrasound and low frequency sound, but that

> Detectable levels of infrasound and low-frequency sound are not at harmful levels based on studies near wind farms in the United States, the United Kingdom, the Netherlands, Denmark and Australia. Moreover, there are no studies demonstrating harmful effects to humans as a result of exposure to infrasound or low-frequency sound at the noise levels measured in the vicinity of wind turbines or in experimental studies involving noise levels several orders of magnitude higher than those noted in the vicinity of wind turbines…

[123] Dr. McCunney gave evidence that annoyance associated with wind turbines is a subjective phenomenon that is primarily related to attitudes to the visual impact of wind turbines and economic benefit associated with wind farms. He stated that annoyance is not a health effect. He provided his opinion that, based on the documents and literature he had reviewed, the Project, if operated in accordance with the REA, will not cause serious harm to human health.

Participants' Evidence

Elizabeth Bellavance

[124] Ms. Bellavance was granted participant status on behalf of WAIT-PW, a community-based organization of which she is a Director, that formed in early 2012 in response to concerns about the development of the Suncor Cedar Point Wind Power Project in Lambton County. She said that the citizens represented by WAIT-PW are concerned that local citizens are not being properly consulted or informed about wind turbine projects, and that these projects have divided Ontario communities.

[125] Ms. Bellavance noted the World Health Organization ("WHO") definition of health as a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity. She stated that WAIT-PW is concerned about mental and social well-being in addition to physical health. She also raised concerns that the test of proving serious harm under s. 142.1(3)(a) of the *EPA* does not meet the criteria of s. 7 of the *Charter*, and that proving serious harm is beyond most, if not all, communities.

[126] Ms. Bellavance testified that she is concerned about the harmful health effects of industrial wind turbines, and suggested that the government is also concerned, given that it is conducting a health study. She said that the government knows wind turbines cause harm to humans living in close proximity to them, but does not know how much harm. She referred to an Australian tribunal decision she has read, saying that the tribunal in that case used the precautionary principle to protect citizens and put the wind power project on hold pending a health study.

[127] Ms. Bellavance expressed concern about documents she has read that urge the removal of infrasound and low frequency noise monitoring requirements, and peer-reviewed studies she has read that indicate she should be concerned about her health when living in close proximity to the turbines. She stated that it is a social injustice to require individuals to prove that release of contaminants from a renewable energy project will cause them serious harm.

Jutta Splettstoesser

[128] Ms. Splettstoesser, who was granted participant status, testified in support of the Project. She resides in the Municipality of Kincardine and operates a farm, with her family, that produces cash crops and solar energy. She has lived near 38 turbines in the Ripley wind project since 2007, and near 115 turbines in another wind farm to the north since 2009. She has stayed near or toured a number of turbines.

[129] Ms. Splettstoesser stated that repeated studies have found no scientific evidence of direct health impacts from wind power projects, and noted that she has met many people from Ripley, Kincardine, Chatham, Essex County and Northern Germany who live as close as 300 m to a wind turbine and confirm that they are happy and healthy.

[130] Ms. Splettstoesser testified that her farm corporation rents some land in the Project area and will work the land around two of the proposed wind turbines. She said that she and her family have been informed about the Project studies, welcome the Project into the community, and have no health concerns about the Project.

William Palmer

[131] Mr. Palmer gave evidence as a participant. He asked to be qualified to give opinion evidence as a professional engineer with expertise on acoustics and several matters related to public safety. Following submissions from the parties, the Tribunal qualified Mr. Palmer as a professional engineer with expertise in public safety risks due to turbine failure and some experience in the acoustics of wind turbines. The Tribunal directed Mr. Palmer to confine his testimony to public safety and acoustical assessment and to not speak to topics outside his area of qualification, such as health effects or shadow flicker along highways. The Tribunal's reasons are set out in Appendix A to this decision.

[132] Mr. Palmer holds a Bachelor of Applied Science and Engineering degree and is a Registered Professional Engineer in Ontario. He spent most of his career working at the Bruce Nuclear facility in various roles, including risk assessment. Since he retired in 2004, Mr. Palmer has studied the issue of wind turbine noise on his own. He has written several conference papers on the subject, attended international conferences on wind turbine noise and appeared before the Tribunal in several hearings. He is a member of the Canadian Acoustical Association and the Acoustical Society of America.

[133] Mr. Palmer gave evidence respecting noise and public safety. Regarding noise, he testified that the manufacturer's sound power levels for the different types of turbines in the Project were determined for a single turbine, yet they were used as the basis for the assessment of total sound power levels for all turbines in the area. According to Mr. Palmer, these levels are not representative of the turbulent conditions that are created when turbines are spaced less than 10 rotor diameters, or 1,010 m, apart, such as in the Project where many of the turbines are spaced only 3.5 rotor diameters apart. It was his view that the close spacing of upwind turbines in this Project will result in extensive turbulence on downwind turbines, increased stress on the turbines, and

increased noise output, likely more than 3 dB. Although he conceded that he was not aware of any study of increased turbulence that suggests a 3 dB penalty, he believes 3 dB is appropriate because the studies indicate that noise levels increase and 3 dB is the degree of change in noise levels that is perceived by people. He stated that the issue of increased inflow turbulence from upwind turbines was not considered in the Approval Holder's NIA report.

[134] Mr. Palmer also testified that the NIA report incorrectly interpreted wind shear. He stated that the use of 7 m/s as the 10 m reference wind speed corresponds to a wind shear value of 0.16, as used in IEC 61400-11; however, the actual measured wind shear for the site is 0.42. This would correspond to a much higher hub wind speed and a large variation in wind speeds at different points across the blades. He argued that this should be factored in by using the upper range of the sound power levels at each frequency rather than a single mid-range value. In his view, the approach in NIA is neither conservative nor representative of site conditions.

[135] In addition, Mr. Palmer stated that the NIA report should have used a ground attenuation factor of 0.2 rather than 0.7, which does not represent the worst case in winter when the ground is frozen. He concluded that the combination of his recommended wind shear and ground attenuation factors would mean that the predicted sound power levels at the receptors would be approximately 2 dB higher than the levels predicted in the NIA. If a further 3 dB increase due to turbulence impacts is added, this would mean that the sound power levels at many receptors will be 5 dB higher than predicted, and thus above the MOE limit of 40 dBA. He also stated that the standard uncertainty of +/- 3 dB from ISO 9613-2 and the uncertainty of measurement of 0.9 to 2.5 dB from IEC 61400-11 were not factored in. Finally, he testified that the maximum sound power levels identified in the NIA report were not consistent with levels used by for the same Siemens turbines in a project in Nova Scotia and should be increased. Thus, in his opinion, the NIA does not reflect the worst case conditions.

[136] Mr. Palmer also criticized the MOE for failing to account for the unique sound characteristics of wind turbines, in particular amplitude modulation. He repeated testimony he had given in a previous hearing that, based on his measurements and observations, amplitude modulation is detectable most of the time that a wind turbine is operating. He noted that his evidence was at variance with that of other noise experts who testified before the Tribunal. After that hearing, he attended the Wind Turbine Noise Conference in Denver, where 12 speakers commented on the subject and, he submitted, confirmed his view. He also disagreed with the distinction made by other

consultants between “normal” amplitude modulation and “other” amplitude modulation; however, he agreed that many researchers in the field make that distinction. He criticized the MOE for not imposing a penalty as required in NPC 104. He submitted that a penalty should be used to account for amplitude modulation, as is done in New Zealand, and that if the MOE would do so, the setback between wind turbines and receptors would have to double. When questioned, Mr. Palmer conceded that the 6 dB penalty applied in New Zealand is not applied in calculating predicted noise levels but is applied at the operational stage. He agreed that no jurisdiction currently requires a penalty for amplitude modulation in models predicting noise levels from wind turbines.

[137] Mr. Palmer was questioned about the papers he has prepared and presented at conferences. These papers were largely based on noise measurements he carried out at existing wind farms in Ontario. He asserted that his measurements were conducted in accordance with international standards, but was unable to identify the particular standard to which they conform and was unable to state the confidence limits with his data, although he suggested it might be around +/- 1.5 dB. He stated that his intent with the measurements was not to produce “precision values” but to compare different locations using similar arrays under similar conditions. He was looking at the change in dominant frequencies due to wind turbines.

[138] Regarding public safety, Mr. Palmer testified regarding public safety issues including blade failure, ice throw, fire and tower collapse. He compiled a list of safety problems with wind turbines around the world, some of which were associated with the Siemens turbine model proposed for the Project. He compiled this list from publicly accessible websites, and checked it against the website of the Caithness Windfarm Information Forum (“Caithness”), an anti-wind development organization in Scotland. An earlier version of this list was excluded from evidence in a hearing in Ohio because of its reliance on information from Caithness. In reviewing information about failures, Mr. Palmer did not contact any manufacturer to determine the cause of any of these failures. According to Mr. Palmer, the list shows that the rate of blade failure, fire or tower collapse is about 0.0002 failures per turbine year in operation, but that the rate is higher in Ontario, about 0.0006. Given the locations of the three nearest turbines to the Appellants’ property lines, he calculated that the combined probability of failure was 0.002, or 1 in 500 per year. Yet, he noted, the Design and Operations Report submitted by the Approval Holder downplayed the risk of failure and concluded that no additional preventative measures were required.

[139] When questioned, Mr. Palmer stated that the response of Siemens to two cases of blade failure due to bond failure was appropriate. He also stated that it would be impossible to design and build a structure that could be guaranteed to have no possibility of failure. He testified that there are a number of factors that go into determining an acceptable risk of failure but that he had not identified them here. In Mr. Palmer's view, risks that can be mitigated should be to the extent that is reasonable. He stated that he did not believe that there had been reasonable mitigation of the risks of failure with the Project.

[140] Mr. Palmer identified his concern that the Project was within the minimum setback from 500 kV power lines established by Hydro One so that a turbine failure could lead to a failure in the electrical system corridor. When questioned, he admitted that he had never seen a Hydro One standard or technical guideline and did not know whether his concern was the basis for a setback between turbines and power lines.

[141] Mr. Palmer also testified that he had seen and photographed ice falling from non-operational turbines in Kincardine beyond the blade length and that could have killed or seriously injured a person on the ground. He disagreed with the issuance of the REA because it contains setbacks that do not protect persons on their land. He characterized the idea that those on the ground would continue their normal activities knowing the risk of ice throw as "incomprehensible" and the removal of their right to use their property as "larceny".

[142] Mr. Palmer stated that as a professional engineer he had tried to warn the MOE of the risks and the need for safety barriers, yet his questions and concerns were ignored. He stated his belief that the outcome will be serious public injury or deaths. He likened the circumstances to the collapse of the mall roof in Elliot Lake and that a future investigation like that looking into the mall collapse would find that those responsible for approving the Project had information such as he has provided that could have prevented public harm but they chose to ignore it.

Presenters' Evidence

David Fritz

[143] Mr. Fritz testified as a presenter on behalf of himself and his wife, Pat Fritz. They own two properties within the Project area. Their main residence would be approximately 841 m from the closest wind turbine, with approximately 14 additional turbines within 2 km. Their second property is a seasonal residence that would be

approximately 554 m from the closest wind turbine, with approximately 13 additional turbines within 2 km.

[144] Mr. Fritz and Ms. Fritz have concerns regarding the health effects of the Project wind turbines and their safety. He said that he believes the operation of the turbines will infringe on their *Charter* rights. He noted that he is not opposed to wind energy and has two wind turbines on his property, but said he has concerns about the much larger turbines to be used in the Project and stated that wind turbines need to be operated safely and in a manner that does not affect the health of those who live near them. He noted that his own two small wind turbines are sometimes noisy in gusting winds and make it difficult to sleep, but they are able to stop operating them at these times. He expressed concern that if they have any issues with the proposed Project turbines, they will not have any way to work with the Approval Holder to resolve them.

[145] Mr. Fritz testified that they are concerned about the noise that large industrial wind turbines make and associated health effects. He said that regardless of what direction the wind is from, they have a high potential to be downwind of a turbine and experience the highest noise effects. They are concerned about health issues as a result of low frequency and high frequency noise. He stated that, while the Approval Holder is following the setback guidelines, the guidelines may be outdated and in need of revision. He also expressed concerns about the possibility of ice throw and restricted access to a sideroad used to access his property. He said that the MOE should wait for the results of health studies regarding the turbines before putting the health of Ontario residents at risk.

Dan Norman

[146] Mr. Norman lives with his wife and children on a family farm in the Project area. He noted that his family moved there to be away from towns and industry. He said that he supports alternative energy if it is built in a responsible, well-planned area away from residential areas. He stated that the Municipality of Kincardine already provides Ontario with energy from the Bruce nuclear plant and existing wind turbines. He is concerned that the turbines will be an eyesore and have negative impacts on tourism, recreation and families.

[147] Mr. Norman stated that he has concerns about health effects and the safety of his family. He said that the proposed Project is already causing his family stress due to the potential for noise, shadow flicker and blinking lights at night. He also expressed fears about ice falling from turbine blades in winter. Mr. Norman stated that he believes

operating these turbines so close to residential dwellings will infringe on his *Charter* rights. He said that the MOE should wait for the findings of the health study so they do not put residents of Ontario at risk, and that there are already enough studies showing that individuals will suffer negative health effects.

Matthew Sheridan

[148] Mr. Sheridan lives with his wife in the Project area. He said that one wind turbine is proposed to be located less than 1 km from his home, with three others less than 2 km away.

