

STATE OF ILLINOIS
PIATT COUNTY ZONING BOARD

GOOSE CREEK WIND, LLC
APPLICATION FOR A SPECIAL USE PERMIT

11/16/2022, 2022

6:06 P.M. - 9:00 P.M.

Held at Monticello, IL, Community Building

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Loyd Wax - Chairman

Jim Harrington - Vice Chairman

William Chambers

Paul Foran

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E X H I B I T S

NO EXHIBITS ADMITTED.....

1 MR. WAX: Let's call the meeting to order,
2 please.

3 First order of business, would you please
4 stand and join in the Pledge of Allegiance to the
5 Flag?

6 (PLEDGE OF ALLEGIANCE.)

7 MR. WAX: Now could we have the rollcall?

8 MS. NUSBAUM: Mr. Larson?

9 Mr. Harrington?

10 MR. HARRINGTON: Here.

11 MS. NUSBAUM: Mr. Lovin?

12 Mr. Wax?

13 MR. WAX: Here.

14 MS. NUSBAUM: Mr. Chambers?

15 MR. CHAMBERS: Here.

16 MS. NUSBAUM: Mr. Foran?

17 MR. FORAN: Here.

18 MS. NUSBAUM: State's Attorney Perry?

19 MS. PERRY: Here.

20 MR. WAX: Shall we have a rollcall of the
21 county board?

22 MS. NUSBAUM: Mr. Spencer?

23 Mr. Carroll?

24 MR. CARROLL: Here.

1 MS. NUSBAUM: Mr. Edwards?

2 MR. EDWARDS: Here.

3 MS. NUSBAUM: Ms. Jones?

4 Mr. Henricks?

5 MR. HENRICKS: Here.

6 MS. NUSBAUM: Mr. Shumard?

7 Thank you.

8 MR. KAINS: Thank you. Well, good

9 evening, ladies and gentlemen.

10 First of all, I would like to apologize
11 for being late. It's a heck of a drive from Barnes
12 Hospital in St. Louis to Monticello, Illinois, but I
13 only exceeded the suggested speed signs just by a
14 few miles an hour. So, I'll let the fellows in the
15 back know, it wasn't even Piatt County.

16 One thing that came to mind after last
17 night's session, the first night of this public
18 hearing, while folks were speaking in the
19 microphones, we up front could hear, Holly, the
20 court reporter, who takes everything down could
21 hear, but some folks in the back of room could not
22 hear.

23 So, to remedy that situation, we are just
24 going to ask that any folks who are speaking to the

1 board, including the board and myself, any of the
2 attorneys, any of the witnesses, any persons
3 conducting questioning, just hug that microphone so
4 everybody in the room can hear.

5 All right. The applicant still has a
6 number of witnesses who are ready to testify, and we
7 will begin tonight with Mr. Gershon.

8 OPENING STATEMENT ON BEHALF OF APPLICANT

9 MR. GERSHON: Thank you very much. I want
10 to first start -- I meant to give this to Phil right
11 before we started, a copy of the PowerPoint.

12 MR. LUETKEHANS: Thanks.

13 MR. GERSHON: Is this microphone too far
14 away or can you hear me?

15 MR. KAINS: In the back, you can hear him?
16 Very good. Thank you.

17 MR. GERSHON: Okay. As I said, this
18 really isn't testimony. This is just walking
19 through sort of a roadmap of what we are going to be
20 seeing today. I thought it made more sense
21 yesterday to have Alan start to give you the real
22 sense of the substance before you have to listen to
23 the legal side of this.

24 Very quickly, as you know, we've applied

1 for a special use pursuant to your WECS Ordinance.
2 This group knows that WECS Ordinance more than most
3 people because you spent an awful lot of months
4 working on it. There was extensive public hearings
5 on that ordinance, testimony by both sides, and as
6 you know there were a lot of changes in that
7 ordinance that were eventually approved by the
8 county board.

9 You've set, the ZBA and the county board,
10 have set those standards. It is the goal and the
11 roadmap of our presentation to show that we have met
12 those.

13 Just so we are clear, our satisfying those
14 standards is part of a number of things. One, it's
15 part of the hearing binders that you received. It's
16 the information that is included in there. It comes
17 from our testimony that you will hear, the cross
18 examination, etc., so it's all combined together to
19 show that but we also have within our application
20 your specific particular standards and how we meet
21 each one of them. So that information is there for
22 you to show what we are doing and is supplemented by
23 what we are doing here.

24 Hold on a second. I have to move two of

1 these at once.

2 I think what you passed is critically
3 important. What it specifically says -- and I try
4 not to read PowerPoints, but on this I would like to
5 read the direct quote.

6 You stated and the county board stated:

7 This ordinance is adopted for the
8 following purposes: To assure that any development
9 and production of wind-generated electricity in
10 Piatt County is safe and effective -- I'll just add
11 that is my emphasis on those two terms up there, but
12 I think they are critical -- and to facilitate
13 economic opportunities for local residence.

14 So when we look at your ordinance, we look
15 at the standards that you've adopted to ensure that
16 development is safe and effective, and that is one
17 of the reasons why we respond to those standards.

18 We are not here to argue with you about
19 what those standards would be. That decision has
20 already been made. You made that, so that is why
21 you won't hear us arguing or arguing about the
22 standards again. We have the standards. We have to
23 follow them. You heard that multiple times in
24 Alan's testimony yesterday.

1 But what we are here for is to make sure
2 that we meet both the requirements, and by that I
3 mean your height requirements, your setback
4 requirements, etc. -- Alan went through a lot of
5 those, other people will testify to others -- and
6 also you have sort of your standard, your standards
7 form and special use which deal with both
8 qualitative and quantitative standards that are --
9 those are the ones that are also included on the
10 application.

11 I know that the binders are rather large.
12 That's because we need to meet what your
13 requirements are and include everything in there,
14 and you can imagine that a lot of effort went into
15 those.

16 You know that we've already submitted as
17 our Group Exhibit 1 that application binder. I am
18 not going to walk through every single item in
19 there, but you've got it; you've got a copy of
20 those. I think some of them are critically
21 important, and I hope you get a chance to look
22 through them.

23 Some of them you've already seen in Alan's
24 testimony, the maps, the site control documents, the

1 evidence of all the property owners who are
2 participating as part of this, our participation
3 agreements, and we also talked about what is
4 appendix C, some of the supporting documentation,
5 both community grants that Alan discussed and our
6 economic impact analysis which was identified as
7 being testified to by Dr. David Loomis later in this
8 hearing -- yeah, later in this hearing.

9 Also, just so we are clear, every one of
10 these items that are in there are there because your
11 code requires them to be there. You've never done
12 this. You just modified your code so recently. I
13 had zoning board members say why in the world did
14 you give us so much stuff. I said, to be honest,
15 you required that we give you all those items. So,
16 that is why they are there. I think you guys know
17 that more than most people just because you've had
18 that opportunity to walk through it.

19 I am finding my limitation is to move
20 forward one PowerPoint not two.

21 Appendix E we talked about. These are our
22 project agreements. We've already talked about the
23 AIMA document. I won't go further into that, but
24 you heard a lot about that at the last meeting.

1 We also have an agreement with the Village
2 of DeLand which deals with their compensation and
3 waiver of their siting authority.

4 In the document, not really a part of your
5 review, but one of the things that we have to do
6 pursuant to your ordinance is either meet -- get
7 their approval or get their waiver of that approval,
8 and they chose to waive it.

9 The biggest piece in there, beyond all of
10 our property memos, are all the project studies and
11 reports. You are going to hear more about these.

12 The market impact analysis, our expert
13 will discuss that when he comes up.

14 Our telecommunications studies, Alan
15 talked about during his presentation.

16 The draft emergency management plan that
17 we are required to provide pursuant to your codes,
18 you'll hear more about the work we've done with the
19 fire departments related to that.

20 Our shadow flicker report, depending on
21 how far we get through today, you will hear our
22 expert on that today or tomorrow on the shadow
23 flicker report.

24 The sound modeling report, same statement.

1 I hope that we'll hear that today or tomorrow. Our
2 expert is here for it.

3 Wildlife habitat assessment, you'll
4 remember there were some questions about wildlife
5 where Alan indicated our expert would be here to
6 talk about it. That's his report. He'll go through
7 that.

8 And our draft decommissioning plan, which
9 again, we are required to submit to you and which we
10 have.

11 Appendix G is really dealing with FAA and
12 US Department of Defense issues and relates to those
13 documents, their determination of no hazard for the
14 turbine locations and the filing documents.

15 The other part of this is critical. I
16 sort of went through it already, but just to
17 summarize:

18 You have seen testimony and received our
19 maps, etc. Our goal here is to confirm for you that
20 all of your setback requirements have been met, all
21 of your noise and shadow flicker requirements and
22 standards have been met and all of your
23 environmental requirements have been met.

24 We have shown, if you look at Section 2.1,

1 at some point when going through the document, that
2 shows our meeting your internal standards and
3 responses of those in addition, again, to our
4 testimony, and I think Alan spoke in some good
5 detail, but David Loomis will also talk about the
6 obligation in your ordinance to show that there is
7 an economic value of this to property owners and the
8 community, and I think we've talked extensively on
9 those numbers.

10 Those numbers, again, that Alan mentioned
11 were \$210 million to participants, \$91 million to
12 all the taking bodies, that is the schools, that is
13 this county, that is fire, to all the taking bodies
14 that support this community, creation of quality
15 construction of long-term jobs, and we talked a lot
16 about those numbers and where those come from, and
17 while we talked it before, David Loomis will speak
18 in more eloquence about all of the benefits to
19 residences, businesses, restaurants and others in
20 the community.

21 And also meets, as discussed in your plan,
22 that first quote I gave to you that talks about it
23 being effective, and the way in which we feel this
24 is being effective is the generation of significant

1 renewable energy as Alan testified.

2 At this point we have previously submitted
3 to you that binder of exhibits, and for the record
4 we asked that that Exhibit, Group Exhibit 1, be
5 accepted by the ZBA.

6 Do you want to confirm?

7 MR. KAINS: It has been accepted by the
8 ZBA. Yes, sir.

9 MR. GERSHON: Great. Thank you.

10 We've got the same request on our
11 Exhibit 1, which was the school district resolution
12 that we gave to you -- I apologize -- our Exhibit 2,
13 the school district resolution we handed to you
14 yesterday. We would ask that that be accepted.

15 And then I have submitted two additional
16 documents, and one is an updated and revised
17 economic impact analysis dated October of 2022 by
18 Dr. David Loomis. We'll go into the detail on it
19 later, but essentially it's the same report as
20 before, but back when he created his first report we
21 did not know, you'll remember, we are talking about
22 60 turbines here, only 50 of which we are going
23 build, and now that we are farther along we know
24 what those 50 will be. Obviously, final engineering

1 may change that, but we asked him. His first report
2 talked about the fact that we are looking at 60 but
3 we really averaging the minimum of 50 over all those
4 properties.

5 This new report says, if we assume those
6 50 primary ones are the ones that are used, we can
7 now show much more direct where all those tax
8 dollars go.

9 Again, I don't want to testify ahead of
10 time -- Dr. Loomis will -- but that is why we've
11 submitted that additional document.

12 I have also submitted resumes of all of
13 our third-party experts, those who are not directly
14 employed by the developer, by the applicant.

15 For the record, Andy Keyt has asked, and
16 we will bring to the next meeting for each of you
17 copies of all of those documents for you to have;
18 and I can give, since I know Phil is going to ask me
19 for it, a copy of all those documents.

20 MR. LUETKEHANS: You just saw me move my
21 mic.

22 MR. GERSHON: That is copies of Exhibits 3
23 and 4, the revised impact analysis --

24 MR. LUETKEHANS: Which one is 3 and which

1 is 4?

2 MR. GERSHON: Three is the updated/revised
3 impact analysis, and 4 is a Group Exhibit with the
4 rest. Thank you.

5 MR. KAINS: Mr. Gershon, those have been
6 received. They are not -- we'll wait for you to
7 move to admit those at the conclusion of the
8 testimony of the respective witnesses.

9 MR. GERSHON: That will be our pleasure.

10 MR. KAINS: Thank you.

11 MR. GERSHON: That completes my direct
12 testimony, and I would like to ask Dr. -- I
13 apologize.

14 MR. KAINS: Mr. Gershon, I am not going to
15 consider that testimony. That was an opening
16 statement, and as an opening statement that was
17 fine.

18 So, folks, as a matter of procedure,
19 attorneys may give opening statements at the
20 beginning of their cases or at the beginning of the
21 hearing.

22 Mr. Luetkehans will have the opportunity
23 to give an opening statement as well.

24 Do you want to reserve that for the

1 beginning of your case?

2 MR. LUETKEHANS: Yes, please.

3 MR. KAINS: Thank you. All right.

4 So that opening statement from
5 Mr. Gershon, now you've given us a roadmap of where
6 you are going, and you may call your next witness.

7 MR. GERSHON: I would like to call
8 Dr. Jeff Ellenbogen to the stand.

9 **JEFFRY M. ELLENBOGEN, MMSc, MD, FAASM,**

10 an expert witness herein, called by the Applicant, after
11 having been first duly sworn, was examined and testified
12 as follows:

13 MR. KAINS: Mr. Ellenbogen, if you could,
14 please speak into the microphone and state your
15 first name and last name, spelling both for the
16 record, please.

17 DR. ELLENBOGEN: Sure. My name is Jeffrey
18 Ellenbogen. J-e-f-f-r-e-y, last name
19 E-l-l-e-n-b-o-g-e-n.

20 MR. KAINS: Thank you, sir.

21 Mr. Gerson, you may proceed.

22 EXAMINATION

23 BY MR. GERSON:

24 Q. We are trying to share this microphone

1 since there was trouble hearing us before. We have
2 arranged for a second mic to be here starting
3 tomorrow so that we can do this.

4 Dr. Ellenbogen, would you please state
5 your background and professional expertise?

6 MR. LUETKEHANS: Mark, can I get a copy of
7 the PowerPoint? Thank you.

8 MR. KAINS: Mr. Gershon, would it be
9 easier if you used the podium, or would you rather
10 question him from your seat there?

11 MR. GERSHON: Let's question him from
12 here. I think that is easier.

13 MR. KAINS: It's your option, sir.
14 Mr. Gershon, you may proceed.

15 MR. GERSHON: Great.

16 BY MR. GERSHON:

17 Q. Dr. Ellenbogen, again, would you please
18 state your professional background and expertise?

19 **A. Sure.**

20 **Good evening, folks.**

21 **I am a medical physician. I went to**
22 **college at the University of Michigan and then Tufts**
23 **for medical school. I did a master's degree at**
24 **Harvard in medical sciences, and then I went on to**

1 **become a neurologist and a sleep specialist through**
2 **training at the University of Pennsylvania and then**
3 **at Harvard as a post doctorate fellow.**

4 **I have board certification in both**
5 **neurology and in sleep medicine.**

6 **I also have a background in acoustics from**
7 **a scientific point of view and from a health point**
8 **of view. I spent three years as a consultant for**
9 **Bose Corporation, and I have a research laboratory**
10 **that looks at the potential health effects of noise**
11 **on sleep.**

12 MR. KAINS: Mr. Luetkehans, do you have
13 any objection to this gentleman testifying as an
14 expert?

15 MR. LUETKEHANS: No.

16 MR. KAINS: Okay. He will be allowed to
17 testify as an expert.

18 MR. GERSHON: Thank you.

19 THE WITNESS: Thank you.

20 BY MR. GERSHON:

21 Q. If you would, please talk about your
22 experience specifically with wind turbine studies.

23 A. Sure. I first got into the topic of wind
24 turbines and its relationship/potential relationship

1 to human health back in 2011. I was asked by the
2 commissioners of the Department of Public Health and
3 the Department of Environmental Protection in
4 Massachusetts where I was living at the time to
5 become a part of an independent scientific counsel
6 to look at whether or not wind turbines cause any
7 health effects.