[149] Mr. Sheridan stated that he was initially happy that the Ontario government was pursuing renewable energy, but has become increasingly concerned about safety due to the emergence of evidence that industrial wind turbines cause serious harm to human health. He noted the WHO definition of health and stated that authorities and wind project managers have failed to consider indirect health effects being caused by audible and inaudible noise from industrial wind turbines. He referred to a number of reports he had read that contributed to his growing concerns.

[150] Mr. Sheridan testified that he has a strong emotional reaction to noise and is highly annoyed by audible sound, which is the main reason that he moved to the country from the city. He said that he is concerned that he will suffer from adverse health affects as a result of the proposed Project. He noted his concerns that the unique nature of wind turbine noise will annoy him and disturb his sleep, causing stress. He stated that he believes health studies will find serious health-related issues, requiring greater setbacks to safe distances from homes.

Norma Schmidt

[151] Ms. Schmidt lived near the Enbridge project. She testified that she began to notice the noise produced by the turbines in the winter of 2008/2009, and experienced a wide range of adverse health effects, which she described. She stated that some symptoms become more severe when in proximity to the wind turbines, and dissipate when she is away from them. She said that sensitivity to low frequency noise persists even when she is away from the wind turbines. Ms. Schmidt stated that she moved out of her home in December 2011, and was not able to return for any significant amount of time when the turbines were operational, without experiencing adverse symptoms. She provided the Tribunal with a small portion of her medical records and a statement from her doctor stating that he advised her to move out of her home to avoid the medical consequences of the turbines.

[152] Ms. Schmidt testified that she initially did not associate her symptoms with wind turbines, but that once she made this association and learned of the MOE's complaints protocol, she began to file complaint reports with the MOE. She took the Tribunal through many of the 135 incident reports concerning her complaints to MOE's office in Owen Sound. She also referred to the WHO definition of health and provided a summary of a number of the research reports she has reviewed that have caused her concern about adverse health effects from turbines. She gave evidence that she had sound measurements performed at her home, which showed non-compliance with sound limits. She said that she recognizes that not everyone living in close proximity to a wind turbine will experience health symptoms, but stated that she is representative of a part of the population that is sensitive to the effects of wind turbines.

[153] Ms. Schmidt stated that the Project is a threat to the health and well-being of the community and would remove the constitutional right to life, liberty, and security of person in accordance to the principles of fundamental justice. She said that her constitutional rights have been infringed by the effects of the wind turbines.

Gregory Schmalz

[154] Mr. Schmalz is a resident of Saugeen Shores, and lives 400 m from a single turbine that is smaller than those proposed for the Project. He expressed concerns that health complaints of families that have been affected by the turbines are not being adequately documented or considered. He stated that he is a co-founder of a local residents' advocacy and support group and has educated his neighbourhood on the health effects of wind turbines as well as receiving copies of, documenting and discussing neighbourhood health complaints.

[155] Mr. Schmalz stated that he believes the Ontario government should regulate cyclical sound from turbines, and implement a 3 dBA penalty for cyclical sound as in Germany. He expressed concern that there will be sleep disturbances as a result of the proposed Project turbines. He noted studies that suggest an association between wind turbines and serious harm to human health.

Susie Stoeckli

[156] Ms. Stoeckli lives on one of the two farms she owns near Kincardine. She said that she will have ten industrial wind turbines within 2 km of her property if the Project goes ahead. She discussed her appreciation of nature, and its importance to her following her husband's death in a car accident.

[157] Ms. Stoeckli testified that she is a dairy farmer and is concerned about the impacts of the Project on her cows, upon which the success of her business depends. She expressed her concerns that the Project will result in stray voltage, which she referred to as “dirty electricity”, running through the ground and power lines to her farm and having direct and indirect effects on the health and production of the dairy cows. She stated that cows are more sensitive to stray voltage than human beings.

[158] Ms. Stoeckli also expressed concerns about her own health, saying that she cannot afford to have sleepless nights due to the noise of wind turbines or to experience annoyance or dizziness.

Dennis Morris

[159] Mr. Morris testified as a presenter on behalf of himself and his wife, Dilsa Morris. They have lived for 50 years on a farm that is within the Project area. He operated a tree-cutting business that has taken him to neighbouring townships where wind turbine projects are already located. He has noticed alarming effects there, which convinced him that the proposed Project will seriously affect the health of himself and his wife. Mr. Morris believes he will be susceptible to noise effects from the turbines due to a recent incident where he was repairing a fence on a farm near two turbines, one of which was approximately 300 – 400 feet away. He said he is not prone to headaches, but experienced a headache, ringing and pressure. He stated that he otherwise enjoys excellent health, and that his livelihood depends on good health to allow him to work. He also expressed concerns that the health of his livestock will be jeopardized.

[160] Mr. Morris is concerned that his house will be vulnerable to frequency or voltage coming from the power lines, or “dirty electricity”, and that he and Ms. Morris will become ill and be forced to move. He noted that since a new conductor line was installed on the east side of his property, he has had no radio reception in his house, which indicates to him that frequency or voltage coming from the power lines is inducing stray voltage and frequency into the wiring of his house.

[161] Mr. Morris said he is also concerned that there will be a violation of his *Charter* rights to be safe and reside in his community free from harm. He stated that he believes further studies of the health risks of large scale wind projects are needed. He noted his concerns about the risk of ice being thrown from the turbine blades, and not being able to access the fields in the winter.

Stephana Johnston

[162] Ms. Johnston lives in proximity to wind turbines in Phase II of the Erie Shores wind project, which began operating in 2008. She stated that there are 18 turbines within 3 km of her residence. She testified that she has experienced a range of adverse health effects, which she attributes to the turbines. She produced some of her medical records, which she took the Tribunal through in some detail. She stated that she does suffer from health conditions that existed prior to the turbines beginning operation.

[163] Ms. Johnston said that there had been sound testing at her residence, but the Tribunal was not provided with the results of that testing. She testified that the noise measurements at her house have gone up to 100 dBA, but also stated that she does not hear the turbines inside of her house. She said, in her written statement, that she listed her house for sale but was unable to sell it. She currently sleeps at night in a trailer.

[164] Ms. Johnston testified to her understanding that cyclical sound from wind turbines causes sleep disturbance, which leads to serious harm to human health.

Discussion, Analysis and Findings

Issue No. 1: Whether engaging in the Project as approved will cause serious harm to human health.

Submissions by the parties

[165] The Appellants submit that the test in the *EPA* requiring them to prove that the Project "will cause serious harm to human health" violates s. 7 of the *Charter* and should therefore be read down to comply with the *Charter*. They suggest that the Tribunal should apply a *Charter*-compliant test that would be similar to the *EPA* threshold for intervention for other contaminants, that is, whether or not the Project is likely to cause an "adverse effect" as that term is defined in s. 1.

[166] The Appellants submit that the evidence presented by the post-turbine witnesses clearly shows that Ontario residents have suffered adverse health effects from wind turbine noise, in some cases at setback distances greater than 550 m, and at sound power levels that comply with current Ontario standards. They point to testimony of sleep disturbance, chest pressure, heart palpitations, headaches, vertigo, tinnitus, high blood pressure and other symptoms that arose following the commencement of operation of wind projects near witnesses' homes and that went away when the affected individuals moved away from the wind projects. They submit that these witnesses did

not have negative attitudes toward wind energy prior to their experiences. They submit further that there has been no alternate cause offered by the respondents' witnesses that would explain the occurrence of these health effects.

[167] The Appellants submit that all of the studies of the health effects of wind turbines cited by the respondents' medical experts found an association between turbine noise and human distress, even if the mechanism of how that distress is caused or the factors contributing to it are not understood. They submit further that the distress associated with exposure to wind turbines is "mainly in the form of annoyance," which is recognized as an "indirect pathway to psychological stress," leading to the symptoms experienced by the post-turbine witnesses.

[168] The Appellants submit that these effects are likely to occur with the Project because the predicted sound power levels do not predict the worst case scenario, as required by the Noise Guidelines. In particular, they submit that the models contain no confidence limits, with the result that many receptors, predicted to have noise levels between 35 and just less than 40 dBA, will very likely experience noise levels above the MOE standard of 40 dBA. In addition, they submit that the MOE standard only addresses audible sound, despite the presence and significant impact of non-audible low frequency sound and infrasound in the emissions from wind turbines. The Appellants rely on Mr. James' evidence that the short bursts of sound he measured in the extremely low frequency infrasound range create vibrations that cause physical sensations in persons exposed to turbine emissions inside their homes over long periods of time. It is the Appellants' position that these sensations caused the symptoms experienced by the post-turbine witnesses.

[169] The Appellants submit that the evidence heard by the Tribunal is sufficient to meet the onus of proof, even in the absence of medical diagnoses, and supports a finding that the Project will cause serious harm to human health. The Applicants argue that the Tribunal in past decisions wrongly required appellants to prove that turbines cause harm with scientific certainty. They also criticize earlier Tribunal decisions on REA appeals where the Tribunal ruled that the evidence of post-turbine witnesses alone, "without the qualified diagnostic skills of a health professional," was insufficient to prove causation (See e.g., *Dixon*, para. 148). They argue that this requirement is inconsistent with the law on causation as established by the Supreme Court of Canada and the Ontario Court of Appeal. The Appellants rely on the Supreme Court's decisions in *Snell v. Farrell*, [1990] 2 S.C.R. 311 ("*Snell*"), *Athey v. Leonati*, [1996] 3 S.C.R. 458,

and *Clements v. Clements*, [2012] 2 S.C.R. 181 ("*Clements*"), and the Ontario Court of Appeal's decision in *Fisher v. Atack* (2008), 242 O.A.C. 164 ("*Fisher* ").

[170] It is the Appellants' position that these decisions allow the Tribunal to draw an inference of causation from the evidence adduced in this case, in the absence of scientific proof, through the application of reason and common sense.

[171] Mr. Palmer, a participant, in his final submissions sought to clarify and defend the evidence he gave, which he argues was misrepresented by the respondents' expert witnesses. Mr. Palmer submits that his evidence shows that there will be an unacceptable risk to public safety due to turbine collapse, blade failure, fire and ice throw and the inadequacy of the setbacks from lands and roads used by private landowners and the public. In addition, he submits that his evidence demonstrates that the NIA does not adequately model for inflow turbulence, ground attenuation, wind shear or amplitude modulation.

[172] In her final submissions, Ms. Bellavance, a participant, reiterated her concerns about the health effects associated with living near wind turbines. She argues that the evidence presented about the experiences of residents in both Ontario and Australia is sufficient for the Tribunal to find that the Project will cause harm to health and will violate rights guaranteed under the *Charter*. She asks the Tribunal to base its decision on common sense. She submits that if it does so, the only reasonable conclusion would be to revoke the REA for the Project.

[173] The Director submits that the evidence presented by the Appellants fails to meet the statutory test that the Project as approved will cause serious harm to human health. The Director argues that the Appellants must prove, on a balance of probabilities, that harm *will* occur and that it is insufficient to show that there is only the potential for harm. The Director argues further that the Appellants must demonstrate that the harm that will occur is *caused* by the Project and that it is *serious*. In addition, the Director asserts, the Appellants must prove that the harm will result from the operation of the Project *in accordance with* its approval and that the Tribunal must assume that the Project will comply.

[174] The Director submits that the evidence of the Appellants themselves shows that they are both in good physical and mental health but have concerns about the impacts of the Project based on information that has been gathered from persons they have met living near wind turbines and from the internet. In the Director's view, this evidence is insufficient to demonstrate that the Appellants will suffer serious harm to their health.

[175] The Director submits that the evidence of the post-turbine witnesses attributes a wide variety of health impacts to their living close to wind turbines; however, all of these impacts are self-diagnosed. The Director notes that none of these witnesses provided a diagnosis from a treating medical professional confirming that their symptoms and health conditions were directly or indirectly caused or exacerbated by exposure to wind turbines. In addition, the Director points out that none provided noise measurements in and around their homes and that those who spoke to their knowledge of noise measurements that had been made referred to levels above 40 dBA. The Director takes the position that this evidence should be assessed in the way that panels of the Tribunal assessed similar or identical evidence in other cases, specifically, *Alliance to Protect Prince Edward County v. Ontario (Ministry of the Environment)*, [2013] O.E.R.T.D. No. 40 ("*Ostrander"*), *Bovaird v. Director (Ministry of the Environment),* 2013CarswellOnt 12680 ("*Bovaird")*, *Dixon* and *Drennan*. In those cases the Tribunal held that the individuals honestly described real conditions from which they suffered and which they believed to be caused by exposure to wind turbines, but that this evidence could not prove causation in the absence of confirmatory medical evidence and measurements of sound pressure levels.

[176] The Director submits that the evidence of Mr. James relates to his belief that the Project will operate out of compliance with the noise limits in the REA due to the under-prediction of noise levels, but that this evidence should be disregarded by the Tribunal or given little weight. The Director points out that previous decisions of the Tribunal have held that the *EPA* requires that, in assessing the potential impact of a wind energy project, the Tribunal is to assume that the project will operate in compliance with its approval. The Director submits that Mr. James made suggestions for the inclusion of additional penalties and different parameters in the NIA report but that these suggestions were not supported by any provincial, national or technical documents, nor was he able to prove that his predictions had been demonstrated at any project approved under the Ontario regulations.