8 At the time, Massachusetts was looking to
9 increase turbines in their communities, and their
10 commissioners wanted to check to make sure that
11 there weren't any known health effects before they
12 proceeded.

13 So, we looked for about a year. We
14 deliberated, we received public comment and we
15 looked at all of the known scientific literature and
16 then put out a publication in 2012.

17 Since that time, I've had some opportunity
18 to maintain my interest and continue to read works
19 that come out on the topic and be aware of them.

20 I also got to do some independent medical
21 evaluations of people who did live near wind
22 turbines and had raised concern about their own
23 health, and I'll raise a few examples of those later
24 in my relatively brief talk here.

1 I also have provided testimony from time
2 to time here. This is my second time here in the
3 great State of Illinois this year.

4 And then, finally, there was a sleep
5 article that came out relatively recently. It was a
6 recent article on sleep and wind turbines that was
7 published, and I was asked to write an editorial for
8 that scientific journal.

9 Just by way of background, in terms of my
10 relationship to paying attention to this topic, it's
11 of great interest to me primarily because of the
12 sleep issue and potential neurological issues. I
13 have a passion for helping people sleep in noisy
14 environments.

15 Okay. This is really the primary slide to
16 kind of introduce the concept and really what are we
17 talking about.

18 The two main potential sources of problems
19 that a wind turbine could do to a person, they are
20 primarily the noise and vibration, on the one hand,
21 and shadow, on the other, as we talk about shadow
22 flicker and the potential problems that might emerge
23 from those. They are quite broad, and people have
24 talked about them. And if you go online, you'll see

1 lots of discussion about a whole broad range. These
2 are just some examples that I put here: Neurologic
3 diseases of various kinds, pain, seizures,
4 dizziness, vertigo, and so forth, cardiovascular
5 disease, asthma, headache. So there is a long list
6 of potential problems, and so it's not a trivial
7 task to try to tackle this topic.

8 This is just a map from the US Wind
9 Turbine Database as a reminder to me that there are
10 more than 70,000 wind turbines that are spinning
11 here in the United States, so it's not a rare thing,
12 and we do our best to pay attention to as many
13 projects and what and how people talk about them.

14 Now, if we focus in on the studies that
15 have been done looking at these various questions
16 about whether or not wind turbines might cause human
17 health effects, there are a handful of studies.
18 Most of them are low or sometimes even very low
19 quality.

20 And remember, like buying a car, peer
21 review publications come in a variety of shapes and
22 sizes and quality, and the ones that were out there
23 on the topic of wind turbines were very poor
24 quality.

1 One thing that I was reassured by, and our
2 commission was, in 2012 in Massachusetts is that
3 there is no such thing as wind turbine syndrome and
4 that there is no support for shadow-related
5 flickers -- sorry -- shadow-flicker-related
6 seizures, and I want to go into that in a bit so
7 that I can give you the reassurance of why I am so
8 certain.

9 There is a recent paper in looking at
10 sleep and wind turbines that I think is of interest.
11 But by far the largest, most rigorous, most well
12 done set of studies was that done by Health Canada
13 back in 2012 to '14, and so I want to spend just a
14 little bit of time introducing you to that study
15 because I think it will come up a lot for you, and
16 it should because it's an outstanding set of studies
17 and it can help clarify some of the issues that are
18 at play. Okay.

19 First, I won't get into the weeds of it
20 too much. I would be happy to, if you have
21 questions about it, but let me just introduce you to
22 it because it will come up a lot. First, the design
23 of the study. It's called actually the Community
24 Noise and Health Study, which is kind of a mouthful.

1 Most people, including myself, will refer to it
2 colloquially as Health Canada. It was done in 2012
3 to 2014. They studied over 1200 people, so it's an
4 enormous study. It was adults aged 18 to 79 and
5 done in Ontario and Prince Edward Island in Canada.

6 The goal was to determine -- to clarify,
7 these are communities in which the wind turbines are
8 actually spinning and the people are actually living
9 near them. This was not a study about the
10 possibility of them, and so they were looking at the
11 health of the people living near wind turbines in
12 Canada.

13 It's a cross-sectional exposure response
14 design, which is a mouthful to say, that we know
15 that these disorders, insomnia, heart disease,
16 diabetes, headaches and so forth are in the general
17 population, and what they were going to do is say,
18 okay, given a group of people who live far enough
19 away from a turbine that the noise is trivial versus
20 people that have moderate noise or louder noise, are
21 there people living near louder and louder noises
22 that are more apt to have headaches, seizures --
23 they didn't study seizures -- excuse me --
24 headaches, sleep loss, cardiovascular disease,

1 stress, I mean physiological stress.

2 One of the things that was unusual about
3 this study is the magnitude, the size, and the other
4 is the scientific rigour, but the third thing that
5 you need to know about the Health Canada that was
6 essential with that interviewing is that they were
7 doing subjective measurements, how is your sleep
8 quality, and objective measures where you are
9 looking at sleep physiology of people as well.

10 When they studied stress, they asked
11 questions about stress, do you experience or feel
12 stressed, but they also had objective measures; they
13 were doing hair cortisol loads.

14 When they were looking at cardiovascular
15 disease, they were asking questions about
16 cardiovascular disease but they were also measuring
17 blood pressure and heart rate, so they did a really
18 good job. This was a comprehensive and major
19 undertaking. They also looked at things like
20 tenonitis, annoyance and quality of life.

21 The findings are easy to get caught up in
22 the details, but I want to just show you the big
23 picture because the picture was a clear picture that
24 emerged at the level of the noise that was

1 experienced in the Health Canada study. There were
2 no associations between the noise levels that people
3 experienced and the health effects that they were
4 looking at. They didn't have a community problem
5 with sleep loss. They didn't have an increase in
6 cardiovascular disease. They didn't have headaches
7 more in the louder conditions. They didn't have
8 higher level of stress cortisol levels. So that
9 part is clear in their study.

10 They did have an increase in annoyance for
11 some of the folks, and we can talk about that. I
12 don't consider that a health effect, but I would be
13 happy to address issues on annoyance as well.

14 But from all of the health issues that
15 they addressed, and there were many, there were no
16 associations between wind turbine noise and human
17 health problems.

18 One thing they didn't address, and I
19 wouldn't have thought to bring it up in detail but I
20 think that it comes up in these meetings so much
21 that I want to kind of get ahead of it and share my
22 perspective on the physiology of seizures just for a
23 minute -- it is a brief tangent -- because there are
24 people that have concern about this, and that would

1 be a reasonable concern if you had a known family
2 member with seizures or you have a risk factor for
3 seizures.

4 I first wanted to show, too, for
5 perspective, the blue circle is just the entire
6 population of the United States, and that little
7 orange sliver at the top is the number of people in
8 the United States that have epilepsy. It is about
9 one percent of our population, so not a small
10 amount, but in the grand scheme of things it's quite
11 small.

12 Now, if you blow out that orange section,
13 which is all of the people in the United States that
14 have epilepsy, now let's look at the orange circle.

15 Among all the people that have the
16 diagnosis of epilepsy, how many of those people will
17 have something called photosensitive epilepsy?

18 How many people with the disorder of
19 seizures will respond to the flashes of light that
20 cause them to go into a seizure, which would be a
21 concern? And that is about three percent. This is
22 from the Epilepsy Foundation and a lot of other
23 sources. So, it's a small percentage of a small
24 percentage. In other words, it isn't every person

1 that has seizures that would respond to flashes of
2 light by having a seizure.

3 Just a little more information about that:
4 So, the frequency of the flashes matters a great
5 deal, and we know that the frequency has to be about
6 5 hertz or even 10 hertz, meaning 5 to 10 flashes of
7 light or more, in order to trigger seizures in a
8 person that has photosensitive epilepsy.

9 Most of the population doesn't have
10 epilepsy. Most of the people that have epilepsy
11 don't have photic seizures. And if among the people
12 that do have photic seizures, it matters the
13 frequency composition, the quality of life and so
14 forth.

15 That is kind of a mouthful. It's a whole
16 lot of information, but you don't need to pay any
17 attention to any of that because the shadow -- the
18 flicker that is created by wind turbines is at about
19 1 hertz or a little bit less, which is which below
20 the threshold that a person who had photosensitive
21 epilepsy would have a seizure.

22 So, I just wanted to be clear about that
23 because this is a topic of, I think, a lot of
24 misunderstanding, and I wanted to be able to walk

1 you through that to reassure you that shadow flicker
2 does not cause seizures even among those people that
3 are at risk.

4 Okay. Let me make some concluding
5 remarks. I know you have a lot of other information
6 to get to. I am not in a hurry to leave, and I
7 would be happy to answer any questions tonight or
8 whenever.

9 There is a lot of poor quality work out
10 there on this topic and you really need to dig into
11 it if you are going to be an active reader on the
12 topic, but I'm delighted that Health Canada helps
13 anchor us to noise levels.

14 I should take a pause for a second because
15 I am not sure I qualified it. In Health Canada,
16 they were -- to remind you -- they were studying
17 wind turbines that actually existed and homes that
18 actually existed near them, and the sound levels
19 that people were exposed to were simply to sound
20 levels that actually existed. They didn't dial it
21 up and down to test. The highest sound level that
22 they tested in Health Canada was 46 dBA.

23 And so they didn't -- so, I want to
24 clarify. They weren't saying that after or higher

1 than 46 dBA is when health consequences would
2 happen. They made no -- they were silent on that
3 topic as am I, but they were -- they did demonstrate
4 that at 46 dBA there were no known health effects.

5 Now, that links us to what I'll call, for
6 lack of a better expression, a reasonable level that
7 we all can agree to, hopefully, or that I would
8 share as a professional opinion of reasonable level
9 that health effects would not take place, and I
10 think that links nicely here in Illinois to the
11 Illinois Pollution Control Board, which provides
12 thresholds in octave bands, and you'll hear about
13 that problem from, I think, their acoustic
14 specialist that set the threshold at or below the
15 same threshold as the Health Canada study.

16 So, at reasonable levels, there are no
17 known health effects. The Illinois Pollution
18 Control Board is at a reasonable level, so I think
19 you are in very good shape here in Illinois.

20 As I said, shadow flicker, just to
21 conclude, does not cause photosensitive epilepsy.

22 If I could just share two brief antidotes,
23 and then I'll stop. One is, coming back to those
24 independent medical evaluations that I had done some

1 years ago; one was in 2014 and another in 2019.

2 The first was a farmer, a machinist, in
3 his early 60s, and he had an imbalance, and it was
4 his understanding that the imbalance was due to the
5 turbine that was near him. It became a legal
6 matter. I don't know the details of it, but I was
7 asked to come and evaluate him and to provide my
8 perspective on his case.

9 In examining him, it was clear that his
10 imbalance was due to a very serious neuropathy that
11 he had in his feet. And, unfortunately, he had
12 issues with alcoholism and diabetes, which are two
13 known causes for neuropathy.

14 And from my perspective, it was a shame
15 that he was not aggressively pursuing his medical
16 care but instead, rather, was focusing on the
17 turbine, which he had, I believe, been misled to
18 think that there was a relationship between the
19 imbalance and the turbine that was near him, which
20 is a shame.

21 The second case is a gentleman in New York
22 who was in his thirties and felt that his sleep
23 problems were due to the turbine that was near him.

24 Again, I was able to speak with him. He

1 told me that he felt that it was due to the turbine
2 because he was trying to figure out what his sleep
3 problem -- what was causing his sleep problem, and
4 he had reached out to a gentleman named Jerry Punch
5 who provided him insight that the turbine that was
6 near him was causing his sleep problem.

7 In interviewing him, it was clear to me
8 that he has a completely different sleep disorder,
9 one that was quite treatable, and he had been living
10 with it for quite some time thinking that it was due
11 to the turbine that was nearby, and that was my
12 professional opinion and still is today.

13 And I think it's just another example of
14 someone living with a disorder that they didn't
15 necessarily need to, not pursuing their medical care
16 because of information that they were misled to
17 believe or think that they found in the internet or
18 among their community.

19 So, I guess that's a way to conclude that,
20 with Health Canada not showing health effects, with
21 shadow flicker not causing seizures, I think that
22 the conversation can be much more nuanced and much
23 more narrow, and I wish you all best of luck in your
24 process.

1 MR. KAINS: Thank you, Doctor.

2 Mr. Gershon, do you have any other
3 questions of Dr. Ellenbogen?

4 MR. GERSHON: No further questions at this
5 time.

6 MR. KAINS: Very good. Thank you.

7 Members of the Zoning Board of Appeals, at
8 this time do you have any questions of
9 Dr. Ellenbogen?

10 EXAMINATION

11 BY MR. CHAMBERS:

12 Q. I have a few questions.

13 Is this mic on?

14 I am a little bit newer to the process
15 here. I started in February, which was after the
16 zoning ordinance was already put together and then
17 came into the process when we started with the
18 shadow flicker, so that is when I started kind of
19 diving into some stuff, and actually I might
20 surprise you that I am not going to ask you anything
21 about shadow flicker because everything that I've
22 been able to find points to that not being an issue.

23 What I would like to ask you about is
24 infrasound, so low frequency noise. I agree with

1 you that there is a lot of bad research out there
2 that is kind of hard to read through, but I did put
3 together some notes from what I believe are some
4 decent sources that at least have been published or
5 come from someone who is an expert in the field. So
6 a few questions I have off of that is: There's some
7 literature I read that points to a tie between low
8 frequency noise and sleep disturbance or
9 specifically infrasound, which is defined as noise
10 at a frequency less than 20 hertz, that is
11 inaudible, of course, but can permeate structures
12 and cause disturbance to the inner ear and the way
13 that communicates with your brain while you are
14 sleeping.

15 Do you have -- so to put that into a
16 question form: What experience, what knowledge do
17 you have specifically on infrasound, disruption of
18 sleep in that, you know, 20 hertz range for
19 individuals within the radius where that infrasound
20 would be detectable?

21 **A. Great. Yeah. Thank you for that. That**
22 **is a great question and a really important one. Let**
23 **me walk through some important thoughts and get to**
24 **the conclusion.**

1 First, just to clarify for everyone,
2 infrasound -- it's called infra because it's below
3 sound. It's a vibration like any other vibration.
4 It's just the human ear is tuned to hear certain
5 frequencies and not others, and there are animals
6 that are tuned to hear those very low frequency
7 sounds. So, we typically hear between 20 hertz and
8 20,000 hertz give or take.

9 If the sound -- I just want to clarify.
10 It isn't that below 20 hertz you can't hear it; it's
11 that we are so tuned away from it that the energy
12 would have to be exceedingly high for you to hear it
13 or feel it, and by feel I mean when you are sitting
14 in the car next to or in the cab of a tractor
15 trailer, for example, when you kind of feel that
16 vibration in your chest, that is like a high-energy
17 infrasound or low-frequency sound, sometimes called
18 UC, which is on the lower range, and you can
19 sometimes feel it.

20 And you are right to say it isn't about
21 perception, but I want to first clarify that there
22 is the capacity to perceive. It's just the sound
23 levels have to be just really booming for you to
24 hear it at those low frequencies.

1 The frequencies that we know for the
2 threshold of hearing or, for that matter, tactile
3 sensation because you can feel vibrations not just
4 hear them. The threshold to hear or feel is way off
5 the charts above where the minor amount of
6 infrasound coming from wind turbines is in general.
7 So, just off the bat, it is imperceived.

8 So now we shift from a sensation of
9 vibration or the hearing of this sound to it's
10 getting into our body in some other way that is
11 imperceptible to causing problems.

12 There is some literature that very high
13 infrasound can cause problems. I have worked for
14 many years for the Department of Defense, and I can
15 tell you that an F-18 blowing by is no friend of --
16 you can really hear and you can feel it. It's
17 serious stuff. So, you work with rockets and so
18 forth, and there is heavy machinery at high
19 amplitude. That is not what is happening here with
20 wind turbines.

21 So we are at very low levels,
22 imperceptible and at very common everyday levels,
23 the refrigerator that is near, the ocean, when you
24 sit at the beach, that sort of thing.

1 Now, we could have a back and forth about
2 all of that, but I want to share something that is
3 really important and I want to bring it back to
4 Health Canada.

5 Health Canada was studying wind turbines
6 that were spinning and people living near them.
7 Now, the wind turbine produces a broad range. The
8 wind turbines you might have, if you choose to have
9 wind turbines, and the turbines that were in Canada
10 spinning and the 70,000 or so here in the United
11 States, they produce a sound spectrum. We don't
12 control -- and that has a property to it. Just like
13 I have a stature and gray and black hair and I am
14 about 6'1" and when I move all of me moves together
15 as a whole, the sound spectrum from wind turbines
16 carries forward a wide range of frequencies, the
17 audible range as well as the inaudible infrasound.

18 So, if infrasound from wind turbines were
19 to be causing health effects and perceptively so,
20 they were not revealed in Health Canada who studied
21 a very wide range of health effects.

22 So, the infrasound is there, and they
23 weren't having cardiovascular problems, headaches,
24 sleep loss, cortisol levels, high stress levels and

1 **so forth, so I feel very encouraged. It wasn't as**
2 **if Health Canada did this theoretical study on only**
3 **audible sound. They did a study on existing**
4 **turbines and existing people, so I feel very**
5 **reassured that infrasound is not -- from wind**
6 **turbines, is not a health risk.**

7 Q. Okay. The second part of that question
8 would be: So, the infrasound that would be
9 generated from the generator portion of, obviously,
10 not from the blades whipping through the air but
11 from the generator portion is usually described as
12 having kind of a pulsating pattern to it.

13 Some of what I was reading was attempting
14 to link that pattern of sound and the inner ear and
15 the imperceptible infrasound like we were talking
16 about to confusion and between the brain and the
17 inner ear during sleep.

18 Do you have any background, any knowledge
19 of specific sleep studies that talk about the actual
20 brain activity and sound relationship for sleep
21 disturbance and how that would relate with
22 infrasound?

23 **A. Yeah. Another good question.**

24 **The only experience that I have with that**

1 **are my patients who have had blast exposure in**
2 **combat, which is, you know, light years away from**
3 **what we are talking about.**

4 **Should infrasound from wind turbines,**
5 **which is exceeding low, cause some sort of a problem**
6 **in the inner ear or the brain or the connections to**
7 **them?**

8 **I would expect that to manifest in some**
9 **way, and it just hasn't. And I wouldn't -- at the**
10 **level that it exists at these reasonable levels, I**
11 **wouldn't expect it to cause a problem, and it hasn't**
12 **shown to have that problem.**

13 Q. Okay. Let me double check my notes here
14 and see if I had any other things here.

15 I did have this: You know, there is the
16 term that you referred to, wind turbine syndrome,
17 which would be a newer term that someone tried to
18 attach to this topic. Predating wind turbine
19 syndrome that monitored the research was already
20 there for what's referred to as noise annoyance or
21 vibroacoustic disease. I don't know if you are, but
22 I assume you are familiar with those terms as well.

23 **A. Yes.**

24 Q. What experience do you have with any of

1 those topics and past research there?

2 And is any of that related to
3 low-frequency noise research on the turbines like
4 the study, the Canada study, for example?

5 A. Right. So, from a wind turbine syndrome
6 perspective, I think we are in agreement that there
7 is no syndrome of wind turbine.

8 Q. Right.

9 A. But we certainly can just in general talk
10 about noise annoyance as a conversation and noise as
11 a general topic. I am not saying that isn't a
12 thing. What I am saying is there isn't an entity
13 called wind turbine syndrome. It was a very catchy
14 phrase, and it attempted -- if I were to be
15 generous, it attempted to encapsulate a lot of the
16 symptoms that people were having in that long list
17 and had to kind of put them all to one disorder.
18 That has been, fortunately, debunked, and so we can
19 really focus more on noise.

20 Vibroacoustic disease is another one of
21 those. It's the same lab in Europe that produced a
22 couple of papers. It was coined vibroacoustic
23 disease by the lead scientist, and that also has not
24 been become a vetted and accepted disorder. I

1 couldn't find it anywhere in the medical literature.
2 It was explored and not shown to be -- it did not
3 demonstrate itself to be a real thing.

4 There are probably many instances. I gave
5 a couple examples of blast exposures, say from an
6 IED, or working on the tarmac near an F-18, or some
7 of the rocket systems or working with high-capacity
8 blasts for which energy can be severe enough that it
9 can cause a lot of health problems, but I just --
10 because of that extreme, I just want to bring it
11 back to altitude zero here. That is not -- you are
12 nowhere near -- you are out of the stratosphere of
13 that level of concern, and so I don't want to
14 confuse those any more than I would want to confuse
15 driving a car on the highway at the speed of an
16 airplane because they are really night and day.

17 MR. CHAMBERS: No further questions.

18 MR. KAINS: Okay. Thank you,

19 Mr. Chambers.

20 Any other questions?

21 Mr. Harrington?

22 EXAMINATION

23 BY MR. HARRINGTON:

24 Q. Thank you for your presentation. I have a

1 couple questions in regards to it.

2 At one point there you mentioned -- and
3 correct me here if I am wrong, if I didn't get the
4 note right -- 5 to 10 hertz of frequency to trigger
5 some sort of shadow flicker issue; is that accurate?

6 **A. The Epilepsy Foundation puts out between 5**
7 **and 30. It's usually people usually test around 15**
8 **hertz.**

9 Q. So, that is what you are saying, the
10 bottom of this band is the 5 to 10 range, right?

11 **A. Yes, sir.**

12 Q. I think you followed that up with saying
13 it's approximately a 1 hertz shadow flicker created
14 by these proposed windmills; is that right?

15 **A. That is exactly right or a little bit**
16 **less, actually.**

17 Q. So, out of curiosity, what RPM are these
18 proposed ones at versus Health Canada or whatever
19 other studies were being compared to here?

20 **A. That's a good question, and I don't know**
21 **the answer to that, but I am confident that someone**
22 **in Apex can get back to you with that.**

23 Q. That is fine. That would be good to know.

24 **A. Yeah. I expect a wing tip would be pretty**

1 fast, but the over -- because they are large, the
2 important thing from my -- as an end user, looking
3 at shadow flicker, the important thing is that
4 however fast it's going its relationship to its size
5 is such that when it passes, the blade passes in
6 front of the sun, that that creates a flicker at a
7 less than 1 hertz event. That is the critical thing
8 I am paying attention to.

9 Q. That is your goal, right?

10 A. For this. You may have other questions
11 about shadow flicker for your own, but from the
12 seizure point of view that is a singular goal
13 because, once you are so far outside of the range of
14 flickering, it's not really, to the brain, it's not
15 really a flicker anymore.

16 Q. Uh-huh. Okay. I get that. But yeah, I
17 think that would be probably important to the
18 surrounding residents -- right? -- is to know what
19 speed these are and what that creates in relation to
20 these other reference points.

21 So, then I would have to think, in that
22 discussion, time of day, time of year, season
23 affects all of these, correct?

24 A. Definitely.

1 Q. Right.

2 **A. Cloudy conditions.**

3 Q. So, in regard to, like, Health Canada,
4 which is sort of your key reference point, do they
5 say this was in the fall or the spring or these
6 hours of the day or I mean --

7 **A. Yeah. That is a great question. They**
8 **were actually looking back retrospectively over**
9 **multiple years that the residents were there, so**
10 **it's kind of a long --**

11 Q. Culmination of days and times?

12 **A. Yeah. Exactly.**

13 Q. Okay.

14 **A. I just want to clarify: Health Canada**
15 **didn't look at seizures.**

16 Q. They didn't look at what?

17 **A. They didn't look at seizures.**

18 Q. No. I think we are just talking flicker
19 in general.

20 **A. Right.**

21 Q. Yeah. I am not focusing on seizures
22 alone.

23 **A. I understand.**

24 Q. So that is good to know, that it was

1 really an average of all that timeframe sort of
2 given there, right?

3 **A. Yeah.**

4 Q. So, I think you went on and then we talked
5 about, you know, that shadow flicker, and then we
6 were talking about the noise level, and we say the
7 Illinois Pollution Control Board mandates -- correct
8 me if I am wrong -- is it 45 is their mandate? Or
9 is that number off?

10 **A. Actually, they are a little bit different.**
11 **Their mandate is an octave band, and the acoustician**
12 **and their team are going to discuss that.**

13 **But what ends up happening as a result of**
14 **-- you can't exceed the limit in this band of**
15 **frequency and this band of frequency and this one,**
16 **and it just so happens that the pattern of the wind**
17 **turbine noise hits its ceiling before it meets the**
18 **limits on all of those bands, and so the average of**
19 **that comes to a 46 or maybe 45 dBA --**

20 Q. Okay.

21 **A. -- equivalent, which puts it right smack**
22 **on where the Health Canada can become a relevant**
23 **insight for you folks here in Illinois.**

24 Q. Okay. Okay. So you are saying it's, once

1 again, a sort of average of the bands there?

2 **A. For Health Canada it was an average of all**
3 **the bands within the audible range or the Illinois**
4 **Pollution Control Board that looked at individual**
5 **bands, but when you marry the two, meaning you take**
6 **the sound quality that turbine produces and put it**
7 **up against the Illinois Pollution Control Board's**
8 **limitations. The output is that you can't exceed 46**
9 **dBA, which is great for this conversation because it**
10 **makes it, unlike in other states or counties, it**
11 **makes it for easier conversation about health.**

12 Q. Okay. I hear ya. So I think Will brought
13 up some great topics there. I guess one thing that
14 maybe you said it and I didn't hear it and I want to
15 hear it again: So, what is the infrasound created
16 by the windmill?

17 **A. What is the level?**

18 Q. I think you said it's low, but is there a
19 number attached to it?

20 **A. There certainly is, and I do believe I**
21 **spoke to the acoustician here on the Apex team who**
22 **has a figure for you. I don't want to make up a**
23 **number. I have one that I am typically willing to**
24 **share, but I don't want to get it wrong.**

1 Q. They are going to testify at a later time,
2 so we'll let it go at that.

3 **A. It will be quite low.**

4 Q. I guess the point I am making is there is
5 infrasound?

6 **A. Definitely.**

7 Q. It is low, but there is some?

8 **A. That is a good point. I am not saying**
9 **there isn't infrasound. I am saying infrasound at**
10 **the level from the turbines produced here is not a**
11 **health concern, but there absolutely is going to be**
12 **some. Yes.**

13 Q. And I am sure that, you know, you can't
14 cite all the information out there, and I am not
15 trying to discredit Health Canada, but out of all of
16 them you showed a map of these other referenced wind
17 farms in the continental US. Are there any studies
18 closer to the Midwest to reference our seasonality?

19 **A. From a health point of view?**

20 Q. Just in general. I mean health or other
21 citations but, obviously, yours is going to be focused
22 on health.

23 **A. Believe it or not, there aren't that many**
24 **studies on health and wind. There are some. Many**

1 of them are exceedingly poor-quality and nothing
2 that would be worthy of discussing here, off the top
3 of my head. I don't think any of them were done in
4 the Midwest, but I could check that and get back to
5 you on that.

6 Q. I guess I would just be curious. Right?
7 Because if you were going to have one of these next
8 to your house, you would say, well, I would want to
9 have a comparison similar to my situation.

10 A. Absolutely, but I want to reassure you one
11 thing, which is, no matter -- because Health
12 Canada's main focus is the noise piece, that whether
13 the turbine is, you know, to my northwest or to my
14 southeast, the sound that they were looking at is at
15 the home.

16 Q. Uh-huh.

17 A. And so, to the extent that the level of
18 noise at the home does or doesn't influence health,
19 I think it does have good, what they would call in
20 nerd speaking, generalized ability. It does extend
21 -- in that respect, it extends to the Midwest or
22 really anywhere.

23 Shadow flicker, maybe you could argue
24 whether it's different or not because they are in a

1 **different part of the hemisphere.**

2 **But noise, it really should generalize --**
3 **Health Canada should be on point for you folks even**
4 **with different turbines in different locations.**

5 Q. Okay. I hear ya.

6 So, this may or may not be a question for
7 you, but I think it's the right time to bring it up.

8 As part of our wind ordinance here, some
9 of the language we stated was "shall appropriately
10 demonstrate compliance." And I guess my question
11 would be: How is that being administrated by
12 yourself or Apex or whoever is going to
13 appropriately demonstrate compliance?

14 **A. You are right. That is not my lane, but**
15 **it is a good question, and I look forward to hearing**
16 **the question myself.**

17 Q. I'll let it go.

18 In addition to that, we also have language
19 following that, which, obviously, you would have to
20 hear the first names, but we also say: With the
21 conditions at homes and families that are affected
22 by wind turbine noise levels are given due
23 consideration as it relates to the health and
24 enjoyment of those individuals, so I guess maybe

1 could you, as a professional, as a key witness,
2 maybe give an example to us of how you would measure
3 that or what you would use as a metric? Maybe it's
4 not the answer you want to give yet. I don't know.

5 **A. Would you mind reading that again? I only**
6 **caught the tail end of that.**

7 Q. So let me start here at the beginning. It
8 says: Noise levels from each wind WECS or WECS
9 project shall be in compliance with applicable
10 Illinois Pollution Control Board (IPCB) regulations.
11 Applicant, through the use of qualified professional
12 -- use of a qualified professional as part of the
13 special use application process shall appropriately
14 demonstrate compliance with the above noise
15 requirements with the condition that homes and
16 families that are affected by wind turbine noise
17 levels are given due consideration as it relates to
18 the health and enjoyment of those individuals.

19 A lot to say, right?

20 **A. I understand it now.**

21 Q. The key concern here particularly for us
22 is we are saying to the community we are giving
23 those people due consider. It's my job to say: How
24 are we administering that? How are we making good

1 on that?

2 **A. I am going to give the same answer: I**
3 **look forward to the answer to that question too. I**
4 **don't know. I am not the compliance guy.**

5 MR. HARRINGTON: Thanks so much.

6 MR. KAINS: All right. Thank you,
7 Mr. Harrington.

8 Any other questions for Dr. Ellenbogen
9 from members of the board?

10 FURTHER EXAMINATION

11 BY MR. CHAMBERS:

12 Q. I have one more. This may be out of your
13 field, but I think now would be the time to ask it.
14 I don't know if it would fit in anywhere else.