[177] It is the Director's position that the evidence of the respondents' noise experts is more reliable than Mr. James' and Mr. Palmer's evidence and demonstrates that the Noise Guidelines contain several conservative assumptions that when applied result in a comparison of the maximum total noise against the most restrictive sound level limit in accordance with the predictable worst case principle. The Director asserts that the NIA was conducted in accordance with the Noise Guidelines, that the evidence demonstrates that the Project will operate in compliance with the MOE noise limits, and

that the Approval Holder will be required to conduct audits to verify that compliance. Therefore, the Director argues, the Appellants have not proved that any receptors will be exposed to noise levels above the MOE noise limits.

[178] The Director submits that Mr. James' evidence on low frequency sound and infrasound is not supported by the research and was refuted by the expert witnesses called by the respondents. The Director takes the position that Mr. James' evidence should be assessed in the same manner as Tribunal panels did in the *Dixon* and *Drennan* decisions, that is, that the evidence of respondents' experts was preferred to his and that, even if it were accepted, it would not prove that serious harm to human health will result from the Project.

[179] The Director submits that the evidence of Dr. Bigelow regarding the research conducted by the Ontario Research Chair and the poster study carried out by his student does not prove that the Project will cause serious harm to human health. The Director asserts that Dr. Bigelow admitted that there are significant limitations with the student's study and that many studies will be required to prove whether wind turbines cause serious harm to health.

[180] The Director submits that the evidence of Ms. Pollard regarding complaints made to the MOE by residents living near other wind turbine projects should be given little weight because the fact that complaints have been made and that complainants attribute health conditions to other wind energy projects does not tend to prove that the Project will cause serious harm to human health. The Director submits that Ms. Connolly's evidence gives some of the context for those complaints, with a similar pattern for wind energy projects, where there are hundreds of receptors but complaints come from a small number of people.

[181] The Director submits that the Appellants proffered no medical expert evidence relating to the potential for health impacts from exposure to wind turbine projects, whereas the respondents called three experts who concluded that the Project will not cause serious harm to human health. These experts, in the Director's view, testified that the types of symptoms experienced by the post-turbine witnesses are very common and have a number of potential causes, that the information they provided was insufficient to reach any conclusion on the cause of their symptoms and that their evidence is insufficient to establish that the Appellants are likely to suffer health effects due to the Project. The Director submits that at most the medical literature reports an association between wind turbines and annoyance, but that this association may reflect

factors such as a negative attitude toward wind turbines, fears or perceptions of economic loss.

[182] The Director submits that the Appellants' evidence is similar to that brought by appellants in earlier REA appeals and that at most it shows that witnesses believe they have suffered adverse health effects because of wind turbines or that some individuals may be irritated by their presence. In these circumstances, the Director argues, it is not appropriate for the Tribunal to draw an inference of causation or to reach a conclusion that is different from the Tribunal's previous decisions in REA appeals.

[183] The Approval Holder submits that the test in s. 142.1(3)(a) contains two elements that must be considered, that is, whether the specific project will cause harm to the health of the appellant, and whether that harm is serious. The Approval Holder submits that the Tribunal, as set out in previous cases, requires that the Appellants prove that the Project will cause serious harm to health on a balance of probabilities, that evidence of only the potential for harm does not meet the onus of proof, that evidence of harm caused by exceedances of the REA limits will not be relevant, and that evidence of post-turbine witnesses as to their symptoms must be confirmed through evidence of qualified health professionals.

[184] It is the Approval Holder's position that the Appellants have failed to provide sufficient evidence to establish that the Project will result in serious harm to human health. The Approval Holder argues that there is not even enough evidence to establish that the Project will result in any harm, much less serious harm, to health. The Approval Holder submits that the evidence of post-turbine witnesses, without a connecting medical diagnosis, cannot prove that wind turbines have caused harm to human health and that the evidence adduced in this case is substantially similar to the evidence filed in the *Dixon*, *Drennan*, and *Bovaird* appeals, all of which were dismissed on the grounds that the appellants had failed to meet the onus of proof. The Approval Holder argues that the only new evidence in this case is that of Dr. Bigelow, but that he conceded that the results of the Waterloo studies to date do not establish a causal link between wind turbine noise and adverse health effects.

[185] The Approval Holder submits that the evidence of the post-turbine witnesses does not prove that the Project will cause the requisite harm because the medical records provided are incomplete and do not show a diagnosis, the information provided is insufficient to establish a diagnosis, and there was no evidence of a medical expert that could confirm their self-diagnosis of causation between their symptoms and wind turbines. The Approval Holder submits that the evidence of the respondents' expert

witnesses supports a finding that there is insufficient information to establish a causal link between health effects and living near wind turbines. The Approval Holder relies on the following evidence. Dr. Mundt carried out a literature review and concluded that there is not sufficient affirmative evidence of a causal link between health effects and wind turbine emissions. He also stated that any causal conclusion based on the self-reported evidence of the post-turbine witnesses would be "speculative and likely misleading". Dr. McCunney opined that the symptoms identified by the post-turbine witnesses could reasonably be expected to relate to numerous conditions, and therefore could not be attributed to wind turbine exposure without proper diagnosis. In addition, Dr. McCunney highlighted that some of the witnesses have pre-existing medical conditions that are independent of where they live, with relevant symptoms, or they take medications with side effects that should be explored as possible causes for their health effects. Dr. Moore's and Dr. Mundt's evidence raised the issue of "pre-conditioning" and the potential for fear and concern in the media contributing to a person's awareness and influencing his or her perception of an issue and the response to it. Dr. Moore also noted that many of the symptoms experienced by the post-turbine witnesses are common in our society.

[186] The Approval Holder submits that the Tribunal held in the *Bovaird* decision that appellants still had to establish that annoyance will result in adverse health effects but that they had not adduced any medical evidence "to confirm that the symptoms reported by the post-turbine witnesses resulted from annoyance, manifested through a somatoform or other disorder or condition." The Tribunal held that the evidence was inconclusive on whether because of certain factors wind turbine noise can be expected to cause annoyance that will result in serious harm to human health.

[187] The Approval Holder also submits that the evidence of the respondents' medical experts does not support infrasound as the direct or indirect cause of potential health effects from wind turbines. In addition, the Approval Holder submits that Mr. James' evidence regarding infrasound, and his criticism that the NIA did not account for it, was contradicted by the respondents' noise experts, all of whom are more qualified than Mr. James. These experts testified that infrasound from wind turbines is no different from other sources of infrasound and has not been shown to affect human health.

[188] The Approval Holder asserts that the Appellants are trying to get around their burden of calling expert medical evidence by arguing that wind turbines cause "annoyance" that will lead to stress, sleep disturbance and harm to health. The Approval Holder asserts that this finding is not supported by the evidence and points to

the *Bovaird* decision, where the Tribunal rejected that finding on similar evidence, holding that the evidence was inconclusive regarding the "degree of annoyance which would be caused and, in turn, whether such annoyance will result in adverse health effects" and 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…" The Approval Holder refers to Dr. Mundt's evidence that in the literature annoyance is the only condition consistently reported with respect to wind turbines but that this association may reflect factors such as attitude or economic impact, rather than noise exposure. Dr. Mundt stated further that annoyance is not considered to be a health condition or disease.

[189] The Approval Holder asserts further that the Appellants are attempting to get around the dearth of medical evidence by arguing that the Tribunal's approach in other cases is inconsistent with court decisions regarding proof of causation. The Approval Holder submits that the Appellants are wrong to claim that the Tribunal has improperly required appellants to prove their cases to a level of scientific certainty; rather, the Tribunal has demanded that appellants prove harm to human health on a balance of probabilities, and that subjective personal assessments of harm are insufficient to meet that onus.

[190] In addition, the Approval Holder submits that the Appellants misapply the law on inferring causation. The Approval Holder takes the position that the *Snell* case makes clear that an adverse inference is a matter of weighing evidence, so that an inference may only arise where a respondent elects to call no evidence to contradict evidence that has been adduced. The Approval Holder submits that the principle has no application where, as in this case, the respondents have adduced expert medical evidence to establish that noise from wind turbines does not cause harm to human health.

[191] The Approval Holder submits that Mr. James' evidence that the predicted sound power levels are in error and do not represent the predictable worst case because of deficiencies in the NIA and the Noise Guidelines was rebutted by the respondents' noise experts and on cross-examination. It points in particular to the evidence regarding the conservative assumptions in the model and the condition requiring post-construction audits to confirm the predicted levels. The Approval Holder submits that the Tribunal should adopt the conclusion it reached in the *Dixon* and *Drennan* appeals regarding the same evidence Mr. James gave here, that is, that even if it accepted that

there are deficiencies in the MOE model and adopted Mr. James' alternative model, "the implication is that the sound levels for the Project would be higher than predicted and higher than permitted in the REA"; however, there was still a need for evidence that those levels will cause serious harm to health and no such evidence was presented.

[192] The Approval Holder submits that Mr. Palmer's evidence respecting the characteristics of noise emissions amounts to a selective inclusion of scientific sources. The Approval Holder submits further that his criticisms of the MOE's Noise Guidelines as inadequate with respect to inflow turbulence, wind shear and amplitude modulation were completely refuted by the respondents' noise experts. The Approval Holder also submits that Mr. Palmer's own measurements were conducted in complete disregard for accepted noise assessment protocols and should be disregarded.

[193] Regarding the evidence of Mr. Palmer on the risk to public safety due to turbine collapse, blade failure, fire and ice throw, the Approval Holder submits that his evidence is unreliable, unscientific, provides no meaningful analysis of risk and is misleading. The Approval Holder submits that Mr. Palmer's recommendations for increased setbacks were lacking in specificity and unsupported by appropriate analysis. The Approval Holder submits that Ms. Raymond's evidence regarding the safety features of the Siemens turbines was not countered by Mr. Palmer.

Findings on whether engaging in the Project as approved will result in serious harm to human health

A. The test in s. 145.2.1 of the EPA

[194] The question that the Tribunal must determine on this appeal is set out in s. 145.2.1 of the *EPA*, namely, whether engaging in the Project in accordance with the REA will cause serious harm to human health. The statute expressly puts the onus on the Appellants to prove that such harm will occur. The Appellants argue via their *Charter* claim that the test they should have to meet is a less onerous one, that of proving that adverse health effects will likely result from the Project. Given the Tribunal's findings on the *Charter* claim set out below, however, the Tribunal will apply the test as set out in the statute in this appeal.

[195] In previous decisions on REA appeals, the Tribunal has delineated a number of principles that have guided its application of the statutory provisions. These include the following:

- an appellant is required to show harm on a balance of probabilities;
- an appellant must prove that a project will cause the harm, so that evidence that raises only the potential for harm does not meet the onus of proof;
- the statute requires the Tribunal to assume that a project will operate "in accordance with" the REA, so that evidence of harm caused by non-compliance will not be considered relevant;
- the Tribunal accepts that harm to health can be caused either directly or indirectly;
- while an appellant needs to prove that serious harm will result, it is not necessary for an appellant to prove the mechanism by which that harm will result;
- the meaning of "serious" harm will be interpreted on a case-by-case basis; and
- a finding that wind turbine noise causes harm to human health would be a medical conclusion, thus self-reported symptoms and personal assessments that wind turbines are the cause of those symptoms are incomplete and must be confirmed by a health professional.

  (see, e.g., *Ostrander* at para. 185, *Erickson v. Ontario (Ministry of the Environment)*, [2011] O.E.R.T.D. No. 29, at para. 819, and *Bovaird* at para. 313).

B. The issue of causation

[196] The Appellants argue that the Tribunal's approach to an applicant's onus of proof in previous cases is inconsistent with the Canadian law on causation. The cases cited by the Appellants address the issue of causation in the context of negligence actions and are therefore informed by tort law principles that justify the awarding of compensation to plaintiffs harmed by negligent defendants. Here the context is a regulatory one and the Tribunal is not considering liability for injuries already sustained, but whether future harm "will result" from operation of the Project in accordance with the REA. Nevertheless, the court cases provide useful guidance on the issue of proving causation.

[197] In REA appeals, s. 145.2.1 of the *EPA* provides that an appellant "has the onus of proving that engaging in the renewable energy project in accordance with the

renewable energy approval will cause harm…". The Tribunal has consistently held that the burden of proof on REA appellants is the balance of probabilities. Here, that means that the Appellants have the onus to demonstrate that it is more likely than not that serious harm to health will result from the operation of this Project. The Tribunal has not in any case demanded that harm be proved to a level of scientific certainty, as the Appellants claimed.

[198] The usual test for proving causation is the "but for" test. As stated by the Supreme Court in *Clements*, inherent in that phrase is the "requirement that the defendant's negligence was *necessary* to bring about the injury – in other words, that the injury would not have occurred without the defendant's negligent conduct (para. 8)." The Supreme Court in the *Clements* and *Snell* cases noted that the "but for" test is a flexible one that should be applied in a "robust and pragmatic" way. Following that approach, the Court held in *Snell* that it could draw an inference from the plaintiff's evidence, "even though positive or scientific proof of causation has not been adduced," in the absence of evidence to the contrary adduced by the defendant. The context of that case was a medical malpractice claim where the expert witnesses called by the plaintiff were able to identify several known causes of the type of harm she suffered, including the negligent act of the defendant, but were not able to say with certainty which of those in fact caused her the harm. The Court went on to say at para. 33 that "if some evidence to the contrary is adduced by the defendant, the trial judge is entitled to take account of Lord Mansfield's famous precept [that is, 'it is certainly a maxim that all evidence is to be weighed according to the proof which it was in the power of one side to have produced, and in the power of the other side to have contradicted'" citing *Blatch v. Archer* (1774), 98 E.R. 969 at 970].