15 You talked a little bit about noise
16 annoyance, and then this kind of moves from the
17 purely medical field, the health effects field, into
18 maybe some psychology a little bit to where you say
19 you have someone who's annoyed, and that becomes
20 more of, you know, a counselor type thing, the
21 psychology end of it. But someone who has
22 experienced a high amount of stress or annoyance
23 about something in this case, say the wind turbine
24 shadow flicker, just the fact that they are there in

1 general, that, you know, that stress, you know,
2 there is plenty of medical documentation to support
3 the idea that prolonged stress, long periods of
4 stress equals adverse health effects on individuals.

5 Do you have any -- have any of your
6 research or any of your sectors you are familiar
7 with overlapped with those types of things with the
8 health effects, the annoyance factor, if you will?

9 **A. Yes, sir. I like that question. I had**
10 **the same question myself. So the key thing that,**
11 **(1) we should know is that there is a -- just to**
12 **rehash what I am hearing you say is that annoyance**
13 **is on, for lack of a better way to put it, the**
14 **causal pathway to bad health, meaning I get annoyed**
15 **and it causes me stress, stress leads to elevations**
16 **in body cortisol levels and so forth, and that leads**
17 **to bad health outcomes, and that is a theoretical**
18 **concern.**

19 And so, I looked back on it, specifically
20 looking at stress. So Health Canada was looking at
21 it, and the way that they phrase the question, I
22 think the quote was: Does looking at the past
23 year -- how much does this noise from the wind
24 turbine bother or annoy you?

1 **And in some ways, you could think of it as**
2 **whether you like the turbine or not. I am not**
3 **discounting annoyance when I say it's not a health**
4 **thing.**

5 **I mean to say that, to your point, it goes**
6 **way into the range of things well outside of health.**
7 **It may annoy me that my neighbor has a dog or a pink**
8 **house.**

9 Q. Yeah. For us, part of our idea here is
10 the zoning factors talk a lot about enjoyment of
11 property, you know, the neighborly considerations of
12 something like there where you are talking about the
13 surrounding landowners and their enjoyment of
14 property which will, obviously, have differing
15 perspectives on that based on in favor or not in
16 favor of the project. So, that's part of the
17 reasoning behind the question there.

18 **A. Understood, and I am probably not the**
19 **person to ask about enjoyment of property and that**
20 **sort of thing. There may be others.**

21 **But from the health point of view, if I**
22 **could zero in for a moment and then also talk about**
23 **annoyance in the Health Canada because they did show**
24 **an increase. At the higher noise level, there was**

1 more annoyance. I think the number was something
2 like 13.9 percent of people at 46 dBA reported that
3 the noise was highly bothering them.

4 Now, Health Canada dug into that, and one
5 of the things that you need to know about that is --
6 and this is so important -- the annoyance that
7 people experienced was due to a long number of
8 factors. When they modeled it out in a couple of
9 different ways, one of the ones that came out on top
10 as causing the annoyance was concern for personal
11 safety or health.

12 Q. Right.

13 A. So that's why I bought up those individual
14 medical examinations because there is -- if you
15 Google wind turbine noise, wow, what pops up, you
16 know, I would think that I am in serious jeopardy,
17 and now, when I hear that noise, I am reminded of my
18 personal safety and concern and now it's really
19 bugging me.

20 So, there is an element -- so in one of
21 the models that they looked at, it was like you're
22 14 times more likely to express annoyance if you
23 think that turbines are going to cause a problem for
24 physical health or safety.

1 And so, I think, when someone has the
2 wrong information but the right intent of how to use
3 that, I can understand why that would become
4 annoying.

5 And so very little -- some of the
6 annoyance had to do with blinking lights. Some
7 people just plain don't like the look of them. So,
8 there was kind of a long list of things that went
9 into it.

10 One of the things from the health point of
11 view, because it's sort of entering outside of the
12 health point of view, but the health point of view
13 among the people that were annoyed, you might think
14 they had more stress, but when the folks in Health
15 Canada measured heart cortisol levels, even just
16 looking at people with an annoyance, it did not have
17 an increase in stress factors.

18 So, I think this was really mostly a story
19 of people who had a fixed false belief about the
20 health or just didn't like them, and it annoyed them
21 and it bothered them.

22 And that is a real thing. I don't mean to
23 dismiss that, but it did not amount or rise up to
24 the amount of the health problem.

1 MR. CHAMBERS: Thank you.

2 MR. KAINS: Thank you, Mr. Chambers.

3 Any other questions from the members of
4 the zoning board?

5 Questions for Dr. Ellenbogen from members
6 of units of local government, including school
7 districts?

8 Any questions for the doctor from those
9 folks?

10 Then Mr. Luetkehans?

11 EXAMINATION

12 BY MR. LUETKEHANS:

13 Q. Nice to see you again. How many times
14 have you testified for wind companies in Illinois in
15 the last year?

16 **A. I believe twice.**

17 Q. For whom? Which company? What counties?

18 **A. Oh, it was Tazwell County, and the other
19 hearing was here, and I don't remember --**

20 MR. GERSHON: I am not trying to give an
21 answer, but since I am aware of it, I believe your
22 other hearing was in Livingston County, and the
23 testimony here occurred I believe as part of a text
24 amendment which was a couple of years ago.

1 MR. KAINS: Thank you for the
2 clarification, but we are going to let the doctor
3 testify.

4 MR. LUETKEHANS: Yeah.

5 MR. GERSHON: I am sorry. Correction.
6 Did you not -- you were there to answer questions
7 but did not testify?

8 THE WITNESS: That is correct.

9 MR. KAINS: Thank you for the
10 clarification.

11 Now, Mr. Luetkehans, your cross?

12 BY MR. LUETKEHANS:

13 Q. Thank you. Here you are testifying on
14 behalf of Apex, correct?

15 **A. I was asked by Apex to come here tonight,**
16 **yes.**

17 Q. And in Tazwell County you were asked to
18 come on behalf of New Energy, correct?

19 **A. I believe so. Yes.**

20 Q. How many times throughout or have you
21 testified in counties or cities on behalf of wind
22 companies this year throughout the country?

23 **A. Approximately six.**

24 Q. Okay. Let's talk about the Health Canada

1 study for a couple of minutes. In that study, the
2 levels of noise were based on modeling, correct?
3 Not actually measured; is that correct?

4 **A. They did do some measurements to confirm**
5 **their modeling, but the main study was done through**
6 **modeling. That is correct.**

7 Q. And people under 18 who had abandoned
8 their homes were excluded from the study, correct?

9 **A. I don't know anything about abandoning**
10 **homes, but the study was looking at people 18 to 79.**

11 Q. Okay. So people below 18 and people above
12 79 were excluded, correct?

13 **A. Correct.**

14 Q. Do you recall that the authors themselves
15 indicated that, "Results may not be generalized to
16 areas beyond the sample at the turbine locations in
17 the study and were not randomly selected from all
18 possible sites operating in Canada." Do you recall
19 that statement?

20 **A. I do.**

21 Q. They also said -- did they not? -- that
22 the "Results do not permit any conclusions about
23 causality," correct?

24 **A. I don't remember that, but it wouldn't**

1 **surprise me.**

2 Q. Did you also recall them saying, "Results
3 should be considered in the content of all
4 published, peer-reviewed literature on the subject"?
5 Do you recall that?

6 **A. I don't recall that, but it sounds**
7 **reasonable.**

8 Q. You have no reason to doubt those are
9 actually statements that those authors have made,
10 correct?

11 **A. Correct.**

12 Q. The raw data of the Health Canada study
13 has not been available to other researchers who have
14 requested them, has it?

15 **A. I believe it's public data.**

16 Q. The raw data. To your knowledge, has the
17 raw data been made available to other researchers?

18 **A. It was my understanding it was public**
19 **data. I would be happy to look into -- what do you**
20 **mean by raw? Versus what?**

21 Q. The underlying data. The actual
22 underlying data. The raw data that goes into the
23 report.

24 **A. I would be happy to check on that for you.**

1 **I am pretty sure they made it publicly available,**
2 **and I can get back to you on that.**

3 Q. That's okay. We'll have someone testify
4 on that.

5 The Health Canada study as it related to
6 cortisol has been criticized -- has it not? -- for
7 excluding or discarding hair that the cortisol
8 levels were unusually high. Do you recall that?

9 **A. I do not.**

10 Q. Okay. You're a sleep medicine specialist;
11 is that correct?

12 **A. Correct.**

13 Q. And as a asleep medicine specialist, would
14 you agree that sleep is essential for the
15 restoration and health of a person's wellbeing?

16 **A. Yes.**

17 Q. In fact, disruptive sleep is known to be
18 associated with several health ailments, correct?

19 **A. Could you define disruptive sleep? There**
20 **are several forms of disruptions, some are more**
21 **worrisome than others.**

22 Q. Well, let's deal with the worrisome ones.
23 What are those?

24 **A. I think the most worrisome probably is**

1 **severe sleep apnea where someone has disrupted sleep**
2 **in combination with the inability to respirate or**
3 **oxygenate.**

4 Q. How about other obstructive sleep?

5 A. **There is a textbook, a long number of**
6 **them.**

7 Q. But certainly, those disruptive sleeps
8 have been known to be associated with hypertension,
9 correct?

10 A. **The best-known literature on that is with**
11 **sleep apnea.**

12 Q. But it is true -- is it not? -- that the
13 disruptive sleep is known to be associated with
14 health ailments such as hypertension?

15 A. **I think you are asking a very broad**
16 **question. You can have disrupted sleep from**
17 **restless leg syndrome. I am not aware of any**
18 **relationship to hypertension. There is disruptive**
19 **sleep from circadian misalignment. I am not aware**
20 **of a relation to hypertension. If you could ask**
21 **something more specific, I could be --**

22 Q. Well, here. I have asked the question
23 before: Do you recall being asked these questions
24 and giving these answers back in Livingston County

1 in December of 2014:

2 In fact, disruptive sleep is known to be
3 associated with several health elements, correct?

4 ANSWER: Yes.

5 QUESTION: It's known to be associated
6 with hypertension, correct?

7 ANSWER: Yes.

8 QUESTION: It's known to be associated
9 with cardiovascular and coronary disease, correct?

10 ANSWER: Certain kinds of sleep problems,
11 yes.

12 Do you recall being asked those questions
13 and giving those answers?

14 **A. Because I recall that conversation, I am**
15 **now more aware of how you could over generalize, and**
16 **I am trying to answer the question as it should be**
17 **answered.**

18 Q. Right now I am just asking: Do you recall
19 being asked those questions and giving those
20 answers? That is the question before you.

21 **A. I do recall you asking those questions,**
22 **and I am giving you my answer now which is more**
23 **nuanced, and I stand by what I said then and now.**
24 **This is exactly what I mean now. I haven't changed**

1 **my position.**

2 Q. Disruptive sleep is also known to be
3 associated with elevated stress hormones, correct?

4 **A. It can be.**

5 Q. It's also known to be associated with
6 attention and memory deficits, correct?

7 **A. That is complicated.**

8 Q. But it can be known to be associated with
9 those type of deficits, correct?

10 **A. Depending on the circumstances, yes.**

11 Q. And it can also be known to be associated
12 with depressed moods, correct?

13 **A. "It" meaning what?**

14 Q. Disruptive sleep.

15 **A. You know, I am trying to be reasonable**
16 **with you, but if I were to ask you a question about**
17 **breaking the law causing a problem to you lawyers,**
18 **you would say I am aware there is a whole lot of**
19 **things that happen to get to that outcome.**

20 **I think I need -- I really -- I am not**
21 **trying to get around your answer. I could use a**
22 **more specific question.**

23 Q. Okay. Chronic frequent disruption or
24 prolonged disruption can cause depressed moods,

1 correct?

2 **A. Again, it's complicated. Can it? Yes.**

3 Q. Thank you.

4 **A. Can it also not? Yes.**

5 Q. Here: I can drive over the speed limit or
6 I can drive under the speed limit, as Mr. Kanis
7 mentioned to us earlier tonight.

8 In fact, sleep loss causes profound
9 impairments and cognitive behavioral performance,
10 correct?

11 **A. For the most part, that is incorrect; but**
12 **it can be in extreme situations, which we are**
13 **certainly not talking about today.**

14 Q. As a doctor, I assume one of your general
15 goals is to promote the wellbeing of your patients,
16 correct?

17 **A. Yes, with the stipulation that my role is,**
18 **within the lane of that role, is primarily through**
19 **health.**

20 Q. And as a sleep medicine specialist your
21 focus is trying to help your patients improve their
22 sleep, correct?

23 **A. Definitely.**

24 Q. And that is because you know that the loss

1 of sleep or poor sleep can have profound impairments
2 on people's health and their cognitive abilities,
3 correct?

4 **A. Depending on the circumstances, yes.**

5 Q. The Massachusetts panel that you talked
6 about that got you started on this, one of their
7 conclusions was that it was possible that noise from
8 some wind turbines can cause sleep disruption; is
9 that correct?

10 **A. Yes. I would add a clause that that was a**
11 **comment that was made in 2012. Health Canada came**
12 **out since then, and that has allowed me to**
13 **understand that the sleep consequences from wind**
14 **turbines are not in reasonable conditions. We now**
15 **have data to support that under 46 dBA would not be**
16 **expected to disrupt sleep.**

17 Q. We have no data on 47 dBA, do we?

18 **A. Health Canada is silent on that because**
19 **they didn't have data to support. They didn't have**
20 **data at all to support or refute that.**

21 Q. Or 48 dBA, they had no data one way or
22 another, correct?

23 **A. Correct.**

24 Q. And all of the Health Canada, as we said,

1 or a large majority of the Health Canada study was
2 based on modeling, not actual measurements, correct?

3 **A. Correct.**

4 Q. Would you agree that any noise during any
5 form of sleep, night, nap or day can disturb sleep
6 if it's of the correct pressure and characteristics?

7 **A. Yes.**

8 MR. LUETKEHANS: Nothing further.

9 MR. KAINS: Thank you, Mr. Luetkehans.

10 Questions from interested parties who are
11 represented by licensed attorneys?

12 Any other attorneys with questions for
13 Dr. Ellenbogen?

14 All right. Now questions from interested
15 parties, members of the public who are either
16 opposed to the application or neutral on the
17 application?

18 Yes, ma'am. Would you please step
19 forward?

20 And I know you spoke or had questions last
21 night, but I have forgotten your name. If you
22 could, please your state first and last names and
23 spell them for the record.

24

EXAMINATION

1 BY MS. CLAUDIA COIL:

2 Q. Claudia Coil. C-l-a-u-d-i-a C-o-i-l.

3 Going back to the Canadian study, I have
4 also read that independent researchers, however,
5 have found limitations in this study. They
6 recommend the results should not be -- which should
7 be considered with caution and not generalized
8 beyond the sample taken from Canada.

9 And then I had some other concerns. The
10 concern is with adults, anyway, is always the
11 long-term effect of whether it's the ultrasound and
12 the noise levels.

13 Most examples that are cited are, you
14 know, even in battle, it's, you know, a one-time
15 explosion, not that that is not serious.

16 But it's the constant production of
17 infrasound or, you know, noise that has the
18 cumulative effect on the human body.

19 Would you say that there are no definitive
20 long-term studies that say that wind turbines do not
21 cause health issues? Definitive?

22 **A. Yes, ma'am. Thank you for that question.**
23 **For just clarification, because I probably didn't**
24 **represent my experience with the defense department**

1 **well: Many of these people are having blast**
2 **exposure from shooting heavy machine guns and heavy**
3 **artillery that is repeated and repeated. I do**
4 **appreciate what you mean when you say that because I**
5 **think that matters.**

6 Q. So, they have experienced issues from
7 repeated --

8 **A. Absolutely. Yes.**

9 Q. So, would you say that, if I am living
10 near a turbine and I am constantly being exposed to
11 ultrasound and noise, that I can have a long-term
12 effect?

13 **A. Well, two things: 1.) Whereas blast is**
14 **very high energy --**

15 Q. Right, but I am just asking --

16 **A. I know. Pardon me. I am just giving some**
17 **context. I didn't want to compare the two where the**
18 **comparison would not be --**

19 **The noise from the wind turbines below 46**
20 **dBA, they are exceedingly low numbers of infrasound**
21 **are just that, number 1.**

22 **And number 2, Health Canada was a**
23 **long-term study.**

24 Q. Okay. How many years was it?

1 **A. Well, they conducted the study over a**
2 **two-year period examining people who live there, so**
3 **many of the people they were looking at --**

4 Q. But I may be living by these turbines for
5 10 years, 20 years, 30 years. So no study has been
6 extended that long?

7 **A. No, ma'am. No study has done that.**

8 Q. Okay. Would you agree that some people
9 are more susceptible than others, in a population,
10 more susceptible to disease to be affected by sound?

11 You know, it's unlikely that everyone in
12 Northern Piatt County is going to have some effect,
13 health effect, from turbines.

14 But would you say that, you know, in a
15 normal population some people are just more
16 susceptible, and not in a psychological way, that
17 their bodies are, you know, they have decreased
18 immune systems, or they have, you know, the
19 conditions that they were born with? You know what
20 I mean? Would you say that that is true?

21 **A. I would say that it's true that there is a**
22 **lot of individual variable diseases. I think there**
23 **is also probably some individual variability with**
24 **sound and what people are bothered by. Yes.**

1 Q. Okay. Now, another concern is pediatrics.
2 The study here covered 18 to 7. Dr. Chan was a
3 pediatric cardiologist in the Carle system. He has
4 often stated children are not small adults.

5 So, what long-term effects or studies or
6 definitive studies have been done on children whose
7 bodies are still developing and cells are still
8 growing and what number of studies have been done
9 invitro, you know, for a fetus that is growing from
10 these things?

11 A. Okay. Those are very interesting
12 questions. There are no studies, to my knowledge,
13 on children or on in utero life.

14 And if I could add to that some flavor of
15 perspective, I agree that children are not small
16 adults, and I share your intuition that the
17 development is a part of that process that makes
18 them unique, and I think actually at each and every
19 step a teenager is not -- a preschooler and so forth
20 is quite different.

21 Q. Right.

22 A. So, it is a shame that Health Canada did
23 not look below 18. They did not, so they are silent
24 on the topic of kids.

1 Q. That is a shame nobody has studied this.

2 A. It is. Yeah. With the slight caveat --
3 well, let's take sleep for example. Generally
4 speaking, kids sleep deeper and more sound than
5 adults. So, if the sounds are not bothering an
6 adult, I don't have a strong intuition but that the
7 children would be susceptible. I could imagine an
8 individual who was unusually susceptible to noise or
9 something.

10 Q. Well, Bill Mulvaney was a superintendent
11 of schools for Armstrong Township, and I believe
12 he's retiring or has retired this year. He was a
13 proponent of the wind turbine project in his area
14 because of the money it could bring into the school
15 system.

16 And what he ended up finding, you know, he
17 might still appreciate some financial benefit for it
18 from his school, but he did write to the board at
19 one point that he had --

20 (PAUSE TO FIX AUDIO ISSUES.)

21 MR. KAINS: Back on the record.

22 Ms. Coil, you may resume your questioning
23 on Bill Mulvaney.

24 BY MS. COIL:

1 Q. So, he wrote, after the wind turbine
2 project had been developed and was working, that
3 what he was noticing in his school was that the
4 children were having headaches, lack of sleep, jaw
5 issues, and they were unable -- they were
6 verbalizing they were unable to sleep because of
7 noise.

8 And then another person, too, Renée
9 Taylor, in McLean County, her children all
10 experienced certain side effects, headaches,
11 irritability, lack of sleep.

12 And an autistic child who had a very --
13 was very sensitive to stimuli, in a normal situation
14 was extremely affected by the turbines.

15 MR. GERSHON: I am sorry, Scott. We are
16 getting a lot of hearsay and it's either a question
17 -- I haven't heard a question yet. I absolutely
18 believe in the right for this person to come to
19 testify, but I don't know if we can respond to
20 hearsay, and we haven't responded to any question.

21 MR. KAINS: Hold on, ma'am.

22 This is a public hearing, and we are going
23 to allow hearsay testimony. This report Health
24 Canada could be considered and will be considered by

1 this board.

2 Okay. But, ma'am, I think the point
3 Mr. Gershon is wanting to make, and I am agreeing,
4 you may make a prefatory statement before asking a
5 question but let's do the questions. I appreciate
6 you, though. Thank you.

7 BY MS. COIL:

8 Q. Now, we can provide the letter from
9 Mr. Mulvaney, if that is of help.

10 Going back to an autistic child. Well,
11 let's not even discuss this one.

12 What would you say of autistic children
13 who are far more sensitive to stimuli?

14 **A. Yeah. I have a couple of thoughts. The**
15 **first, I just want to clarify you were talking about**
16 **proponents. I'm not a proponent of anything. It**
17 **makes no difference to me what you guys decide to do**
18 **or have or do not have turbines. I am just here**
19 **talking about answering some questions of the**
20 **science and providing some perspective and giving**
21 **antidotes, if I may.**

22 **These antidotes that you are describing of**
23 **individual people having individual problems is**
24 **precisely the thing that I run into regularly where**

1 someone, instead of seeing a specialist or a care
2 provider to address the specific question and to
3 discover the underlying problem, because kids have
4 sleep problems, kids have bronchial problems, they
5 have enlarged tonsils that lead to sleep apnea.
6 Those are all treatable problems, and to assume that
7 it's the wind turbine nearby I think would be a very
8 big mistake. I have seen it over and over again
9 where someone makes that somewhat reasonable leap of
10 faith based on the minimal information that they
11 have only to discover that the much more compelling
12 feature is something completely unrelated, as it
13 should be. This is not very loud. Forty-six,
14 you'll hear, but it's going to be quiet. I mean we
15 are talking like a library speech level quiet, so
16 this is not a rocket ship blasting off. This is
17 something really within reasonable limits, I guess.

18 With regard to autism, I think it is a
19 very long question and a very short -- a long answer
20 and short answer, and the short answer is no one has
21 studied autism with wind turbines, and I wish they
22 did because that would help me to answer your
23 question.

24 Q. Okay.

1 **A. For some perspective on it, I don't think**
2 **people know what -- some autistic kids may really**
3 **like them. So, I don't know, but I don't have a**
4 **terribly strong intuition that a wind turbine is**
5 **going to cause disruption to autistic children.**

6 **Q. Okay. The World Health Organization had**
7 **recommended that the dBA be less than 30 to protect**
8 **children's health and that they also -- at night, in**
9 **the evening.**

10 **So, I don't look at the World Health**
11 **Organization as very stringent on a lot of health**
12 **issues, but why would they come up with that?**

13 **A. That's a great question. I actually share**
14 **it. I am really concerned about the World Health**
15 **Organization and their inability to weigh in**
16 **properly on this particular issue.**

17 **I am aware of Lden 45 that they**
18 **recommended. I am not aware of a 30.**

19 **If you have some document you would like**
20 **me to look at, I would be happy to.**

21 **What I want to just be really clear on is**
22 **the World Health Organization has made some**
23 **publications over the years about nighttime noise.**
24 **They, finally, in 2018, produced a document that**

1 included wind turbines specifically and they, in
2 their publication, left out incorporating any
3 element of Health Canada into their study. They
4 said -- in the document, they said they ran out of
5 time to incorporate that data, which is really
6 striking. At any rate, I think they have a serious
7 lack of rigger or credibility on the subject.

8 Q. So, just in ending, I guess my big concern
9 is for children, with the lack of study for them,
10 and invitro. That is a big concern.

11 Lastly, I am afraid that too much is going
12 to be attributed from wind to psychosomatic disease.
13 You know, health care is quick to jump to that.

14 If there is not something that can
15 actually be, you know, tested, you know, or
16 measured, and I hope that that is not the future of
17 wind.

18 MR. KAINS: Thank you. Thank you,
19 Ms. Coil.

20 Before we have any further questions of
21 the doctor, we are going to take a recess. It is
22 7:42. We will be in recess for 13 minutes, until
23 7:55. Thank you.

24 (BREAK TAKEN.)

1 MR. KAINS: Take your seats, please.

2 Folks, just a reminder, when you are
3 conducting questions of the witness, at this point
4 we are just asking that you stick to asking
5 questions. I know it's tempting to start telling
6 your side on a particular point, but you can ask
7 questions. You can state a remark that leads to a
8 question but, you know, you will be allowed to
9 testify when it's your turn.

10 And about testifying, it came up in a
11 question last night that you -- the question was:
12 When is the public comment period? And I simply
13 stated that, when you sign in to testify, that is
14 your time to say whatever it is you want on the
15 subject whether you are in favor or whether you're
16 opposed or whether you are neutral. That is your
17 time to say whatever you want to say on the subject,
18 with the caveat that you may be questioned by other
19 people on the opposite side, but that's part of this
20 process.

21 At the public hearing, we want everyone to
22 be able to testify. I note from the sign-in sheets
23 from last night that a number of people crossed
24 their name off, and that is your right. You can

1 testify or not testify. That is your right, but I
2 don't want anyone to feel like they're shut out from
3 testifying or making a comment about how they feel
4 on this issue.

5 I do know, from previous experience with
6 these attorneys, their questioning of, dare I say,
7 civilian witnesses/non-expert witnesses, regular
8 folk, and they aren't going to beat you up, okay?
9 And I am going to make sure of that. They will be
10 able to ask you questions, however, and your friends
11 and neighbors on the opposite side can ask you
12 questions.

13 In Mason County a few years ago, I had
14 cousins, one testifying and the other asking
15 questions on cross examination, and they were on
16 opposite sides of the issue, and it's two weeks
17 before Thanksgiving. One of the zoning board
18 members asked one of them, So are you all getting
19 together at the same table for Thanksgiving? And
20 the answer, of course, is yes. All right.

21 But I want to make sure that, if anyone
22 wants to say their peace, that they do so. And they
23 can sign in. There are sign-in sheets still back
24 there.

1 Ms. Gallagher, we will take it up after
2 the meeting if you have a question for me.

3 MS. GALLAGHER: No. I just want to
4 comment that some of the confusion that I had was
5 that the three sheets, it's very tiny print.

6 MR. KAINS: Okay.

7 MS. GALLAGHER: So, it was unclear what
8 they were.

9 MR. KAINS: That is Kayla Gallagher. You
10 probably know her better than a lot of the people.

11 That was just a concern of mine. I saw a
12 number of sign-in sheets with the names crossed out,
13 and that concerned me. Okay.

14 But I want to just let you folks know that
15 there will be a time for you testify and say your
16 comments, and so the testimony and public comment
17 will come, and so you get to stand up and say your
18 peace once, but you would be subject to people for
19 questioning on the opposite side of the issue.

20 Like I said, I've conducted hearings as a
21 hearing officer with Mr. Gershon and Mr. Jacoby on a
22 petition or an application, and I've had two
23 hearings with Mr. Luetkehans representing opposition
24 groups. They are not going to beat you up, okay?

1 So, feel free, if you haven't already, to
2 go and hit up one of those sign-in sheets. But,
3 yeah, make sure it's the one that is in either
4 opposition or in support of or neutral, okay?

5 But just a reminder: When you are asking
6 questions of witnesses, just stick to the questions,
7 all right?

8 Okay. Thank you.

9 And with that, Doctor, you are still on
10 the stand. And just a reminder: You are still
11 under oath. Do you understand that?

12 THE WITNESS: Yes.

13 MR. KAINS: Very good. Are there any
14 other questions from members of the audience?

15 Okay. And you have to be opposed or
16 neutral to his position.

17 This lady right here in the blue, you may
18 come up, and then this lady, and then I know
19 Ms. Vetter is back there.

20 All right. Could you please state your
21 name, spelling your first and last name for the
22 record?

23 EXAMINATION

24 BY MEG MINER:

1 Q. Meg Miner. M-e-g M-i-n-e-r, and I am
2 still neutral.

3 My question for the doctor actually is
4 related to what you have said a number of times now
5 about your experience with people who have
6 experienced combat-related or
7 prolonged-exposure-related problems in the
8 Department of Defense, and I am curious now what you
9 might have to say about prolonged exposure of people
10 who have existing hearing problems to these low
11 levels of noises that we are talking about here and
12 if there is anything that you have to contribute to
13 that because I know there are a number of veterans
14 in Piatt County, and I know of at least one that has
15 long-term exposure and hearing loss from noise.

16 **A. Understood, ma'am. That is a really**
17 **interesting, unique question. I would like to**
18 **clarify that the main signal that we have that is of**
19 **concern is the noise, the perception of the noise**
20 **and how that influences my experience of it, whether**
21 **it wakes me up or whether it gets my heart going or**
22 **something like that.**

23 **Someone who had hearing loss would be far**
24 **less likely to experience the turbine's presence.**

1 And I want to clarify for the veterans,
2 which has nothing to do with this, but their hearing
3 loss is a little bit different because sometimes,
4 depending on the cause of their loss, it may not be
5 broad spectrum, it may have low notch, which is
6 certain frequencies due to repetitive blasts were a
7 .50 caliber machine gun or something like that that
8 might change the composition of their hearing, but
9 in all cases it would be a reduction and you would
10 be less likely to hear the turbines.

11 Q. And that would be a similar assessment for
12 people with tinnitus, too?

13 A. Well, first of all, Health Canada did look
14 at -- the turbines don't cause tinnitus. But to the
15 extent that one has tinnitus, I have no reason to
16 believe it should not, it would not make that worse.
17 The tinnitus is mostly from noise-induced hearing
18 loss, although there are other causes and that would
19 be the same situation. They would have a hearing
20 loss. They would be less apt to hearing the
21 turbine. They would be hearing the tinnitus, which
22 may be annoying to them, but it wouldn't have
23 anything to do with the turbine.

24 Q. Thank you.

1 **A. Welcome .**

2 MR. KAINS: Thank you, Ms. Miner.

3 All right. This lady here -- and remind
4 me -- let's let you get to the microphone.

5 Again, please state your name, your first
6 and last name, and spell it, first and last name.

7 EXAMINATION

8 BY ANNETTE WARSAW:

9 Q. Yes. Annette Warsaw. A-n-n-e-t-t-e
10 W-a-r-s-a-w.

11 I had a question -- sorry -- I had a
12 question in reference to the study, the Canada
13 study. And maybe you mentioned it and I missed it,
14 so excuse me if I did.