[199] The Ontario Court of Appeal in the *Fisher* case held, at para. 57 and 58, that the robust and pragmatic approach offers a "method for evaluating evidence. It is not a substitute for evidence that the defendant's negligence caused the plaintiff's injury; nor does it change the amount of proof required to establish causation" and it cannot be used as a substitute for reviewing and making findings on relevant evidence. "Put another way, the robust and pragmatic approach does not permit drawing inferences concerning either the ultimate issue of causation or links in the chain of causation without reviewing the relevant evidence and making findings about the range of available inferences." (para. 59)

[200] The Tribunal's role is to review and weigh the evidence that is put before it and to reach findings based on that evidence. While there is no impediment to the Tribunal

drawing an inference of causation in appropriate circumstances, the appropriateness of that step will depend on the nature and quality of the evidence that is before it.

[201] In this case, the Appellants have the onus of proving that serious harm will result from the Project. They have conceded that the "pre-turbine" evidence of the Kroeplins alone is not sufficient. Instead, they rely on the evidence of the post-turbine witnesses to demonstrate that exposure to wind turbines has caused serious harm to health in the past and will do so in the future here. This evidence consists of witnesses testifying regarding the health conditions and symptoms that they experience, which they sincerely believe have been caused or exacerbated by living near wind turbines. As the Tribunal stated in the case of *Kawartha Dairy Ltd. v. Director (Ministry of the Environment* (2008), 41 C.E.L.R. (3d) 184 (*Kawartha Dairy*), at para. 21:

> in this case, the question is whether the subjective symptoms reported … are sufficient to establish that night-time noise emissions pose a likelihood of harm, or actual harm, to his health or the health of the members of his family. While the Tribunal gives due weight to Mr. Hornibrook's subjective report of the symptoms he and his family have experienced, as an evidentiary matter, the Tribunal cannot simply assume that he is correct in his assertion that various members of his family suffer from a sleep disorder, aggravation of Crohn's disease, cognitive impairment, or depression. Confirmation of those conditions requires the diagnostic skills of a qualified health professional. Similarly, the Tribunal also cannot simply assume that Mr. Hornibrook is correct in his assertion that sleep disruption resulting from the night-time noise emissions is an operative cause of these conditions, to the extent that they do exist. Accordingly, in weighing the evidence, the Tribunal finds that it can only consider the problems reported by Mr. Hornibrook as subjectively reported symptoms. While the evidence establishes that these symptoms indicate that night-time noise emissions are causing Mr. Hornibrook and his family significant discomfort, the Tribunal finds these symptoms, considered in totality, are not sufficient to establish a danger to their health…

[202] The Tribunal in the *Bovaird* decision followed this approach. There, it stated, at para. 313:

> The Tribunal does not question that the post-turbine witnesses have experienced the symptoms they have described. However, in order to arrive at a reliable conclusion respecting causation, personal assessments which do not consider the full range of potential causes of the 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 possesses.

[203] Here, the medical records of the post-turbine witnesses can help confirm some of the health conditions from which they suffer. However, because there may be a number of potential causes of their medical conditions and symptoms, there is also the need to

prove the causal link between exposure to wind turbines and those conditions. The Tribunal could draw an inference of that link if there was evidence of sufficient reliability before it, but it cannot just assume that link to be there because the post-turbine witnesses sincerely believe it to be so.

[204] A finding of causation must be justified on the evidence. As the Ontario Court of Appeal stated in *Fisher*, a flexible approach to causation is not a substitute for evidence and does not reduce the level of proof required. In some other REA appeal hearings, appellants have combined post-turbine evidence with evidence from medical practitioners to try to prove that wind turbines have caused harm to human health. In all of those cases, the Tribunal has found the evidence to be insufficient to establish on a balance of probabilities that serious harm to health will result from operation of the wind turbine project. With more limited evidence on the record in this proceeding, it would be difficult to justify an inference of causation.

[205] It is also important to recognize that the Appellants' evidence is not the whole of the evidence that the Tribunal must weigh. There is also the evidence of the respondents, who proffered several experts to contradict the Appellants' evidence. As the Court held in *Snell*, an inference of causation may be appropriate in the absence of any evidence to the contrary, but that where there is contradictory evidence adduced, the exercise that must be carried out is to weigh all of the evidence and reach a finding that is justified. While this approach may demand that respondents adduce evidence to counter an adverse inference possibly arising from an appellant's evidence, it does not mean that the onus shifts to the respondents to prove an alternate explanation for the symptoms experienced by the post-turbine witnesses, as the Appellants argued.

C. *Whether the Appellants have proved that serious harm to health will result from the Project*

[206] The case put forward by the Appellants in this appeal includes evidence in support of the following propositions: that wind turbines have caused serious harm to human health in other projects in Ontario; that while these projects were approved prior to the current regulations, in some cases harm resulted for persons residing more than 550 m from a turbine and at noise levels below 40 dBA; that the harm was caused indirectly, resulting from the stress and annoyance experienced by the witnesses; and that it is likely that serious harm will result from this Project either because deficiencies in the NIA and in the MOE's approach to evaluating noise levels from the Project will cause noise levels to be above the 40 dBA limit or because that limit does not protect residents, including the Appellants, from harm caused by inaudible infrasound.

[207] The evidence regarding health effects from other Ontario wind energy projects was provided by the post-turbine witnesses. The Appellants did not call any medical experts to address either the generic case linking wind turbines and harm to health or the specific issue of the cause of the symptoms and conditions experienced by these post-turbine witnesses. The medical records put into evidence from these witnesses in some cases confirmed serious medical conditions, but none of their records included a physicians' note stating an opinion that the cause, or the worsening, of their conditions was due to exposure to wind turbines.

[208] The Appellants called Dr. Bigelow as a factual witness in order to show that exposure to wind turbines is associated with a statistically significant increase in sleep disturbance and other health effects. At the request of the Appellants, Dr. Bigelow was not qualified by the Tribunal to give opinion evidence on the relationship between turbines and health, but he spoke only to the studies undertaken by the Ontario Research Chair, including the poster study carried out by his student. He testified that the survey and its findings have serious limitations that mean it cannot be relied on as proof of the proposition put forward by the Appellants. The Appellants also adduced evidence regarding the number of health-related complaints that had been made to the MOE regarding the Enbridge project; however, the MOE witness Ms. Pollard cautioned that she and her staff only evaluated the noise levels at the complainants' residences and did not have the expertise to verify or evaluate the health complaints themselves.

[209] Therefore, the only evidence before the Tribunal that the post-turbine witnesses suffered harm as a result of exposure to wind turbine emissions was the personal assessment of each of those witnesses.

[210] Furthermore, the respondents countered those assessments through evidence from medical experts that contradicts the association made by the post-turbine witnesses between their exposure to wind turbines and their health conditions. The respondents' witnesses noted that many of the symptoms experienced by the post-turbine witnesses are common and that some of them suffer from serious health conditions or take medications that could cause them to experience such symptoms. They also discussed research showing that factors such as attitude toward turbines or economic impact may influence the reactions people report with respect to living near wind energy projects.

[211] As noted above, the Tribunal has repeatedly held that lay witnesses may testify as to the symptoms they experience, but that evidence of a health professional is necessary to confirm the medical conditions from which they suffer and the cause of

those conditions, whether it is due to sound pressure levels directly or to annoyance. No such confirmatory evidence was provided in this case and there is also expert evidence before the Tribunal that casts significant doubt on the association made by the post-turbine witnesses between turbines and their health. The Tribunal finds that the Appellants' evidence does not support the drawing of an inference of causation.

[212] Even if the evidence of the post-turbine witnesses were accepted as proof of a causal relationship between exposure to wind turbines and adverse health effects, this would only go toward proving that health effects *could* be caused by exposure to wind turbines in certain circumstances. The Appellants would still need to prove that *this* Project *will* result in serious harm to health. They attempt to do that through the evidence of Mr. James.

[213] Mr. James' evidence attempts to prove two things. First, he seeks to show that sound power levels will be higher than predicted by the model and as indicated in the NIA and, consequently, levels will be higher than 40 dBA at many receptors. This is also the thrust of Mr. Palmer's evidence regarding noise. Second, Mr. James seeks to show that even if the 40 dBA limit is met for audible sound, residents will experience adverse health effects because effects are caused by inaudible sounds in the low frequency sound and infrasound range and the MOE has no standard for low frequency sound or infrasound.

[214] The evidence on the first point relates to the lack of confidence limits, the ground attenuation factor, the impact of inflow turbulence and the lack of a penalty for amplitude modulation that Mr. James and Mr. Palmer submit underestimate the predicted worst case condition for the Project. This evidence was rebutted by the evidence of the respondents' noise experts, which the Tribunal finds to be more persuasive. The respondents' experts testified to the effect that the MOE Noise Guidelines were developed in accordance with international standards and accepted professional practice but more importantly that the Noise Guidelines include several conservative assumptions that more than account for the concerns raised by the Appellants and Mr. Palmer. In addition, the respondents' witnesses noted that the REA itself requires that post-construction acoustical audits be conducted to confirm the predictions in the model. Mr. O'Neal's comment that he does include confidence limits in his models, except when a manufacturer guarantees a sound power level, does not directly address the approach followed in Ontario and, as a stand-alone comment, does not undermine the Ontario approach. Moreover, Mr. James conceded that the NIA was conducted in accordance with the MOE Noise Guidelines. By doing so, he was in essence taking

issue with the Noise Guidelines themselves, which was also the situation that the Tribunal faced in the *Dixon* and *Drennan* cases. In *Dixon*, the Tribunal stated, in para. 159:

> In effect, the Tribunal is being asked to evaluate and select between the MOE noise assessment model and an alternative model or variant of the model proposed by Mr. James. The challenge for the Tribunal is that, even if the Tribunal accepts the "deficiencies" in the MOE model as suggested by Mr. James, the implication is that the sound levels for the Project would be higher than predicted and higher than permitted in the REA. However, in order to discharge the onus to establish a deprivation under a s. 7 *Charter* claim, it is still necessary for the Appellants to establish the causal connection that the elevated noise levels will cause serious psychological or physical harm to human health. No such evidence was presented. This is the case whether the Appellants are pursuing a s. 7 *Charter* claim or attempting to satisfy the EPA statutory test.

[215] This finding was adopted by the Tribunal in *Drennan*. The same challenge faces the Appellants here.

[216] The evidence on the second point relates to the role that inaudible low frequency sound and infrasound associated with wind turbines may play in causing annoyance and indirect health effects and the claim made by Mr. James that the MOE does not measure those sound ranges or limit exposure to them. The respondents' noise experts directly rebutted Mr. James' evidence on this point, including his claims as to the superiority of his equipment, his methods, and his interpretation of his findings. They cast significant doubt on his characterization of the uniqueness of wind turbine infrasound, which he argues is due to the occurrence of sharp pulses below 1 Hz. The evidence as a whole shows that this is an area of active research internationally but that there is to date little if any scientific support for Mr. James' position. His evidence on this point also suffers from the same difficulty as that on the first point, that is, even if the Tribunal were to accept his evidence, there is no evidence making a causal connection between infrasound that will be emitted by this Project and serious harm to human health, whether direct or indirect. As the Tribunal stated in *Drennan*, at para. 212:

> Mr. James also raises a number of issues related to infrasound and low frequency sound. Most of these comments were general in nature and not related to the Project. More important, he did not connect infrasound and low frequency sound to whether it would cause serious harm to physical health. Moreover, Dr. Mundt and Dr. McCunney gave evidence directly challenging Mr. James' evidence and the evidence of Dr. Mundt and Dr. McCunney is more persuasive at this point in time.

[217] In effect, Mr. James is offering an explanation for the mechanism by which health effects might occur without offering any evidence that health effects *will* occur with this Project. In particular, he was not able to identify a setback distance from a turbine where effects either will or will not occur.

[218] Aside from the issue of sound-related emissions, the evidence of harm to health was limited to Mr. Palmer's evidence on safety and the risks associated with turbine collapse, fire, blade failure and ice throw. The Tribunal agrees with the Approval Holder that his prediction of failure rates for the Siemens turbines is unreliable. Moreover, Mr. Palmer did not consider the effect of the safety features outlined by Ms. Raymond and his justification for revised setbacks to protect the public was vague and unsupported by evidence.

Findings on Issue No. 1

[219] In conclusion, after weighing and evaluating the evidence as a whole, the Tribunal finds that the Appellants have failed to establish, on a balance of probabilities, that engaging in the Project in accordance with the REA will cause serious harm to human health.

Issue No. 2: Whether the Appellants' rights to security of the person have been violated under s. 7 of the *Charter*.

Background

[220] The Appellants submit that the "serious harm to human health" test under s. 142.1(3)(a) of the *EPA* violates the Appellants' rights to security of the person under s. 7 of the *Charter*. They claim, in their notice of appeal, that the approval for the project has a serious adverse impact on the Appellants' physical and psychological integrity. They state that the process for granting the REA, which does not comply with the precautionary principle, does not require the Director to consider the potential health effects on the Appellants, resulting in a serious impact on the Appellants' psychological integrity. The Appellants assert that the REA has been granted without requiring the Approval Holder to conduct any form of study to determine adverse health effects on neighbours living in close proximity to the proposed project. They submit that the test of "serious harm to human health", applicable to appeals of the Director's decision by virtue of s. 142.1(3)(a) of the *EPA*, violates s. 7 of the *Charter* by permitting those violations of the Appellants' right to security of the person that fall short of the "serious harm" threshold.