15 In part of that study, you talked about
16 how long was the study -- how long were those people
17 followed?

18 **A. The study was conducted over the course of
19 2012 to 2014.**

20 Q. Okay.

21 **A. And depends on what they are asked. Some
22 of them were survey questions that are just now, so
23 they didn't keep asking that same survey question,
24 but it was usually about the previous year, thinking**

1 **sort of an evaluation of the last year.**

2 Q. Okay. And then he had asked you a
3 question and I would like to clarify, and it
4 referenced a modeling, not measurements.

5 So, for those that know a little bit but
6 not a lot about studies and surveys, could you just
7 give -- and this isn't, obviously, in your expertise
8 but just kind of a layman's terms explanation of
9 what that means?

10 A. Yes. Thank you. I appreciate the
11 opportunity to clarify that. And mostly I am going
12 to let the acousticians speak to the level of
13 detail, but I do just want to give you that
14 50,000-foot perspective.

15 Q. Sure.

16 A. They did not, could not, it was not
17 feasible to put a microphone at 1200 people's
18 houses. People don't want it, for their privacy.
19 It would be a decade evaluating all of that data.
20 It would be a mammoth undertaking.

21 So what they did was they validated their
22 modeling process by doing some measurements, and
23 they demonstrated that their model accurately
24 depicts the sound that is measured, and then they

1 were able to take that model -- so, in other words,
2 what they would do is say, okay, the turbine is
3 here, and given some hills and how the ground kind
4 of reflects some of that noise and there is another
5 one over here, we believe, based on the distance and
6 the topography and some other features of sound, we
7 can compute or expect or predict what sound they
8 would have at their house.

9 Q. Okay. So in my language, it's not a guess
10 but it's almost like an averaging of --

11 A. Okay. I like the not guess part.

12 Q. Yeah.

13 A. It's not averaging. It's making a
14 mathematically calculated, highly educated guess --

15 Q. Okay.

16 A. -- using a validated model, which is a
17 whole lot of a mouthful to say. Like, you know,
18 like when you tell your kids, if you have them, I'll
19 be home from work in 40 minutes. You looked on
20 Google Maps maybe, and they made a calculation and
21 estimate based on movements of cars and your road
22 and the time of day and the weather, and so there
23 was a lot of information that went into that. It is
24 a model.

1 Q. Right.

2 **A. But it's a pretty darn good one. I think**
3 **that is maybe the best analogy.**

4 Q. And then my last question about this
5 specific is: You mentioned that these were -- were
6 they all homeowners?

7 And if they were, did they take into
8 account the distance of the turbine?

9 I don't know in Canada, specifically
10 Ontario and Prince Edward Island, what their
11 statutes say about distance, and I don't expect you
12 to know that either, but my question is: Was that
13 referenced in the study?

14 **A. To my knowledge, it was not. They were**
15 **focusing on the sound no matter how far or how**
16 **close.**

17 MS. WARSAW: Okay. That's it. Thank you.

18 MR. KAINS: Thank you, Ms. Warsaw.

19 Ms. Vetter, you had your hand up.

20 As she comes forward, are there other
21 questions from folks in the audience for the doctor?

22 All right. Yes, sir. You'll be next.

23 MS. VETTER: I want to ask you to clarify
24 one other thing about the signup for the turbine

1 stuff. Do I have to sign in every night?

2 MR. KAINS: No, no. You don't have to
3 sign in every night.

4 MS. Vetter: Because I have been signing
5 in every night. That is why I thought it was at the
6 end of the sessions. And if you ask questions to
7 these professionals over here, then they are only
8 asking questions back to clarify what you are here
9 to ask them, true? As opposed to --

10 MR. KAINS: You go ahead and ask him a
11 question.

12 EXAMINATION

13 BY KELLY VETTER:

14 Q. Okay. I was wondering, in reference to
15 that study that you talk about in Canada, who was
16 the author of that study? What was the doctor's
17 name?

18 **A. To clarify, it's actually an enormous**
19 **scientific undertaking, and they had many**
20 **publications. The lead scientist, his name is David**
21 **Michaud, and that is a spelled M-i-c-h-a-u-d I**
22 **think.**

23 Q. So out of that study, did that look at did
24 wind turbine syndrome come from that?

1 **A. No, ma'am. The wind turbine syndrome came**
2 **in the middle 2000s, I think maybe the publication.**
3 **The book came out I think in 2009.**

4 Q. Are you familiar with that publication?

5 **A. Of course, I am.**

6 Q. You are?

7 **A. Yes.**

8 Q. Yeah. Do you remember the name of the
9 lady who wrote that?

10 **A. Yes.**

11 Q. I am trying to think of that.

12 **A. I believe her last name is Pierpont.**

13 Q. That is fine. I read that book just to
14 get a handle on what her concerns were, and I am
15 surprised you don't quote any of the things that she
16 has written in her book about the wind turbine
17 syndrome because she has peer reviewed and also has
18 a lot of good information.

19 One of the things that I was going to ask
20 was -- she talks about the vibroacoustic disease.

21 Well, there is another scientist in -- I
22 think she is from the UK. She has a Ph.D. in
23 environmental sciences.

24 Do you have a Ph.D. in environmental? Do

1 you have anything in environmental science?

2 **A. No, ma'am.**

3 Q. So, your only specialty is? Say it again,
4 please.

5 **A. I have a few specialties. Neurology. I**
6 **do sleep medicine, and I do some forms of wilderness**
7 **medicine.**

8 Q. So, what she talks about, and I wondered
9 if you had any information on -- she has been
10 investigating low frequency noise since 1988 and she
11 talks about the health effects from those turbines.
12 Are you familiar with any of that work?

13 **A. Any of what work, ma'am?**

14 Q. She talks about the vibroacoustic disease,
15 which you talked about earlier. You said there has
16 never been anything proven about that, where they
17 actually state there has been autopsy proven to show
18 tissue proliferation, particularly collagen and
19 fibroelastic tissue that causes heart problems,
20 hypertension and other psychologic provision
21 findings. And this is not just isolated to wind
22 turbines, to be fair.

23 MR. KAINS: Ms. Vetter, could you ask a
24 question, please?

1 MS. VETTER: Yeah. The question was, was
2 he familiar. He said he had not seen anything
3 proven about this.

4 And this is something that was proven by
5 environmental studies, and I am wondering if he is
6 familiar with any of that information.

7 MR. KAINS: Are you familiar with that
8 information, sir?

9 THE WITNESS: Yes.

10 BY MS. VETTER:

11 Q. Okay. Because you didn't say that
12 earlier?

13 A. **Well, I think I did say -- maybe I should**
14 **just clarify.**

15 Q. You said it wasn't proven. That is why I
16 am asking.

17 A. **Sorry. I was answering the question: Am**
18 **I familiar with the work? I am.**

19 Q. You are not familiar with the
20 autopsy-proven information?

21 MR. KAINS: Folks, you are stepping on
22 each other.

23 MS. VETTER: Sorry.

24 MR. KAINS: If he's answering a question,

1 let him answer. If she is asking a question, don't
2 continue on with your answer because Holly has got
3 to take it all down. This has to be typed up in a
4 transcript to go to these folks and the county board
5 members and if there is any appeal of this.

6 So, ma'am, ask the question, please.

7 MS. VETTER: Want me to ask it again?

8 MR. KAINS: Yes, ma'am.

9 BY MS. VETTER:

10 Q. It can be yes or no. I just want to know
11 if you are familiar with the autopsy-proven
12 information from this study from the Dr. Mariana
13 Alves-Pereira. She is a Ph.D. in environmental
14 science.

15 **A. I believe her name is "Alves-Pereira."**

16 Q. Yes.

17 **A. And I am familiar with her work. I am**
18 **confident that it is not a disorder, that there is**
19 **no such thing as vibroacoustic disease.**

20 Q. Well, that wasn't my question. My
21 question is: Have you read about autopsy-proven
22 information to show about this particular thing
23 happening with wind turbines?

24 **A. I've read her work. Yes. Yes. How about**

1 **just a flat yes?**

2 Q. You know that that has been there because
3 you said, and nothing has been proven. So, this
4 says it has been proven. That is what I wanted to
5 ask you about to clarify that.

6 So, have you ever, in your work, have you
7 ever worked with people who have been around
8 turbines and they have sleep problems?

9 Do you have any patients that you deal
10 with that you work with?

11 **A. Only the ones who I was asked to get**
12 **involved with and perform an independent medical**
13 **evaluation.**

14 Q. Who offered you or wanted you to do that
15 work?

16 **A. There were several, and these were cases**
17 **in litigation. I don't remember the company, but I**
18 **can look it up for you.**

19 Q. I am just asking. So you don't deal with
20 patients in trying to diagnose and help them? You
21 don't deal with any wind turbine patients on that
22 level?

23 **A. My regular, everyday clinical practice**
24 **does not involve anyone near or exposed to turbines.**

1 **No.**

2 Q. All right. Okay. Let's see here. Are
3 you aware that there is a number out there that says
4 30 percent of the people affected by motion of
5 turbines, they are affected by 30 percent, and they
6 are usually people who have motion sickness and
7 things like that who just that kind of movement
8 bothers them, like when they are driving? Are you
9 aware of any of those kinds of things?

10 **A. Could you repeat the beginning of that? I**
11 **am sorry. I missed it.**

12 Q. That 30 percent of people have issues with
13 wind turbines, with the motion of wind turbines.
14 And I wanted to know if you are aware of any of that
15 information and that it's usually people with
16 epilepsy, motion sickness, you know, like if they
17 have car sickness or anything like that. Are you
18 aware of any information about that?

19 **A. I am not aware of that kind of**
20 **information. No.**

21 Q. Okay. Have you ever yourself gone out to
22 a farm and experienced any of the shadow flickering
23 that people are talking about?

24 **A. Yes.**

1 Q. And for what period of time have you done
2 that?

3 **A. I would --**

4 Q. Did you sleep overnight somewhere and get
5 it?

6 Did you camp out somewhere where they are?

7 What has been your experience?

8 **A. It was about maybe about 10 or 20 minutes.**
9 **I can't remember.**

10 Q. Okay. Alrighty. Is it true that the
11 longer the blade is the more shadow you will have?

12 The longer, you know, it reaches further,
13 so, you know -- so we are talking about 620 feet?
14 Is that what we said?

15 So, they are higher than the ones that
16 have been some of these studies. I am wondering.
17 The shadow flickering is a greater distance than it
18 would be with these shorter ones.

19 **A. That is a good question. That is really**
20 **not my area, but there is someone who is going to be**
21 **speaking about shadow flicker I believe and can**
22 **answer that question.**

23 MR. LUETKEHANS: Can we ask Mr. Gershon
24 not to whisper the answer? I am hearing it over

1 here. If he wants to testify, he should testify.

2 THE WITNESS: Well, it is unfortunate --

3 MR. KAINS: Well, hang on.

4 Mr. Luetkehans, that is a very good point.

5 The witness is to answer the questions, if
6 the witness knows the answer.

7 If you don't know the answer, you can
8 simply say I don't know.

9 But, yeah, let's let -- I want to see the
10 witness answer the questions.

11 Thank you. All right.

12 Ms. Vetter, go ahead and ask the question
13 again.

14 BY MS. VETTER:

15 Q. I am trying to look for it in my notes.

16 Because your testimony is about being able
17 to sleep and handle the wind turbines, right? And
18 shadow flickering, is that part of what your
19 testimony should include?

20 **A. Well, shadow flicker happens at certain**
21 **times of day, usually early morning or early in the**
22 **evening -- late in the evening -- excuse me -- and I**
23 **don't have any reason to believe that relates to**
24 **sleep in any way.**

1 **And, yes, I am here to discuss any of the**
2 **potential health effects, including all of those**
3 **potential from wind turbines, including shadow**
4 **flickering.**

5 Q. So that was my question. Is the longer
6 the blade, the longer the shadow, the longer reach
7 that has on to another person's property or
8 whatever?

9 **A. I am really here to talk about the health.**
10 **I would be happy to answer questions about that. I**
11 **don't have knowledge about the length of blades and**
12 **shadow.**

13 Q. Okay. You say that the study in Canada
14 and the study of the wind turbine syndrome you don't
15 accept it as any kind of a qualification for health
16 issues. But these are specialists in their area, so
17 why should we accept what you have to say when other
18 specialists are saying the opposite of what you are
19 saying?

20 **A. I am not aware of any --**

21 MR. GERSHON: I am sorry. I object. I
22 would like to know what specialist she is referring
23 to and asking him to respond to that.

24 MR. KAINS: That is a very good point.

1 MR. GERSHON: Okay.

2 MS. VETTER: I can talk about the Ph.D. of
3 environmental science.

4 MR. KAINS: Yeah. It's better if you have
5 a specific specialist rather than just generically
6 saying specialist.

7 MS. VETTER: Okay.

8 MR. KAINS: If you have the person's name
9 and/or their qualifications that would be helpful
10 and then ask to state the person's name and
11 qualifications -- I am sorry. I am leaning back and
12 not in the microphone. I apologize -- and then ask
13 the question based on that, if you could, please.

14 BY MS. VETTER:

15 Q. Okay. So the Ph.D. in environmental
16 science, peer-reviewed and conference presentation,
17 Dr. Mariana Alves-Pereira, or however you told me I
18 should say it, why should we believe you over her?

19 **A. I don't think medical science is about**
20 **believing anyone. I think that what we do is**
21 **conduct studies, present them into the marketplace**
22 **of scientists and that it is fully vetted.**

23 **This is not a disorder. Vibroacoustic**
24 **disease is something she had put forward, named a**

1 disorder that didn't exist. It is not only not
2 accepted by me, you couldn't find another physician
3 who would name that. There would be no medical
4 textbook. There is no billing code. Nobody is
5 talking about this as a thing because it isn't.

6 That isn't to say that at extreme levels
7 of noise that there aren't health effects. I am
8 sure there are, but that isn't what we are talking
9 about today.

10 Q. And that isn't what she was talking about
11 either, but she was talking about this particular
12 thing, and she was peer reviewed, and she does
13 conferences all over --

14 MR. GERSON: I am sorry. Again, what is
15 the question?

16 MS. VETTER: The question was -- he's
17 stating that --

18 MR. GERSHON: That question has been asked
19 and answered.

20 MR. KAINS: We have an objection from
21 Mr. Gershon. Asked and answered.

22 And you have asked the question. Let's
23 move on.

24 MS. VETTER: I was just trying to figure

1 out. He didn't give an answer, so I was just trying
2 to clarify it more, but that's fine.

3 MR. KAINS: Ma'am, if he doesn't know the
4 answer or doesn't give an answer that you are
5 satisfied with, then you need to just go on to the
6 next question.

7 MS. VETTER: Okay. All right.

8 MR. KAINS: Thank you.

9 BY MS. VETTER:

10 Q. Okay. So it was stated about the WHO and
11 the health concerns that they have, and you -- you
12 agree -- you don't agree with the WHO on the dBA for
13 children?

14 You thought that they were a little out of
15 line on that; is that true?

16 We discussed that earlier. It made me
17 think about that question.

18 **A. I am not aware of what document you are**
19 **referring to. I do remember being asked about the**
20 **dBA level. I am not sure where it came from.**

21 Q. The lady who came here earlier asked you
22 to talk about the WHO and was saying that the dBA
23 needed to be 30 megahertz.

24 And you said, I don't know. I don't agree

1 with the WHO, and I don't know where they came up
2 with that.

3 That was just -- I don't know. I can't
4 read these things back in these kind of things, but
5 I am just asking you about that.