[221] The Appellants further submit, at para. 113 of their written closing submissions, that the evidence heard by the Tribunal during the hearing:

> makes clear that there has yet to be established a safe setback distance or an appropriate noise level to protect humans from harm to their health associated with industrial wind turbines. The evidence before this Tribunal is that even at setback distances of 800 m and noise compliance with the 40 dBA, Ontario residents are still exposed to adverse health effects associated with noise emitted from industrial wind turbines. It is therefore submitted that because the legislative scheme for the creation of industrial wind turbine projects exposes the public to a risk to their health, the legislative scheme must comply with s, 7 of the *Charter*.

[222] The Appellants submit that the "serious harm to human health" test under s. 142.1(3)(a) of the *EPA* violates s. 7 of the *Charter*, and should therefore be disregarded by the Tribunal and read down such that the section requires appellants to show that engaging in the REA will likely cause an adverse effect to human health. They seek a revocation of the Director's decision to approve the REA.

[223] In *Chaoulli v. Quebec (Attorney General)*, 2005 SCC 25 ("*Chaoulli*") at para. 109, the Supreme Court of Canada states that, in addressing a s. 7 *Charter* claim, the following must be considered: whether the impugned provisions deprive individuals of their life, liberty or security of person; if so, whether the deprivation is in accordance with the principles of fundamental justice; and, if so, whether the breach is saved under s. 1 of the *Charter*. The Tribunal now turns to an analysis of these issues.

Sub-Issue No. 2.1: Whether there has been a deprivation of security of the person in relation to the issues raised by the Appellants.

(a) General

[224] The Appellants submit that, while s. 7 of the *Charter* is routinely engaged in criminal or penal matters, the courts have recognized that the protections afforded by s. 7 extend into the spheres of civil and administrative law. The Director and the Approval Holder did not challenge this position.

[225] As in both *Dixon* and *Drennan*, the following issues arose in relation to the broader question of whether or not there has been a deprivation of security of the person under s. 7 of the *Charter*:

- Whether the deprivation complained of by the Appellants is state imposed and whether the harm results from the impugned provisions or government conduct;

- Whether the deprivation must be “serious”; and
- Whether the Appellants have proven serious physical or psychological harm.

(b) Whether the deprivation complained of by the Appellants is state imposed

Submissions by the parties

[226] The Appellants cite the findings in *R. v. Morgentaler*, [1988] 1 S.C.R. 30, at paras. 56-57, that interference by the state in one’s physical or emotional integrity is sufficient to trigger a review of the statute against the principles of fundamental justice, and that a breach of security of the person occurs where there is state action which interferes with bodily integrity or causes serious state imposed psychological stress.

[227] The Appellants submit that the regulatory regime for the creation of industrial wind turbine projects is a state action that exposes the public to a risk of harm to their health, and that this risk to health associated with noise emissions from industrial wind turbines engages the s. 7 *Charter* protections.

[228] The Appellants rely on the dissent by Madam Justice Arbour in the case of *Gosselin v. Attorney General for Quebec*, [2002] 4 S.C.R. 429 (“*Gosselin*”), which states, at para. 309, that the Supreme Court of Canada:

> …has consistently chosen instead to leave open the possibility of finding certain positive rights to the basic means of subsistence within s. 7. In my view, far from resisting this conclusion, the language and structure of the *Charter* – and of s. 7 in particular – actually compel it (emphasis in the original).

[229] The Appellants rely on the recent decision in *Canada (Attorney General) v. Bedford*, 2013 SCC 72 (“*Bedford*”), in which the Supreme Court of Canada held that criminal prohibitions relating to prostitution violated the right to security of the person under s. 7 because they increased a pre-existing risk of serious harm. The Court notes the Attorney General of Ontario’s description of the s. 7 claim in that case as a “veiled assertion of a positive right to vocational safety” (para. 81). The Appellants assert that, while the immediate source of harm (the conduct of the pimps and johns) was not state imposed, the Court made the following observations at para. 89:

> It makes no difference that the conduct of pimps and johns is the immediate source of the harms suffered by prostitutes. The impugned laws deprive people engaged in a risky, but legal, activity of the means to protect themselves against those risks. The violence of a john does not diminish the role of the state in making a prostitute more vulnerable to that violence.

[230] The Appellants submit that, while the alleged source of harm at issue in this appeal – the industrial wind turbines – are owned by the Approval Holder, the Ontario government has enacted the legislative provisions that govern their approval, knowing that industrial wind turbines cause adverse health effects.

[231] The Appellants assert that evidence before this Tribunal demonstrates that even where there are complaints of adverse health effects and evidence of non-compliance, the MOE allows projects to continue operating while further testing is undertaken. They submit that, although the Ontario government is aware that individuals are experiencing adverse health effects, the MOE's Compliance Protocol is not concerned with health effects. The Appellants further submit that the Ontario government has created a regime that poses a risk to individuals' health, and has not provided any mechanism for citizens to protect their health in the event that adverse health effects occur, because the procedures in place have no regard for the health of Ontario residents.

[232] The Appellants note the Director's position that the regulatory regime does protect human health by creating a right of appeal to the Tribunal, but assert that it is not protective of human health because of the test that must be met for an appeal to succeed. They contend that the only way for citizens to raise health concerns in relation to wind turbines is before the Tribunal and, therefore, the appeal test must comply with the *Charter*.

[233] The Director submits that a *Charter* s. 7 claim must be founded on a state imposed deprivation of the right. In this case, he submits that the Appellants have failed to demonstrate that the harm they allege from the Project is a state imposed deprivation of their security of the person and therefore the claim must be dismissed.

[234] The Director notes that the majority in *Gosselin* held, at para. 81, that:

> Nothing in the jurisprudence thus far suggests that s. 7 places a positive obligation on the state to ensure that each person enjoys life, liberty or security of the person. Rather, s. 7 has been interpreted as restricting the state's ability to <u>deprive</u> people of these [Emphasis in original].

[235] The Director submits that the state action at issue in cases such as *Morgentaler*, *Chaoulli* and *Bedford* was legislation that impaired the ability of the claimants in those cases to take steps to alleviate or address a health problem by imposing upon them prohibitions that removed their decision-making power over their physical or psychological integrity. The Director further submits that, in order to succeed in those cases, the claimants were required to prove that the impugned law prevented them from taking steps to reduce the alleged harm or risk of harm.

[236] The Director asserts that there is no such prohibition at issue in this case, and that the impugned legislation has not deprived the Appellants of the ability to protect their security of the person. He notes that, absent the current regulation of wind turbines, the only avenue the Appellants would have to address alleged health effects would be a common law proceeding. The Director submits that the legislation at issue has not deprived the Appellants of the ability to take those protective steps, so that the required connection between the impugned legislation and the deprivation of the Appellants' security of the person does not exist in this case. Instead, he says, this legislation has enhanced the protection of the Appellants' security of the person by providing a right of appeal to an independent, expert tribunal and giving the Appellants an opportunity to demonstrate in a trial *de novo* that an approved project will cause serious harm to human health.

[237] The Director states that courts have repeatedly found, where there is no legislative prohibition, that protective legislation does not engage the s. 7 security of the person right. He submits that the Appellants are seeking a positive right to a more protective REA regulatory regime. The Director asserts that the courts have repeatedly rejected claims that the legislature owes a positive obligation to ensure that each person enjoys the rights protected in s. 7. He cites a number of cases in support of this proposition, including *Flora v. Ontario (Health Insurance Plan, General Manager)*, 2008 ONCA 538 ("*Flora*") at paras. 101, 103-104.

[238] The Approval Holder submits that deprivation of security of the person will only be found where the claimant establishes that the impugned legislation or state action caused the alleged harm, and that in this case the Appellants must establish that the Director's approval of the REA will cause serious psychological or physical harm in order to engage s. 7 of the *Charter*.

[239] The Approval Holder relies on *Energy Probe v. Canada (Attorney General)* (1994), 17 O.R. (3d) 717 (Ont. Ct. Gen. Div.), at para. 67, and *Operation Dismantle Inc. v. Attorney General of Canada (Minister of Defence)*, [1985] 1 S.C.R. 144, at para. 29 ("*Operation Dismantle"*), for the proposition that the Appellants must demonstrate the causal link between the state action or the impugned legislation and violation of a *Charter* right. The Approval Holder also notes the following principle set out by the Tribunal at para. 84 of *Dixon*:

> [f]or a s. 7 *Charter* claim, the Tribunal finds that the onus is on the Appellants to establish, on the evidence, the claimants have suffered or will suffer serious physical or psychological harm.

[240] The Approval Holder notes that the Supreme Court of Canada recently held, in *Bedford* at paras. 75-78, that the claimant is required to show, through a fact specific analysis, a real link between the impugned government action and the alleged harm, as opposed to a speculative link. The Court refers to this as a "sufficient causal connection" test. The Approval Holder also refers extensively to the Tribunal's findings in *Dixon*, submitting that it must be proven, on the evidence, that the impugned legislation or state action causes the alleged deprivation.

Findings on whether the deprivation complained of by the Appellants is state imposed

[241] The Tribunal recognizes that the submissions of the parties in this matter, with respect to this issue, were similar to those in both the *Dixon* and *Drennan* proceedings. The Tribunal finds, as in *Drennan*, that the findings in *Dixon* at paras. 41-50 are applicable in this appeal, and adopts those findings in this case.

[242] The Tribunal also adopts the following summary in *Drennan*, at paras. 43-48, of the key points in the *Dixon* findings:

> [43] The key points in those findings can be briefly summarized. Firstly, the Tribunal agrees with the submission of the Director that the jurisprudence to date has not promoted the notion that s. 7 *Charter* claims are intended to further positive rights, but instead, to protect claimants from state imposed harms. However, the Tribunal is also cognizant that the courts, such as in the dissent in *Gosselin*, have considered the possibility that positive rights may be the subject of a s. 7 *Charter* claim in the future.
>
> [44] Secondly, in reviewing the cases on the matter, it would appear that whether the harm complained of is state imposed depends on how the harm is characterized. In *Bovaird*, a similar issue and similar arguments were raised. The Tribunal noted the following:
>
> > [493] The Tribunal finds that the core of the Appellants' claim is that greater protections are required for human health than what are currently provided for under the requirements for renewable energy approvals. This claim applies to **all** renewable energy approvals, not just the current Project, despite the fact that under the legislative scheme it is the approval for the Project that is under appeal to the Tribunal.
> >
> > [494] Such a characterization might lend itself to a finding that the current appeal is analogous to the OHIP case of *Flora*; that is, the impugned sections of the *EPA* are protective of security of the person, rather than causing a deprivation of a freestanding right.
> >
> > [495] At the same time, the demand for greater health protections only arises because of the Director's decision to allow a wind project in an area where it did not previously exist. The Appellants argue that the protections built into the approval are insufficient **in the context of** a project that is being allowed to proceed. In this regard the present case is more akin to *G(J)*, where

> the state action in allowing the Project necessitates sufficient protections to prevent harm to human health. Viewed in this manner, it is the Director's decision, or the statutory scheme that has charged the Director with making this decision based on "public interest" factors, that would engage s. 7.
>
> [496] As noted above, the Tribunal finds that it is not necessary to determine which characterization is more appropriate in this case, in light of its findings respecting sub-issues (b) and (c). Either characterization may be argued and considered by the Tribunal in future.

[45] The Tribunal also finds that it is not necessary to determine which characterization is more appropriate in light of the findings below. The Tribunal further finds that either characterization may be put forth and considered by the Tribunal in a future proceeding.

[46] Thirdly, it is important to note that, with respect to a s. 7 *Charter* claim, a claimant must not only prove the harm complained of is state imposed, but that there is a causal connection between the harm and the state action. The Tribunal agrees with the Director's submission that where there is a proven risk of harm, it must be established that the state action or impugned provisions create an increased risk of harm.

[47] Fourthly, the courts have held that the evidentiary burden is only met where a "sufficient causal connection" has been established between the harm complained of and the impugned state action. This test was most recently articulated by the Supreme Court of Canada in the *Bedford* case.

[48] The Tribunal agrees with the following summary from the *Dixon* decision at para. 50:

> the Tribunal leaves open the possibility that an appellant might frame the s. 7 *Charter* deprivation in a manner that it could be characterized as "state imposed" in circumstances such as in the present claim. However, the Tribunal notes that the onus is on an appellant to demonstrate that there is a sufficient causal connection between the psychological or physical harm complained of (that is, health and psychological effects from the operation of wind turbines at the regulatory requirements and decibel levels) and the impugned state actions or renewable energy approval appeal provisions.

(c) Whether the deprivation must be "serious"

Submissions by the parties

[243] The Appellants submit that it is a violation of s. 7 to require an appellant to show 'serious harm' to human health, saying instead that, "in order for s. 7 to be engaged, an appellant must only show that it will interfere with bodily integrity or cause serious state imposed psychological stress." In effect, the Appellants are submitting that the level of harm to engage s. 7 is different for psychological harm than physical harm in that for physical harm, it does not have to reach the threshold of "serious."

[244] The Appellants cite *New Brunswick (Minister of Health and Community Services) v. G.(J.)*, [1999] 3 S.C.R. 46 ("*G.(J.)*"), at paras. 59-60, in which the Supreme Court of Canada held that psychological stress must be distinct from the ordinary stresses and anxieties of everyday life, finding that "[f]or a restriction of security of the person to be made out, then, the impugned state action must have a serious and profound effect on a person's psychological integrity." The Appellants submit that the Project, as approved in the REA, will likely cause a serious and profound effect on the Appellants' psychological integrity, based on the scientific literature indicating an association between industrial wind turbine noise emissions and annoyance.