6 **A. The only WHO document that I am aware of**
7 **that speaks to wind turbines speaks to a 45 Lden**
8 **level. And, no, I don't agree with their evaluation**
9 **or assessment.**

10 Q. Okay. So you don't know about any
11 addendum that talks about children?

12 **A. I am not aware of any addendum that talks**
13 **about children at the 30 dBA level, ma'am.**

14 MS. VETTER: Okay. We'll move forward
15 from that. That may be all of it. I think that is
16 it for now. Thank you.

17 MR. KAINS: Thank you, Ms. Vetter.

18 Now the gentleman in the red and gray
19 shirt can come on up.

20 After this gentleman, does anybody else in
21 the audience have a question for Dr. Ellenbogen?

22 Thank you, sir, for your participation.
23 Please state your name and spell your first and last
24 names for the record.

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EXAMINATION

BY MR. REED:

Q. My name is Jim Reed. J-i-m R-e-e-d.

I'm just trying to get a better understanding of this Health Canada study and how it relates to Piatt County. You mentioned a while ago that the topology was taken into consideration. So how does the topology from within that study compare to the topology of this proposed project?

A. I would like to clarify two things: 1.)

I think that it's probably best for the acoustician who is here to answer about specific modeling things.

My point is actually simpler. When Health Canada made their model, they took a great number of variables into consideration for their community, but what only matters to Piatt County is what sound reaches the household, the place, the dwelling. And so, to that extent, when we are talking about what levels are whether it reaches a house up and over the pine trees or around a crook, a stream or through an open field of soil. Whatever sound gets to the person at the residence is the thing that I care about from the health perspective, which is why

1 **I feel that Health Canada is an excellent study to**
2 **generalize to Piatt County.**

3 Q. Are you stating then that the acoustician
4 is an expert also in the Health Canada study?

5 A. **I can't speak for what.**

6 Q. You referenced he would cover that, so
7 that is why I am asking. Do you know that?

8 A. **I don't know that, but I would except that**
9 **he has working knowledge of the modeling of Health**
10 **Canada, but I will let him answer that question.**

11 Q. You did just mention that it's all
12 relative to the noise reaching the house. So, also,
13 I believe it's relevant to understand whether Health
14 Canada, those windmills and the setbacks relative to
15 those structures to the residences, and the people
16 that were studied and how and any effect they
17 compared to what is proposed here in Piatt County.

18 A. **It's sort of -- I am having -- I think**
19 **that might be, from my perspective -- and pardon me**
20 **if I am being overly simplistic, but that feels like**
21 **maybe the same question. It is, from my**
22 **perspective, however far they set these turbines**
23 **back, here or there, I am concerned about what noise**
24 **gets to the residence. So, if it's setback**

1 **three miles and it's a reduced sound at 26 dBA at**
2 **this particular dwelling, I am going to think that**
3 **that is kind of a reasonable model for whatever**
4 **turbine is near a residence here in Piatt County**
5 **that makes a 26, 28 dBA sound at the residence. So,**
6 **the setbacks may be different, the turbine itself**
7 **may be different, the height, the manufacturer, but**
8 **whatever sound gets to the residence is the only**
9 **thing I think that is relevant for the health**
10 **question.**

11 Q. You don't think that comparing one site
12 that maybe is at three miles versus one that is at a
13 1000 foot that that's relevant?

14 A. **I think that might be relevant for a great**
15 **many things but not for the health of these. No.**

16 Q. Okay. Specifically within the Health
17 Canada study, it's kind of hard from the PowerPoints
18 and from your presentation -- did they actually
19 study shadow flicker?

20 A. **They did. Yes.**

21 Q. Okay. Because at one point you referenced
22 the Epilepsy Foundation, but I didn't see the data
23 specifically on shadow flicker from the Health
24 Canada study.

1 **A. I did not present that because the Health**
2 **Canada paper on shadow flicker is a study of**
3 **annoyance, how much does shadow flicker bother**
4 **someone, and they did not study seizures.**

5 **But since Health Canada was published, and**
6 **I have gone to some of these kinds of meetings, a**
7 **lot of people have themselves raised concerns in**
8 **their community independent of Health Canada saying,**
9 **"Yeah, but, Doc, fine. Whatever noise or not, I'll**
10 **decide whether I like that or not. But is this**
11 **going to causes seizures because that is a serious**
12 **health problem?" And so, I have addressed that**
13 **through my own means not through Health Canada.**

14 **Q. All right. So that was more your opinion**
15 **rather than what came out of the study?**

16 **A. It's my professional opinion as a**
17 **neurologist in which epilepsy is a major disorder of**
18 **our community.**

19 **Q. Do you regularly treat epilepsy patients?**

20 **A. I do.**

21 **Q. My brother-in-law had shadow-induced**
22 **epilepsy diagnosed, and that is why I take exception**
23 **to your conclusions because I do know it exists.**

24 **Also, within the Epilepsy Foundation, do**

1 you think they don't recognize natural light and
2 natural light effects as causing epilepsy?

3 **A. I am sorry. Could you repeat that,**
4 **please?**

5 Q. Within the Epilepsy Foundation study, do
6 you think, or your opinion is that they don't
7 reference natural light or natural light effects as
8 causing epilepsy, in triggering it?

9 **A. They are well aware that either natural**
10 **light or synthetic light can cause seizures if the**
11 **right amount of intensity, broad spectrum and right**
12 **frequency, and wind turbines are not even close to**
13 **the right frequency. They just simply wouldn't**
14 **cause seizures.**

15 Q. Okay. Because when I read from their own
16 site, it says natural light such as sunlight,
17 especially wind shimmering off the water or other
18 reflective items, flickering through even trees or
19 through the slats of venetian blinds can trigger it.

20 So, I was just wondering if you are aware
21 of that opinion of theirs and if that is what you
22 are referencing.

23 **A. I am not aware of that particular**
24 **statement, but I can assure you that they are not**

1 talking about wind turbines. They are talking about
2 an unusually high frequency of flicker. Say, if the
3 wind comes blowing by and you have sun coming
4 through your venetian blinds and the tree branches
5 go this way and that, and you get 15, 20, 30 hertz
6 flicker, then, if it's an intense light and you are
7 looking right at it and everything is lined up, then
8 that is possible. They are certainly not talking
9 about wind turbine shadow flicker.

10 Q. Well, they certainly do not reference all
11 that you just referenced either as being part of
12 their statement here.

13 A. I think I just -- my only point that I
14 would just want to share with you is that talking
15 about wind versus talking about wind turbines are
16 very different things, and they are talking about
17 wind and its interaction with the natural
18 environment. We are having a discussion about wind
19 turbines, which are going to be flicker at the level
20 at, like, less than 1 hertz.

21 Q. Also, within the Health Canada study, are
22 you aware of the height and length of the blade that
23 was within that study versus the height and the
24 length of the blade that is proposed for Piatt

1 County?

2 **A. I am not aware of either of those.**

3 MR. REED: Okay. Thank you.

4 MR. KAINS: Thank you, Mr. Reed.

5 Then no other questions from the public?

6 Are there questions for Dr. Ellenbogen

7 from Piatt County staff and consultants?

8 Redirect, Mr. Gershon?

9 FURTHER EXAMINATION

10 BY MR. GERSHON:

11 Q. We are going to try and share this mic,
12 but if anyone in the back can't hear us, please let
13 me know.

14 I am going to try and get through a couple
15 of these issues here. The first, is Health Canada
16 -- I should say you've had a chance during the break
17 to go back and review. Did you have a chance during
18 the break to go back and review the Canadian
19 government page on Health Canada?

20 **A. I did, yes. Yes.**

21 Q. Is Health Canada a Canadian government
22 federal institution?

23 **A. It is, yes.**

24 Q. It was implied that Health Canada hid or

1 removed, throughout, the hairs with the highest
2 cortisol levels.

3 Do you have any reason to believe that the
4 Canadian government would manipulate their data as
5 was implied?

6 **A. No.**

7 Q. Thank you. And I am skipping around
8 because I don't want to spend simply more time than
9 some of these just to give the context.

10 Mr. Mulvaney was identified with respect
11 to his quotes. Are you aware that Mr. Mulvaney, in
12 interviews since those quotes, has supported the
13 California Ridge Wind Farm that was identified?

14 **A. I actually don't know who Mr. Mulvaney is.**
15 **I apologize.**

16 Q. I could be mispronouncing his name. It
17 was the school official. That was Mr. Mulvaney,
18 correct? That was the woman who came and spoke
19 about it. We'll provide evidence on that later.

20 MR. KAINS: Do you have any further
21 questions for the doctor?

22 MR. GERSHON: I do.

23 MR. KAINS: Very good. Go ahead.

24 BY MR. GERSHON:

1 Q. Are you a licensed medical doctor?

2 **A. Yes.**

3 Q. Do you rely on your license for your
4 livelihood?

5 **A. Yes.**

6 Q. Would your license be in jeopardy if you
7 lied under oath?

8 **A. Yes.**

9 Q. Would you lie under oath today just
10 because Apex hired you?

11 **A. No.**

12 Q. Can you confirm, as a licensed medical
13 professional, that your expert testimony today would
14 be the same no matter who engaged you to provide
15 that testimony?

16 **A. Definitely. Yes.**

17 Q. Thank you. Sorry. Also, with respect to
18 the Health Canada study, have you -- you had a
19 chance to review the Canadian government's website
20 over the break?

21 **A. Yes, I did.**

22 Q. Would you please read their statement with
23 respect to the raw data from that study?

24 **A. Yes, and I am reading from the Canadian**

1 government's website, and I can provide the URL.
2 It's kind of a long one but I can e-mail to you if
3 that is okay.

4 It says, "Raw data originating from the
5 studies available to Canadians, other jurisdictions
6 and interested parties through a number of sources,"
7 and Statistics Canada Federal Research Data Centers
8 is the link that they list.

9 And then they go on to talk about the
10 Health Canada website for the noise data, open
11 access to publications and scientific journals and
12 conference presentations.

13 Q. Thank you. I believe, in the last person
14 who spoke, you provided your professional opinion as
15 a neurologist that shadow flicker, at the rates
16 generated by wind turbines, did not create epilepsy.
17 Is that correct?

18 A. That is correct.

19 Q. Is it also correct that this is not just
20 your opinion; it's also the opinion based on the
21 shadow flicker rates identified on National Epilepsy
22 -- the Epilepsy Foundation?

23 A. Well, just to clarify, the Epilepsy
24 Foundation doesn't make comment about the frequency

1 of the turbine shadow flicker.

2 What the Epilepsy Foundation makes clear
3 is that the frequencies in order to induce
4 photosensitive epilepsy are greater than 5 hertz.

5 And that shadow flicker from wind turbines
6 -- I am adding to give relevance to this meeting --
7 that is at or below 1 hertz, which is quite far away
8 from that range.

9 Q. And please feel free to also tell me if
10 this is not your area of expertise but should be
11 done by our other consultants.

12 When we hear 1 hertz, being what is
13 generated, actually less than 1 hertz being what
14 occurs from the wind turbines and 5 hertz being the
15 lowest level identified by the National Epilepsy
16 Foundation, should I read that as that's just -- 1
17 to 5, is that a ratio or is this an exponential
18 level when you are dealing with hertz? Perhaps you
19 could explain that.

20 A. That is a good question. It's not just a
21 couple of hertz higher. It's quite literally 5
22 times or more higher. So, to me, moving from
23 1 hertz to 5 hertz would be like going from 70 miles
24 an hour on the open road here to five times that in

1 **terms of thinking about the safety and wellbeing of**
2 **a driver. So, it's a very large magnitude**
3 **difference.**

4 MR. GERSHON: Thank you. No further
5 questions at this time.

6 MR. KAINS: Thank you, Mr. Gershon.

7 Finally, questions, last chance for
8 members of the zoning board to ask Dr. Ellenbogen?

9 Any other questions?

10 All right. Very good, Doctor. Thank you.

11 THE WITNESS: Thank you.

12 MR. KAINS: You may step down.

13 (WITNESS STEPPED DOWN.)

14 MR. KAINS: Mr. Gershon, who is your next
15 witness and what is the subject matter?

16 MR. GERSHON: Our next witness is our
17 acoustical noise expert, and he'll be responding on
18 the satisfaction of the wind project to the Illinois
19 Pollution Control Board and county standards.

20 MR. KAINS: How long will the direct
21 examination of this witness be?

22 What I am getting at, guys, is it's 25
23 until 9. I want to get another witness on even if
24 we may not conclude.

1 MR. GERSHON: I am told his presentation
2 should take approximately 15 minutes.

3 MR. KAINS: Mr. Luetkehans, what is your
4 opinion?

5 MR. LUETKEHANS: If you think it's going
6 to be done on cross tonight, the answer is no.

7 If you want to start, I am okay. It's not
8 going to change what I do.

9 MR. KAINS: Because I think, if we have a
10 witness testify on direct examination giving his
11 presentation, and then we come back tomorrow night
12 with all cross examination, I think that would be
13 appropriate.

14 I don't want to leave 20 minutes early
15 just because, you know, we are not going to get the
16 witness on, thoroughly questioned and off the
17 witness stand.

18 All right. Mr. Gershon, go ahead and call
19 your next witness.

20 All right. Sir, would you please raise
21 your right hand and address the court reporter to be
22 sworn?

23 **EDDIE DUNCAN,**

24 a witness herein, called by the Applicant, after having

1 been first duly sworn, was examined and testified as
2 follows:

3 MR. KAINS: All right. Sir, please state
4 your name for the record, spelling your first and
5 last names.

6 THE WITNESS: My name is Eddie Duncan.
7 E-d-d-i-e and D-u-n-c-a-n.

8 MR. KAINS: Very good. Thank you.

9 Mr. Gershon, you may proceed.

10 EXAMINATION

11 BY MR. GERSHON:

12 Q. Thank you. Would you please -- actually,
13 one question: Would you please state your
14 professional background and experience?

15 **A. Yeah. My name is Eddie Duncan, and I am a**
16 **senior director at RSG or Resource Systems Group. I**
17 **am a board-certified noise control engineer through**
18 **the Institute of Noise Control Engineering, and I**
19 **have been working in the field of acoustics and**
20 **specifically within the field of wind turbine**
21 **acoustics for 20 years.**

22 MR. KAINS: Do you have anything else on
23 his qualifications, Mr. Gershon?

24 MR. LUETKEHANS: I am not going to object

1 to his qualifications. Let's just get that over
2 with.

3 MR. KAINS: Mr. Luetkehans, thank you.

4 All right. Mr. Duncan will be received as
5 that from coming from an expert witness.

6 Go ahead, Mr. Gershon.

7 BY MR. GERSHON:

8 Q. Two items: 1.) Eddie, if you would ask
9 for the next slide as you need it each time so she
10 will know when to put that.

11 And I would ask that you present both the
12 work that you were asked to undertake and what your
13 findings were.

14 A. Sure. So if we could go to the next slide
15 here, in general, just to describe, RSG has been
16 doing this type of work for 30 years, and you are
17 not meant to necessarily list read all of these
18 articles here, but this is an example of all of our
19 research since 2006 in conducting researching into
20 wind acoustics and specifically and especially our
21 sound propagation modeling, and so many of these
22 papers that are listed here are related to our work
23 in validating how sound propagation models. I'm
24 here today to talk about the sound propagation

1 modeling that we conducted for this proposed
2 project.

3 Next slide, please.

4 To do that, I am briefly going to cover
5 some acoustical concepts so that we are all on the
6 same page particularly as they relate to the IPCB
7 noise limits, and then we'll talk about those limits
8 and then we'll talk about the sound modeling
9 methodology that we used, the model results and our
10 conclusions.