[245] With respect to the threshold for physical harm, the Appellants submit that the harm must be non-trivial, but is not required to rise to the level of serious harm. The Appellants assert that limited case law exists concerning the level of harm needed to engage s. 7 with respect to physical security, and suggest that this is due in part "to the fact that bodily integrity is a relatively self-evident concept, and that an action either causes physical consequences or it does not".

[246] The Appellants say that the harm to physical integrity need not be serious and submit that, in *Chaoulli* at para. 123, the Supreme Court of Canada found that the denial of health care for a condition that is clinically significant to a person's current and future health engages the protection of s. 7. The Appellants submit that the threshold of "clinically significant" to "current and future health" is not the same as "profound" or even "greater than ordinary" physical maladies. Instead, they submit that the threshold envisioned by the Court in *Chaoulli* is "simply 'serious' enough to warrant clinical attention, rather than being life-altering or life-threatening." The Appellants assert that this proposition is supported by case law in which courts have found that that threshold is not as high for violations of physical integrity as for psychological harm, and that state action that has the likely effect of impairing a person's health engages s. 7.

[247] The Appellants submit that the harm suffered by those living in close proximity to wind turbines is sufficient to warrant clinical attention, and that this is borne out by the witnesses before the Tribunal, and the Tribunal's findings in its decision in *Erickson.* The Appellants say that a test that requires an appellant to show that the project will cause serious harm fails to capture all the harms that are protected by s. 7 of the *Charter*.

[248] The Director submits that, for s. 7 to be triggered, the harm must be serious, whether it is psychological or physical. In support, he cites *Chaoulli*, at para. 123,

where the Court finds that the adverse impact on security of the person "whether psychological or physical, must be serious."

[249] Like the Appellant, the Director relies on *G.(J.)*, at paras. 59-60, in support of the proposition that ordinary stresses and anxiety are not sufficient to engage s. 7 of the *Charter*. He suggests that "being troubled, annoyed, disturbed or upset" are examples of ordinary stresses and anxieties. The Director submits that expanding the s. 7 protections to apply to harm that is less than serious would be inconsistent with the purpose of the *Charter* right, would greatly expand the scope of judicial review, and would trivialize what it means for a right to be constitutionally protected.

[250] The Approval Holder also cites *Chaoulli*, at para. 123, submitting that adverse impact on security of the person under s. 7, whether psychological or physical, must be serious. The Approval Holder states that state interference with bodily integrity arises where the impugned laws or state action actively interfere with bodily integrity and/or cause serious harm to physical health, and indicates the circumstances of several cases, including *Morgentaler*, *Bedford* and *Chaoulli*.

[251] The Approval Holder asserts that serious, state imposed psychological harm arises where the impugned legislation or state action results in a "serious and profound effect" on a person's psychological integrity and provides examples of where children are removed from the parents' custody and where laws prohibit women from ending their own pregnancies. In support, the Approval Holder relies on *Blencoe v. British Columbia (Human Rights Commission)*, 2000 SCC 44, at paras. 84-85, and *Chaoulli*, at paras. 116-117.

[252] The Approval Holder submits that harm that is less serious cannot result in deprivation of security of the person, contrary to the Appellants' submission. The Approval Holder states that the Supreme Court of Canada in *G.(J.)*, at paras. 59-60, expressly rejected such an assertion and held that the right to security of the person is not engaged by ordinary stresses and anxiety.

Findings on whether the deprivation must be "serious"

[253] As with the submissions on the issue of whether the alleged deprivation is state imposed, the submissions on this issue are very similar to those provided in both *Dixon* and *Drennan*. In all three cases, the Appellants have raised the issue of the extent or level of harm that is required to make a finding that there has been a breach of s. 7 security of the person under the *Charter*. As in *Dixon* and *Drennan*, the Tribunal in this

case does not need to make a specific finding as to what "serious" means in the context of s. 7.

[254] It appears that while the parties are generally in agreement that the harm must be serious with respect to psychological harm, they disagree concerning what level of harm is required to engage s. 7 with respect to physical harm. While the Appellants submit that the threshold is something less than "serious," and the Director and Approval Holder submit that the level of harm is "serious", the meaning of "serious" is also at issue.

[255] The Appellants submit that the threshold for a s. 7 *Charter* claim is met if the claimant suffers harm that is non-trivial and clinically significant to their current and future health, or "serious" enough to require clinical attention. The Director and the Approval Holder both submit that, to engage s. 7 of the *Charter*, harm must be serious, whether it is psychological or physical in nature.

[256] In the *Dixon* case, at paras. 68-73, the Tribunal canvassed the case law on this topic and made the following observations, which this Panel of the Tribunal also adopts in this case:

> [71] From the *Chaoulli* decision, a number of observations can be discerned. First, the case law is clear that the level of harm, whether psychological or physical, must be "serious."
>
> [72] A second observation is that the comments in *Chaoulli* suggest that the term "serious" connotes a "clinically significant health condition." Although still general in nature, the Court has provided significant and useful guidance in holding that in order to meet the threshold for a s. 7 claim, the deprivation must be serious in the sense that the claimant has a health condition that is clinically significant. This, presumably, is a diagnosis made by medical professionals. What is a clinically significant health condition, of course, was not definitively laid out by the Court, and, it can be assumed, will have to be assessed on a case-by-case basis.
>
> [73] An understanding of what is meant by "serious" in the context of a s. 7 *Charter* claim also can shed light on the threshold needed to meet the "serious harm to human health" ground under s. 142.1 of the *EPA*. It can be assumed that there will be some parallels in analysis and thresholds between a *Charter* claim and the health ground of appeal for a REA appeal. However, future cases will have to determine whether a "clinically significant" health condition that satisfies the threshold for a s. 7 *Charter* claim would also satisfy the test for a s. 142.1 *EPA* appeal (or *vice versa*).

(d) Whether the Appellants have proven serious physical or psychological harm resulting from the impugned provisions or government conduct

[257] As noted in *Dixon* and *Drennan*, even if the Tribunal were to agree in this case with the Appellants' submissions with respect to whether the alleged deprivation is state imposed, the following issues must also be addressed: the nature of the evidentiary burden that is required in order for the Appellants to establish their s. 7 *Charter* claim; and whether the Appellants have met their evidentiary onus.

Submissions on the nature of the evidentiary burden

[258] The Appellants submit that, based on the findings in *Erickson* and the testimony of the post-turbine witnesses in this proceeding that they have experienced adverse health effects at varying setback distances, the Appellants have satisfied their evidentiary onus to establish their s. 7 *Charter* claim. In particular, they cite para. 872 of *Erickson*, in which the Tribunal found that

> [t]his 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.

[259] The Appellants further submit that the risk to health associated with noise emissions from industrial wind turbines violates s. 7 of the *Charter*, and that s. 7 applies to future harms. They say the courts have held that an appellant need not be certain that future harm will occur, or that it be measurable with scientific precision, but only that the risk of harm is likely to occur. In support of this proposition, they cite *Doe v. Metropolitan Toronto (Municipality) Commissioners of Police* (1998), 39 O.R. (3d) 487 (Ont. Ct. Gen. Div.), at para. 163, and *Suresh v. Canada (Minister of Citizenship and Immigration)*, 2002 SCC 1, at para. 127.

[260] In this case, the Appellants made additional submissions regarding the Tribunal's approach to an applicant's onus of proof in previous cases in relation to the law on causation, which are addressed under Issue No. 1.

[261] The Director and the Approval Holder submit that a person claiming a violation of a s. 7 right must establish on a balance of probabilities that the impugned legislation or state action deprives them of life, liberty or security of the person. They further submit that a s. 7 claim must be based on an evidentiary foundation.

[262] The Director submits that the Supreme Court of Canada has consistently required that a claim of serious harm be proven on the evidence, relying on a number of cases, including *Morgentaler*, *Chaoulli* and *Bedford*. The Director asserts that, in this case, the Appellants have failed to establish on the evidence that the Project will cause serious physical or psychological harm, stating that there is no credible or acceptable evidence before the Tribunal that any individual has suffered or will suffer an adverse health effect resulting from wind turbines.

[263] The Approval Holder asserts that a claimant bears the burden of establishing that their *Charter* rights have been infringed. Citing *R. v. Dixon*, [1998] 1 S.C.R. 244, at para. 32, as authority, the Approval Holder states that this requires the claimant to show, through evidence, that it is "more likely than not" that a state action has resulted in the breach of a *Charter* right.

[264] The Approval Holder relies on *G.(J.)*, at para. 60, in submitting that objective evidence, usually in the form of independent expert evidence, is required to meet the burden of proof under s. 7 of the *Charter*.

Findings on the nature of the evidentiary burden

[265] As noted in *Dixon* in paras. 81-84, and adopted in *Drennan* at para. 76, it is apparent that, with respect to the case law on s. 7 *Charter* claims, the courts have all held that the onus is on the claimant to establish, on the evidence provided, serious physical or psychological harm. The Tribunal in *Dixon* stated, at para. 81, that "[s]peculation, allegations and mere concerns do not suffice." In *Dixon*, the Tribunal cited the extensive authority for these propositions and concluded, at para. 84, that "[f]or a s. 7 *Charter* claim, the Tribunal finds that the onus is on the Appellants to establish, on the evidence, the claimants have suffered or will suffer serious physical or psychological harm." This Panel of the Tribunal also adopts that finding in this case.

Submissions on whether the Appellants have met the evidentiary burden to prove serious physical or psychological harm

[266] To determine whether the Appellants have met the evidentiary burden by establishing in evidence that there has been or will be serious physical or psychological harm in order to support a s. 7 *Charter* claim, the Tribunal turns to factual and opinion evidence heard by the Tribunal in this appeal, summarized earlier in this decision, and the parties' submissions on the evidence, set out above under Issue No. 1.

Findings on whether the Appellants have met the evidentiary burden to prove serious physical or psychological harm

[267] As noted above, the Appellants put forward four post-turbine witnesses who state that they have suffered harm from wind turbine projects. Although the evidence of post-turbine witnesses has been put forward in past appeals under s. 142.1(3)(a) of the *EPA*, the Tribunal has not found in any case that evidence of this nature is sufficient to establish the evidentiary base to meet the test in s. 142.1(3)(a), absent the qualified diagnostic skills of a health professional.

[268] In paras. 149 and 150 of the *Dixon* decision, the Tribunal reviewed a number of cases, including *Ostrander* and *Bovaird*, that discussed the role of post-turbine witnesses in establishing causation. At para. 151, the Tribunal concluded that:

> In summary, it is fair to say that the Tribunal has consistently held in a variety of cases that the evidence of post-turbine witnesses alone has not met the evidentiary threshold so as to meet the "serious harm to human health" test under s. 142.1 of the *EPA*. The question is whether such evidence, although not meeting the threshold for the *EPA* test, nevertheless would meet the test for a s. 7 *Charter* claim.

[269] This Panel's findings regarding the evidence of the post-turbine witnesses is set out above under Issue No. 1. In both of the *Dixon* and *Drennan* decisions, the Tribunal found that its general conclusions with respect to the role of post-turbine witnesses under an *EPA* appeal are equally applicable to the s. 7 *Charter* test and this Tribunal Panel makes the same finding. This Panel also finds that the evidence provided by the Kroeplins is insufficient on its own to establish a s. 7 *Charter* claim. Furthermore, as noted above in the Tribunal's analysis and findings under Issue No. 1, the evidence of Ms. Pollard, Dr. Bigelow and Mr. James do not provide an additional evidentiary base that is substantial enough to support a s. 7 *Charter* claim in this proceeding.

[270] In summary, as in the *Dixon* case, the Appellants did not provide professional medical opinions to diagnose the health complaints from the post-turbine witnesses and to establish a causal link between those complaints and wind turbine noise or noise from transformers. As importantly, the Tribunal has the benefit of the testimony of Drs. Mundt, McCunney and Moore that reinforces previous Tribunal findings that the post-turbine witnesses need to be properly diagnosed by a medical professional and that there is no reliable evidence to demonstrate that the Project will cause serious physical or any other serious harm.

[271] The Tribunal therefore finds that the Appellants have not met the evidentiary burden to prove that the impugned provisions or government conduct will cause serious psychological or physical harm.

(e) Overall Findings for Sub-Issue No. 2.1

[272] The Appellants retain the onus to establish that there has been a deprivation of security of the person under a s. 7 *Charter* claim. This onus has not been discharged in this case.

[273] Even if one were to accept that the test to prove a causal connection under s. 7 of the *Charter*, so as to establish serious psychological or physical harm, is less onerous or stringent than the threshold under s. 142.1(3)(a) of the *EPA* to establish serious harm to human health, the burden has not been met by the Appellants here. The constitutional challenge therefore fails on the evidence. As a result it is not necessary in this case for the Tribunal to determine if the threshold under s. 7 of the *Charter* is less stringent than under s.142.1(3)(a) of the *EPA*.

Sub-Issue No. 2.2: If so, whether this deprivation is in accordance with the principles of fundamental justice; and if so, whether it is saved under s. 1 of the *Charter.*

[274] In light of the above findings, it is not necessary for the Tribunal to address this issue.

Sub-Issue No. 2.3: If it is found that there is a violation of s. 7 of the *Charter*, what is the appropriate test before the Tribunal?

[275] In light of the above findings, it is not necessary for the Tribunal to address this issue.

Findings on Issue No. 2

[276] In conclusion, the Tribunal finds that the Appellants have not established, on the facts of this case, that their rights to security of the person under s. 7 of the *Charter* have been violated.

DECISION

[277] The appeals are dismissed.

Appeals Dismissed

"Maureen Carter-Whitney"
Maureen Carter-Whitney, Panel Chair

"Marcia Valiante"
Marcia Valiante, Member

Appendix A – Procedural Rulings

Appendix A

Procedural Rulings

The Tribunal made a number of procedural rulings over the course of the hearing. These rulings are set out in this appendix.

Motion to Exclude Evidence

The Director brought a motion to exclude evidence that was heard on the first day of the hearing. The Director sought:

- an order excluding the evidence of post-turbine witnesses and presenters relating to their belief that living near wind turbine projects has caused them to suffer adverse health effects, and excluding the evidence of any other witness in relation to health effects they believe they suffered from being near turbines, in the absence of corroborating medical evidence;
- an order excluding the evidence of Heather Pollard; and
- an order excluding and striking from the witness statements the proposed evidence of Rick James and William Palmer to the extent that they provide evidence not relevant to the issues within the jurisdiction of the Tribunal, including evidence about the Project operating out of compliance with the REA.

The Hearing Panel heard this motion and gave an oral ruling as follows:

> The Tribunal dismisses the Director's motion to exclude evidence with reasons to follow and with the following direction. The Tribunal directs the post-turbine witnesses as follows regarding the scope of their evidence. They are to testify to their own personal circumstances and experiences, and not those of other people, and they are to testify as to their symptoms, but not on their conclusions in relation to cause and effect. The Tribunal notes that, pursuant to a consent order, the post turbine witnesses may give evidence about their own symptoms and the symptoms of anybody that lives in their household.

The Tribunal now provides its reasons for this disposition.

<u>Submissions on the motion to exclude evidence</u>

The Director submits that the proposed evidence of a number of witnesses and presenters is irrelevant and, in some cases relates to matters outside the Tribunal's jurisdiction. He further submits that the Tribunal should exclude this evidence rather

than allowing it in and simply according it limited weight. The Director states that, pursuant to Rule 4 of the Tribunal's *Rules of Practice*, the Tribunal has an overarching interest and obligation to ensure a just, cost effective and expeditious hearing of every case on its merits. He says that this interest is operationalized by, among other things, admitting only evidence that is within the proper scope of an appeal and relevant to the subject matter of the hearing. He relies on *Sierra Club Canada v. Ontario (Ministry of Natural Resources)*, 2011 ONSC 4086 (Div. Ct.) ("*Sierra Club*"), at para. 8, to highlight the importance of defining the appropriate record prior to the hearing. He states that this principle applies to a hearing before the Tribunal, and in particular to a REA hearing, as well as to a judicial review.

The Director asserts that the Tribunal has previously excluded evidence that was irrelevant, outside the scope of the appeal before it, or was unduly repetitious or otherwise inadmissible. He states that the narrower scope and expedited REA process require the Tribunal and parties to ensure that only relevant evidence is admitted to avoid unnecessary complication, length and expense due to the proliferation of collateral issues.

The Director cites *R. v. Mohan*, [1994] 2 S.C.R. 9 at para. 18, as authority for the proposition that the question of whether evidence is relevant is a question of law, and that evidence is relevant and *prima facie* admissible if so related to a fact in issue that it tends to establish it. He notes the Tribunal's powers under s. 142.1(3) and submits that the Tribunal is limited to a decision on the issues of serious harm to human health, or serious and irreversible harm to plant life, animal life or the natural environment, only and has no authority to enlarge the scope of an appeal. He further asserts that the issues on this appeal in particular have already been defined by para. 14 of the Tribunal's order of November 29, 2013 in this proceeding.

The Director contends that the Tribunal has no authority or jurisdiction to consider and adjudicate the issue of operation of the renewable energy project out of compliance with the REA issued by the Director, and that the current appeal is limited to considering whether harm will result from the approval as issued.

Regarding the evidence of the post-turbine witnesses, the Director submits that the anticipated evidence of the post-turbine witnesses and presenters, as set out in their witness statements, is irrelevant to the matters at issue in this appeal. He notes that the Tribunal has previously found that such evidence as these witnesses propose to give in this appeal cannot be relied upon to make the link between their health complaints and the wind turbines in and of itself, and that the Tribunal in *Kawartha Dairy* held that

confirmation of medical conditions requires the diagnostic skill of a qualified healthcare professional.

The Director asserts that, in *Ostrander*, the Tribunal concluded that it could not rely on the testimony of the post-turbine witnesses to make the link between their health complaints and the wind turbines, or extrapolate their personal experiences to the case before it in that appeal. He states that, while the post-turbine witnesses and presenters in this case are different than those who testified in *Ostrander*, the content and utility of their evidence is not. He also states that, as in *Ostrander*, the proposed evidence of the post-turbine presenters and witnesses does not include noise level measurements at their residences, which would allow the Tribunal to draw any conclusions about what sound pressure levels were allegedly causing the symptoms the presenters and witnesses believe they have experienced.

Regarding the proposed evidence of Ms. Pollard, the Director submits that it is entirely irrelevant to the issues on this appeal because the fact that the Ministry received complaints from individuals living near the Enbridge project does not tend to prove that those individuals suffered health effects, or that they suffered those health effects as a result of living near industrial wind turbines. He further submits that the Tribunal cannot extrapolate and rely on that evidence to support a finding that the project under review in this appeal will cause any health effects.

The Director points out that Ms. Pollard's proposed evidence does not include noise level measurements, which would allow the Tribunal to draw any conclusions about what sound pressure levels were allegedly causing the symptoms the complainants believed they have experienced, and that her proposed evidence cannot even be used to establish the truth of the contents of the complaints. The Director states that Ms. Pollard's proposed evidence cannot possibly establish any fact in issue on this appeal, and relates to matters entirely outside of the Tribunal's jurisdiction. He says that if Ms. Pollard's anticipated evidence is not excluded, it will result in the proliferation of collateral issues and a lengthier, more costly hearing.

Regarding the proposed evidence of Mr. James, the Director says that his witness statement asserts that the Project will operate out of compliance with the MOE Noise Guidelines. He contends that the Tribunal has no authority or jurisdiction to consider and adjudicate the issue of compliance with the approval raised by the Appellants, or with respect to the appropriateness of the decision-making of the Director in this case, and so Mr. James' evidence on these points is irrelevant and outside the scope of the

Tribunal's jurisdiction. On this basis, the Director says this evidence ought to be excluded.

The Director notes that the Tribunal came to a similar conclusion with respect to Mr. James' evidence in a motion by the Director in the matter of *Wrightman v. Director, Ministry of the Environment* 2013 CarswellOnt 14130 ("*Wrightman* Order"), at para. 3:

> With respect to the Director's Motion regarding the witness statement and proposed testimony of Rick James, the Tribunal orders that Mr. James be restricted to testifying regarding matters within the scope of his expertise, as determined by the panel hearing the appeals, and that any testimony directed only at showing that the Project will not meet the terms and conditions of the Renewable Energy Approval under appeal be excluded.

Regarding the proposed evidence of Mr. Palmer, the Director states that Mr. Palmer's witness statement, in the section entitled "Noise Issues", says that the Project will not operate in compliance with the noise limits set in the REA. The Director again submits that the Tribunal has no authority or jurisdiction to consider and adjudicate the issue of compliance with the approval raised by the Appellants, or with respect to the appropriateness of the decision-making of the Director in this case. He, therefore, states that Mr. Palmer's evidence on these points is irrelevant and outside the scope of this Tribunal's jurisdiction, and ought to be excluded.

The Director notes that the Ontario Divisional Court in *Lockridge v. Ontario (Director, Ministry of the Environment)* (2012), 68 C.E.L.R. (3d) 27 ("*Lockridge*") states, at para. 51, that improper opinion evidence that is clearly inadmissible is not rendered admissible because the underlying application raises *Charter* issues.

The Approval Holder supports the Director's motion and stresses the prejudicial effect that can result from the acceptance of the evidence that the Director seeks to exclude. The Approval Holder states that evidence the Appellants wish to bring forward in relation to the post-turbine witnesses is extremely prejudicial because it includes health records from individuals over many years, and health complaints that must be discerned for those individuals as to what existed before and after the presence of wind turbines. However, the Appellants are not introducing evidence concerning exposure or diagnoses, nor are they calling witnesses with the expertise required to weigh that evidence.

The Approval Holder submits, regarding the proposed evidence of Mr. James and Mr. Palmer, that they do not have the medical expertise required to comment on the effect of the turbines and their statements about alleged health impacts is also prejudicial.

The Approval Holder also submits the same in relation to Ms. Pollard, stating that there is a serious risk that her evidence of complaints could be misconstrued when there is no basis on which to establish any of the facts of those complaints or whether the individuals actually made these complaints, as they will not be present.

Regarding the relevancy of the post-turbine witnesses, the Appellants submit, citing Sopinka's *The Law of Evidence in Canada* (1992), that it is a well-established principle of the law of evidence in Canada that direct or circumstantial evidence of the facts in issue are relevant, and that a fact will be relevant not only where it relates directly to the fact in issue, but also where it proves or renders probable the past, present or future existence, or non-existence, of a fact.

The Appellants assert that the *Kawartha Dairy* and *Ostrander* appeals were decided on the evidence presented to the Tribunal in those proceedings through direct examination and cross-examination, and that the evidence in this case has not yet been tested in that manner. They cite the Supreme Court of Canada in the case of *Snell*, in which the Court held that inferences can be drawn from the evidence presented before the trier of fact for a finding of causation, even where causation cannot be proved with scientific certainty. The Appellants submit that, based on the Court's reasoning in *Snell*, the failure to call medical experts is not fatal to a finding of causation that the Project will cause harm on a balance of probabilities. The Appellants further submit that the weight to be given to the evidence that is received by this Tribunal Panel is an argument to be made after a full hearing of the evidence and not prior to the evidence being adduced before this Tribunal.

The Appellants say that the Director relies on *Sierra Club* for the proposition that the Tribunal should exclude evidence on the basis that the evidence sought to be adduced by the Appellants in some way encourages the proliferation of collateral issues. They seek to distinguish this case, however, on the basis that the *Sierra Club* matter was before the Court by way of judicial review, while in this hearing before the Tribunal, the Appellants have the right to adduce evidence that goes to any fact in issue.

The Appellants contend that the evidence of the post-turbine witnesses goes to a fact in issue before this Tribunal, and that they will argue that corroborating medical diagnosis of their symptoms is not required for showing causation based on the Supreme Court decision in *Snell*.

With respect to the proposed evidence of Mr. James, the Appellants say that his evidence is relevant to the question of whether or not the Project as approved will cause

harm to the Appellants. They further say that Ms. Pollard's evidence will address the MOE's state of knowledge regarding harms to residents associated with living in close proximity to industrial wind projects. They submit that the evidence of these two witnesses is relevant to the Appellants' *Charter* challenge. They note that in conducting an analysis of whether s. 7 of the *Charter* has been infringed, this Panel will be required to make findings in relation to: whether there exists a real or imminent deprivation of life, liberty, or security of the person, or a combination of those interests; identifying and defining the relevant principles of fundamental justice; and determining whether the deprivation has occurred in accordance with relevant principles.

The Appellants assert that Mr. James' evidence goes to the question of whether there exists a real or imminent deprivation of security of the person, and say they will submit that the level of harm likely to be caused by the Project is critical to the analysis of the protections provided for the security of the person under the *Charter*. They contend that, in evaluating these *Charter* issues, the rules of the Tribunal should be liberally construed to secure a just determination of the proceeding on its merits. They rely on the Supreme Court of Canada decision of *MacKay v. Manitoba*, [1989] 2 S.C.R. 357, at paras. 8-9, in submitting that it is important to have a broad factual matrix in *Charter* cases.

The Appellants also assert that Ms. Pollard's evidence goes to the question of determining whether the deprivation has occurred in accordance with relevant principles. They note that, as a part of their claim that the deprivation is not in accordance with the principles of fundamental justice, they will assert that the government had full knowledge of the harms that have been caused, are caused, and will be caused to residents living in close proximity to wind turbines, and that creating a statutory regime that does not give due regard to these known adverse health effects suffered by residents is not in accordance with the principles of fundamental justice.

The Appellants note, based on the *Lockridge* decision at paras. 77-81, that the state of knowledge of the government about the risks associated with living in close proximity to wind turbines is relevant to whether a deprivation of s. 7 is in accordance with the principles of fundamental justice.

The Appellants submit that the evidence of the witnesses being adduced before the Tribunal, and the evidence of post-turbine presenters, as well as the evidence of Mr. Palmer, as it relates to a risk of health as set out in the notice of appeal, are all relevant to either the issue of harm or the factual determinations that the Tribunal must make in respect of the *Charter* claim in this case. They further submit that the evidence

is relevant and required to have a full and fair hearing on the issues that the Tribunal must determine. They say that any determination as to the weight to be given to certain evidence should be done after all evidence has been heard and the parties provide their final submissions to the Tribunal.

Findings on the motion to exclude evidence

The Tribunal finds that the post-turbine witnesses, Ms. Pollard, Mr. James and Mr. Palmer will all be permitted to give evidence before the Tribunal. Given that the Appellants are putting forward a *Charter* claim and a legal argument concerning inferences on causation in this appeal, which could be characterized as novel, they should be given the opportunity to present evidence to support their claim.