11 Next slide, please.

12 So, briefly, I want to touch on frequency
13 because the limits that we are talking about here
14 are frequency-based limits.

15 When we are talking about frequency, we
16 are talking about the pitch of sound. You could
17 think of this or what is at least easily
18 understandable by most people is the different
19 sounds that musical instruments make. A piccolo is
20 a high-frequency sound, and bass guitar would be a
21 low-frequency sound.

22 Well, in acoustics, we divide those
23 frequency ranges up into what are called octave
24 bands or one-third octave bands. The IPCB limit is

1 based off of full octave bands or octave band.

2 The human ear can hear between 20 hertz
3 and 20,000 hertz, and generally speaking we talk
4 about the sound range from 20 hertz to 200 hertz as
5 being low-frequency noise or low-frequency sound,
6 from 200 to about 4,000 as being mid-frequency, and
7 4,000 and above as being high-frequency.

8 Below 20 hertz is infrasound that is not
9 heard by the human ear except at very, very high
10 levels.

11 And above 20,000 hertz is ultrasonic
12 sound, which is also not heard by the human ear.

13 Next slide, please.

14 The other thing that we need to talk about
15 is sound pressure level. So, the sound pressure
16 level is the actual limit that you would be
17 applying. The limit is the amplitude of the sound.
18 Those amplitude limits are applied at each octave
19 band, frequency octave band.

20 And so, sound pressure level, what we do
21 is we hear sound pressure, fluctuations in sound
22 pressure. That happens from 20 micropascals all the
23 way up to 20 million micropascals. It is a huge
24 range. And so, that we can kind of truncate that

1 range and have it within a manageable range, we use
2 logarithmic functions to convert that sound pressure
3 to sound pressure level, which is what is in the
4 regulation.

5 And for pressure sound levels, we are
6 talking about generally 0 decibels, which is the
7 threshold of human hearing; and up to 120, maybe 140
8 decibels, that would be kind of the threshold of
9 pain, something very, very high.

10 And the levels we are talking about for
11 wind turbines and generally are on the order of 40
12 to 50 decibels, just to give you an idea where that
13 is on the scale.

14 Next slide, please.

15 A couple specific things related to wind
16 turbines: So, how do wind turbines create sound?

17 The main mechanism is through aerodynamic
18 sound created by the blades cutting through the air.
19 So, that is the primary source of sound. It's
20 broadband in nature. It's not tonal.

21 There are also secondary and actually at
22 this point in wind turbine development very, very
23 minor; it's the sound of gears turning and things of
24 that nature. The noise control that is built into

1 turbines, modern wind turbines, is such that you
2 don't typically hear those sounds unless you are
3 standing right at the base of it. You may be able
4 to hear it there, that type of thing. So what we
5 are really talking about when we talk about the
6 sound that we are modeling is the aerodynamic sound
7 from the blades.

8 The last thing I want to touch on is
9 masking. There is the possibility of masking to
10 occur. It's not a guarantee, but what this chart on
11 this presentation points out is that the spectrum of
12 the V -- excuse me -- the V62, which is the turbine
13 that is proposed here, that spectrum is similar in
14 shape to the spectrum of background sound levels
15 during a 5 meters per second wind speed. So it's
16 just that, if they're comparable in level, those
17 spectrums are similar, and so there is some
18 possibility that some frequency could be masked.

19 Next slide, please.

20 So now for the regulation, the local
21 regulation here points to the IPCB limits, so that
22 is what we are going to be focusing on here. I
23 think that's really all I need to focus on in this
24 slide here, is to point out that we are really

1 talking about the IPCB limits which are what are
2 referenced in the local ordinance.

3 Next slide.

4 As I mentioned previously, those limits
5 are octave band-based limits. Those octave bands go
6 from 31.5 hertz up to 8 kilohertz. Those limits are
7 shown here on the slide. The limits are not only
8 varied by octave band, but they also vary by daytime
9 and nighttime, and they also vary by where the
10 source is located versus where the receptor that
11 would be receiving sound is located.

12 To kind of cut to the chase here, we are
13 looking at a limit that is class C land, which would
14 be farmland or where the wind turbine is located, to
15 class A, which would be a residence, essentially.

16 So, there are some other Lad uses within
17 class E and class A, but that is the more stringent
18 standard, and the report just also focuses on that
19 nighttime sound limit, but that is the more
20 stringent level.

21 So, while we are showing both the daytime
22 and nighttime here, we are really talking about the
23 class C to class A limits at nighttime and
24 evaluating as whether the project can meet those

1 limits.

2 Next slide, please.

3 So, for sound propagation modeling, it's
4 conducted per international standard, which is ISO
5 9613-2. This is the standard for how sound
6 propagates outdoors, and that standard is
7 implemented into modeling. It's implemented into
8 other software as well, but the key thing is that
9 those calculations are being conducted in accordance
10 with that international standard.

11 In addition to that international
12 standard, there is also the ANSI, or the America
13 National Standard Institute, standard that
14 recommends specific model parameters that should be
15 used in that international standard to ensure that
16 the sound levels from the proposed project or from a
17 wind turbine are conservatively accurate, and so we
18 are following the model parameters that are in that
19 ANSI standard for specific to wind turbine noise.

20 The model is a three-dimensional model.
21 There is terrain and all that in the modal. The two
22 main things that kind of control the levels are the
23 sources that you put into the model and where your
24 receivers are, your receptors. So, I am going to

1 talk about those briefly here.

2 The sources are wind turbines, and so for
3 this project we are talking about a Vestas V162.
4 That is what was modeled, and we did that at 71
5 turbine locations throughout the project area.

6 To be clear, there is only a proposal to
7 build 50, but the modeled report includes a total of
8 71 turbine locations.

9 In addition to that, we modeled two
10 high-voltage transformers located at the project
11 substation, and we modeled the turbines that are
12 located at the adjacent Sapphire Sky Project as well
13 from that border between the two projects in case
14 there is potential for cumulative impact. Those are
15 the sources.

16 The receptors, we modeled over 1200
17 receptors across the project area. Those receptors
18 are located at primary structures which are
19 primarily residences but include businesses and
20 things of that nature.

21 We also have what are called a grid of
22 receptors that is -- I forget the grid resolution.
23 I would have to check. But every 40 or 50 meters
24 there is another receptor, and what those grid

1 receptors do is allow us to generate what our sound
2 level contour line will be, which you'll see on some
3 maps that we are about to show you.

4 So, to be clear, the sound level was
5 calculated at both primary structures and throughout
6 the project area anyway. You can view those sound
7 levels all throughout the project area.

8 Next slide.

9 I am going to briefly walk us through a
10 series of maps. The maps show sound level contour
11 lines, and those contour lines represent sound
12 levels. So there's different colors that represent
13 sound levels ranging from a dark blue line, which is
14 3 decibels, all the way up to a dark purple line,
15 which is 70 decibels.

16 We also show on the maps a black dash
17 line, and you are probably about to hear me say
18 black dash quite a bit as we go through these
19 slides. That black dash line represents the IPCB
20 limit. That black dash line is going to change from
21 slide to slide because the limit is different for
22 each octave band.

23 This first slide is 31.5 hertz full octave
24 band, and the limit here is 69 decibels. What

1 you'll see -- it might be difficult to see on the
2 slide here, but it's also available in the report
3 that has been submitted -- is that that black dash
4 line is not visible on the map, and the reason for
5 that is that that sound level at the limit is
6 occurring so close to the turbine that you can't see
7 it. And the key takeaway here is that there are no
8 primary structures within the boundaries of that
9 black dash line.

10 Next slide, please.

11 It's the same story for 63 hertz. The
12 difference here is that the limit is 67 decibels and
13 the there is no primary residences within that
14 67-decibel limit line.

15 Again, if you are looking, even in the
16 report where it might be a little clearer, you are
17 not going to see that black dash line because it
18 occurs so close to the turbines.

19 Next slide.

20 At 125 hertz, it's the same story. Black
21 dash line there, the limit is 62, and the sound
22 levels are so close to the turbines that you can't
23 see them, and there are no primary structures within
24 that limit.

1 250 hertz, if you have very good vision
2 and are looking closely in the report, you may be
3 able to start to see a black dash line. It's
4 essentially a black circle around the icons that
5 show the turbines. Again, it's occurring very close
6 to the turbines and there are no primary structures
7 within the 250 hertz black dash line.

8 Next slide.

9 This is the 500 hertz slide. This is
10 where we start to see the black dash line a little
11 more. You'll see it in the reports, and I think you
12 can even see it here on this slide here, the black
13 dash line is clearly visible. Upon inspection of
14 the map, you'll notice that there are no primary
15 structures within the black dash line. This is a
16 limit of 47 decibels. We might come back to 500
17 hertz down the road. It's just important to note
18 this is one where the sound level is traveling,
19 however limited, it's traveling further than the
20 other octave bands.

21 Next slide.

22 At 1 kilohertz, the black dash line is
23 also visible. And if you inspect these maps, you'll
24 see that there are no primary structures within that

1 black dash line, although it is further from the
2 turbines than any of the other black dash lines, and
3 the limit here is 41 decibels.

4 Next slide.

5 Before we go further, I just want to tell
6 you that 500 hertz and 1 kilohertz are the two
7 frequency ranges where the sound level limit travels
8 further from these turbines than the other octave
9 bands. So those we'll probably end up coming back
10 to it if we talk more about this.

11 So, 2 kilohertz, which you'll notice is
12 that the sound levels are starting to recede back to
13 the turbines, and the same story for the next two
14 slides. The reason for that is at 2 kilohertz and
15 above atmospheric absorption takes over and sound
16 levels attenuate very, very quickly.

17 So, for this slide and the next two, you
18 can slide through them and pause for just a moment.
19 You can see the sound levels receding, and then all
20 three of those slides there are no primary
21 structures within the black dash line.

22 Next slide.

23 We can focus in a little bit, though,
24 because I know that those maps might be a little bit

1 difficult to read from this distance, although it is
2 easier in the report. The modeling shows that the
3 IPCB limits are met at all primary structures.

4 And what this table shows -- and this is a
5 reproduced table from the report itself. It is a
6 summary of the receptors where the highest sound
7 levels occur.

8 And in this table you can look at the 500
9 hertz and 1 kilohertz octave band, and you see at
10 500 hertz the sound level is 45 to 46, and at the 1
11 kilohertz octave band is 39 to 40, and those sound
12 levels are close to the IPCB limit but are not equal
13 to and are, in fact, below the IPCB limit. That is
14 where the receptors are for the highest sound
15 levels.

16 I do want to pause here and be clear. I
17 think the previous testimony you just heard was
18 referencing a 46 dBA sound level. We are not
19 talking about the A-weighted sound levels here.

20 The IPCB limits are unweighted sound
21 levels by octave. The A-weighted sound level that
22 was being spoken about in previous testimony is an
23 overall level which is actually A-weighting these
24 levels and then summing them together, and that's

1 how we arrive at an overall sound level.

2 So, there is a clear distinction there
3 that the IPCB limits are unweighted sound levels by
4 octave bands versus the number we were talking about
5 previously at 46 dBA that is a total sound level
6 that has been A-weighted to mimic how the human ear
7 hears and perceives frequency, which is what we use.

8 Next slide, please.

9 So, in conclusion, all of the primary
10 structures are below the IPCB limits. The areas
11 around the primary structures that would be deemed
12 as residential are also below the IPCB limits.

13 In addition to that, although we didn't
14 talk about it, the manufacturer data indicates that
15 the turbine is not tonal. We already talked about
16 the aerodynamic noise being broadband. And so, the
17 tonality limits or tonality limits that are in the
18 IPCB limits don't apply.

19 That concludes my direct, unless Mark has
20 questions for me.

21 MR. KAINS: Very good. Thank you,
22 Mr. Duncan.

23 Do you have questions, Mr. Gershon, of
24 Mr. Duncan?

1 MR. GERSON: If I could, I would like to
2 hold off on those until tomorrow. I think they
3 might go past our timing.

4 MR. KAINS: All right. All right.

5 Besides him, Mr. Gershon, besides
6 Mr. Duncan's testimony tomorrow night and answering
7 questions, who are your other witnesses that you are
8 hoping to have testify tomorrow and the subject
9 matter, just so folks know whether they should tune
10 in tomorrow night?

11 MR. GERSHON: Thank you. On that, first I
12 have a question, if I can. Before I answer that, I
13 want to clarify, when our prior expert spoke, you
14 specifically released him when you were done. I
15 don't believe you did that, but I believe that is
16 the intent, that he was released.

17 MR. KAINS: I said you may step down, but
18 I did not release him, but he would be subject to
19 recall if you wish to recall him or if the board
20 wishes to recall him.

21 But yes, Doctor, thank you, and you are
22 released from this hearing.

23 MR. GERSHON: Thank you. And we certainly
24 did not do it on purpose, but I think today is a

1 clear explanation of why we can't say what the exact
2 schedule will be on each day.

3 But I believe that, in addition to Eddie
4 Duncan being on tomorrow, we also anticipate Jacob
5 Runner, regarding shadow flicker, to be on tomorrow,
6 and Jason may also be here on safety issues if we
7 get to it.

8 MR. KAINS: Jason?

9 MR. GERSHON: Connelly.

10 MR. KAINS: Thank you. Regarding what?

11 MR. GERSHON: Regarding safety.

12 I haven't, admittedly, identified him now
13 three days in a row. He's still speaking to me, but
14 I have to be clear that I am not sure we'll get to
15 him tomorrow.

16 MR. KAINS: All right. Very good.

17 Anything further, Mr. Gershon?

18 MR. GERSHON: Nothing from us. Thank you.

19 MR. KAINS: Mr. Luetkehans?

20 MR. LUETKEHANS: No.

21 MR. KAINS: All right. Folks, we are
22 going to be in recess.

23 MR. LUETKEHANS: You know what? I am
24 sorry.

1 MR. KAINS: Go ahead, Mr. Luetkehans.

2 MR. LUETKEHANS: There is one thing I
3 would ask Mr. Gershon: One of the gentlemen who
4 asked questions -- and I'll try to be loud.
5 Sorry -- gave Mr. Gershon's client an address for
6 the amount of shadow flicker. If he could get that
7 e-mail to me tomorrow so we can get that to the
8 gentleman, I would appreciate it, especially since
9 we may be talking about shadow flicker tomorrow. I
10 think the gentleman has a right to know what his
11 receptor number is at least.

12 MR. KAINS: Will you do that, Mr. Gershon,
13 or one of your --

14 MR. LUETKEHANS: I can give you the
15 address if you don't have it.

16 MR. GERSHON: We have the address, and we
17 are gathering the information, and we can have that
18 for tomorrow.

19 MR. KAINS: Very good. Thank you.
20 Anything further from counsel?

21 MR. GERSHON: No. I am sorry. Thank you.

22 MR. KAINS: We are in recess. We will
23 reconvene tomorrow night at 6:00 in this same room.

24 (END OF PROCEEDINGS.)

CERTIFICATE OF REPORTER

I, Holly Wingstrom, CSR #84-003888, reported in machine shorthand the proceedings had in the above-entitled cause and transcribed the same by computer-aided transcription, which I hereby certify to be a true and accurate transcript of the proceedings had.


Holly Wingstrom, CSR #84-003888
Official Court Reporter

Dated: 11/27/2022

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