Some of the evidence that the Appellants seek to put forward might be beyond the Tribunal's jurisdiction in the context of an appeal based solely on s. 142.1(3)(a) of the *EPA*. However, the Tribunal accepts that this evidence may be relevant to the questions to be determined in relation to the *Charter* challenge. As submitted by the Appellants, this evidence, and legal argument concerning it, must be heard in order for the Tribunal to make a determination on its relevance or what weight should be accorded to it.

The Tribunal accepts the Appellants' assertions that the evidence of Ms. Pollard, Mr. James and Mr. Palmer may be relevant to their *Charter* claim. In an appeal based only on s. 142.1(3)(a) of the *EPA*, it may be outside the Tribunal's jurisdiction to consider evidence on the Project operating out of compliance with the REA, or on the adequacy of the MOE's response to non-compliance. However, the Tribunal finds that these may well be reasonable arguments under s. 7 of the *Charter*. The Director correctly points out that, in the *Wrightman* Order, the Tribunal stated that testimony directed only at showing that the project would not meet the conditions of the renewable energy approval under appeal in that case was excluded. The Tribunal notes, however, that a *Charter* claim, although raised, was not pursued in that case.

Similarly, while the Tribunal in *Ostrander* found that it could not rely on the testimony of the post-turbine witnesses alone to make the link between their health complaints and the wind turbines, there was no *Charter* challenge before the Tribunal in that case. In order to adjudicate the *Charter* claim in this appeal, the Appellants must be allowed to present their evidence. However, the Tribunal observes that, although the post-turbine witnesses or presenters may testity to their own personal circumstances and experiences, none of them has the medical expertise required to attribute or draw

conclusions in relation to the causes of their health symptoms. Therefore, the Tribunal directs the post-turbine witnesses and presenters to limit their testimony to their own experiences and symptoms, and not testify concerning the experiences and symptoms of others in their communities. Pursuant to a consent order, the Tribunal notes that the post-turbine witnesses and presenters may give evidence about their own symptoms and the symptoms of others living in their household.

As noted by the Director, Rule 4 of the Tribunal's *Rules of Practice* states:

> These Rules shall be liberally construed to secure the just, most expeditious and cost-effective determination of every proceeding on its merits.

The Tribunal observes that, given the efficient conduct of all REA appeals due to the six-month statutory deadline for the disposition of such appeals, there is no concern that allowing the evidence at issue will add unduly to the length of this hearing. Given that the evidence is required to advance the Appellants' argument, the objective of Rule 4 is satisfied in this case.

The Tribunal does not accept that allowing the evidence at issue to be heard poses a risk of prejudice as suggested by the Approval Holder. The Approval Holder raised concerns that hearing health evidence without accompanying expert opinion evidence would be prejudicial, as would hearing testimony concerning complaints without a factual basis for those complaints. However, the Tribunal has found that the evidence in question goes to issues in relation to the *Charter* challenge that are properly before the Tribunal, and the Tribunal is able to discern the relative strength or weakness of the evidence, and assign weight accordingly.

Request for qualification of William Palmer as an expert witness

Mr. Palmer asked to be qualified as a professional engineer with expertise on acoustics and several matters related to public safety. The Appellants supported the qualification of Mr. Palmer, but the respondents opposed the extent of his requested qualification, as discussed in greater detail below.

The Tribunal provided an oral ruling as follows:

> The Tribunal qualifies Mr. Palmer as a professional engineer with expertise in public safety and acoustics. The Tribunal directs Mr. Palmer to confine his testimony to public safety and acoustical assessment and to not speak to health effects or shadow flicker along highways or anything else that is not within his area of qualification.

The Tribunal now provides its reasons for this ruling.

Mr. Palmer holds a Bachelor of Applied Science and Engineering degree and is a Registered Professional Engineer in Ontario. He spent most of his career working at the Bruce Nuclear facility in various roles, including having responsibility for risk assessment. Since he retired in 2004, Mr. Palmer has studied the issue of wind turbine noise on his own. He has carried out noise measurements at homes near the Enbridge project. He has written several conference papers on the subject of wind turbine noise, attended international conferences on wind turbine noise and appeared before the Tribunal in several hearings. He is a member of the Canadian Acoustical Association and the Acoustical Society of America.

The Appellants supported the qualification of Mr. Palmer. The Director did not object to the qualification of Mr. Palmer in the area of acoustics, but expressed serious reservations about the weight that should be given to his evidence in this regard due to his lack of formal education or work experience on noise assessment or acoustical emissions from wind turbines. In addition, the Director submitted that Mr. Palmer is not unbiased but is an advocate against wind turbines. With respect to public safety, the Director accepted that Mr. Palmer has some expertise in the area of risk assessment generally, but objected to his giving evidence on the issue of shadow flicker as it affects drivers, noting that he has no expertise on that issue and that the evidence he proposed to give was essentially lay evidence.

The Approval Holder did not support the qualification of Mr. Palmer in the area of acoustics, stating that he is self-taught, without the level of technical review, or professional scrutiny and mentorship that occurs in an engineering practice and thus his credentials do not come close to the level of expertise expected of the Tribunal. The Approval Holder stated that Mr. Palmer's evidence on acoustics should be disregarded as he is an anti-wind advocate and not impartial in the work he carries out or in the evidence he has presented before the Tribunal. With respect to public safety issues, the Approval Holder agreed with the Director's position about the issue of shadow flicker but did not otherwise object to Mr. Palmer being qualified.

The Tribunal's Practice Direction for Technical and Opinion Evidence allows a witness with "specialized education, training, or experience" to provide opinion evidence. Mr. Palmer has education and training in some aspects of engineering but he has none as an acoustical engineer. Instead, he has developed some experience in this field over the last decade. The Tribunal has qualified Mr. Palmer in the past as having "some experience" in the acoustics of wind turbines, and makes the same finding in this case. The reliability of his opinions and his alleged bias will be considered by the Tribunal as it

weighs his evidence. With respect to public safety, Mr. Palmer's engineering training and his work experience justify the Tribunal in qualifying him to give opinion evidence regarding the issue of risks to public safety due to turbine failures. The Tribunal agrees with the Director regarding the evidence of shadow flicker and driver distraction and does not qualify Mr. Palmer to give evidence on that issue. As a result, parts of pages 9 to 11 and Tab E of his witness statement are struck. The Tribunal also notes in Mr. Palmer's witness statement that he addresses the issue of the health effects of wind turbines, while acknowledging his lack of medical expertise. As a result of his lack of expertise, parts of pages 17 to 20 of Mr. Palmer's witness statement are also struck.

Request for qualification of Rick James as an expert witness

The Appellants sought to have Mr. James qualified as "an acoustical engineer with expertise in environmental noise and noise modeling and with specific expertise in the field of wind turbine noise modeling and sound monitoring including low frequency noise and infrasound and the human response to noise."

At the hearing, the respondents indicated that they did not object to Mr. James testifying but submitted that they intended to cross-examine him on his qualifications and address the issue in their closing submissions. In their closing submissions, the Approval Holder and the Director both challenged his qualifications and asked that the Tribunal not qualify him as an expert and that the Tribunal exclude or disregard his evidence.

Mr. James owns and acts as principal consultant for E-Coustic Solutions in Michigan. He has a B.Sc. in Mechanical Engineering and has practiced as an acoustical engineer for 40 years. He is a member of the Institute of Noise Control Engineers ("INCE"), but is not certified by the INCE as an acoustical engineer, nor is he a registered professional engineer in any jurisdiction.

With respect to wind turbine noise and the siting of wind farms, Mr. James has worked for clients in over 60 communities, carried out several studies and made numerous presentations of his work. He has testified as a witness in a number of regulatory hearings. He was qualified as an expert in three previous REA hearings before the Tribunal.

When questioned by counsel for the Approval Holder, Mr. James admitted that he had no medical, epidemiological or statistical expertise and that none of his papers has been published in the *Noise Control Engineering Journal*, the peer reviewed journal of the INCE. He also conceded that he has not prepared a noise assessment report for the MOE or for a proponent of a wind farm. He stated that he is founder and continues to

be a board member of the Society of Wind Vigilance, a group opposed to wind power developments located too close to homes. He stated that he had not yet seen a project in Ontario that was sited safely.

Mr. Bunting, counsel for the Approval Holder, put to Mr. James that he had been accused by a reporter in the United States of being a “hired gun” and of “cherry-picking” research findings to support his position in opposition to wind power developments. Mr. James was aware of this accusation but discounted it as coming from an advocate of wind power. Mr. Bunting also reviewed the Tribunal’s Practice Direction on Expert Opinion Evidence with Mr. James and questioned Mr. James’ compliance with the requirements to provide full and fair disclosure, including disclosure of differences in professional or scientific opinions. Mr. James conceded that he did not expressly reference differences of opinion regarding the health effects of wind turbines due to low frequency sound and infrasound, but was aware of those differences when writing his witness statement, believed that the Tribunal was aware of those differences, and did not make any attempt to hide information.

Mr. Bunting also questioned Mr. James about statements he had made in this and previous hearings when describing the noise associated with wind turbines as being similar to “being on a battleship in World War II with a kamikaze pilot coming toward you”, or like a tornado or tsunami, or like a gunshot. Mr. James disagreed that he used such characterizations to be alarmist about wind turbines.

The Approval Holder raised a number of issues with Mr. James. The Director made similar submissions. The Approval Holder submitted that Mr. James is not highly qualified because: he is not licensed as a professional engineer, nor is he certified as an acoustician, in any jurisdiction; he has never submitted a noise impact assessment report to the MOE; and he has not had any of his papers or studies published in the peer-reviewed journal of the INCE, of which he is a member.

In addition, the Approval Holder criticized Mr. James’ conduct, arguing that he breached his obligations as an expert witness because he has a clear bias and lacks the independence required by law and by the Tribunal’s Practice Direction for Technical and Opinion Evidence. The Approval Holder argued that Mr. James saw wind turbines as a business opportunity. The Approval Holder cited a number of instances in his evidence where, instead of clearly disclosing differences of scientific opinion, Mr. James selectively included information and studies that advanced his position and failed to include relevant material that could contradict his conclusions. The Approval Holder also noted examples of his use of alarmist and unscientific language. The Approval

Holder submitted further that Mr. James provided opinions on matters beyond acoustics, including statistical analysis and epidemiology.

In response, the Appellants submitted that Mr. James does have the qualifications to be qualified as an expert, with 40 years of experience as a practicing acoustical engineer and a focus on wind turbine noise since 2006. They asserted that he has not displayed bias nor has he become an advocate but was vigorously advancing strongly held opinions, as is allowed by the Tribunal's Practice Direction. They argued that if the Tribunal considers that he exhibited bias, it would go to weight and not admissibility. They submitted further, with respect to his witness statement, that it is not fair for the respondents to criticize Mr. James for doing what their own experts did, that is, failing to cite research that does not support his views. Finally, the Appellants submitted that Mr. James did not give evidence in areas outside of his area of expertise. They argued that although he included two epidemiological studies in his report and recommended that the Tribunal review them, he did not give evidence about the methods or findings of those studies.

Findings on qualification of Rick James as an expert witness

Mr. James has a Bachelor's degree in Mechanical Engineering and has worked since the 1970s in the field of noise control engineering and acoustics, primarily in occupational settings. Since 2006, Mr. James has acted almost exclusively as a consultant to local communities regarding noise from wind turbines. The Tribunal notes that he has been qualified as an expert in previous Tribunal REA appeal hearings.

The Tribunal's Practice Direction for Technical and Opinion Evidence states that in order 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 persons cannot provide reliable opinions." Mr. James has specialized education and work experience in acoustics and noise control engineering, so even though he is not professionally licensed as an engineer or acoustician, he does meet the Practice Direction's minimum requirements to be able to provide opinion evidence. The Tribunal finds that Mr. James is qualified to provide evidence on matters related to acoustics and noise control engineering and wind turbines. Evidence he provided on other matters, including health effects of wind turbines and epidemiology, will be excluded from consideration.

The evidence about Mr. James' independence is equivocal. Some aspects of his evidence were selective and he was not entirely forthcoming about the actual state of the science with respect to wind turbine noise. His failure to modify his witness statement after it was shown to be inaccurate through cross-examination in a previous Tribunal hearing shows carelessness, at a minimum. His use of alarmist language may indicate that he is acting more as an advocate than as an objective and independent expert. While all of these factors could influence the weight to be given to his evidence, the Tribunal does not consider that his evidence is so tainted that it should be excluded entirely.

Request to admit "Fright Factors" article

In response to questioning by counsel for the Approval Holder in cross-examination during his testimony, Dr. Bigelow provided a brief description of research conducted by Dr. Laurie Hoffman-Goetz, one of his colleagues as part of the Research Chair, which addressed "fright factors", defined as statements of dread or poorly understood science. He confirmed that Dr. Hoffman-Goetz's research concluded that Ontario newspaper articles that included fright factors relating to wind turbines may produce fear, concern and anxiety for readers.

During the examination in chief of Dr. Mundt, counsel for the Approval Holder sought to introduce into evidence the article, "Fright factors about wind turbines and health in Ontario newspapers before and after the *Green Energy Act*," of which Dr. Hoffman-Goetz is a coauthor. Counsel for the Appellants objected to the article, which had not been provided beforehand, being introduced into evidence through Dr. Mundt, when it had not been entered as an exhibit during Dr. Bigelow's cross-examination.

The Panel provided the following oral ruling at the hearing:

> The Tribunal will accept the article in question as an exhibit, given that Dr. Bigelow testified on Friday that he was familiar with the work of Dr. Hoffman-Goetz and with this specific journal article, and commented on the content of this article.