

In The Matter Of:
LIVINGSTON COUNTY ZONING BOARD OF APPEALS

DECEMBER 17, 2014
December 17, 2014

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1 LIVINGSTON COUNTY ZONING BOARD OF APPEALS
 2 CASE SU-7-14
 3 PLEASANT RIDGE WIND ENERGY PROJECT
 4 December 17, 2014
 5 6:30 PM
 6 Walton Centre
 7 Fairbury, Illinois
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(Commencing at 6:31 p.m.)
 CHAIRMAN CORNALE: If we can make our way
 to our seats please. All right, if we can go ahead
 and call this meeting to order. Chuck, roll call
 please.
 MR. SCHOPP: This is the December 17th,
 2014, continuation hearing of the Livingston County
 Zoning Board of Appeals review of Livingston County
 Case SU-7-14 Pleasant Ridge Energy, LLC, Pleasant
 Ridge Wind Energy project, with the roll call being
 Michael Cornale.
 CHAIRMAN CORNALE: Here.
 MR. SCHOPP: John Vitzthum.
 MR. VITZTHUM: Here.
 MR. SCHOPP: Richard Kiefer.
 MR. KIEFER: Here.
 MR. SCHOPP: Diana Iverson. Howard
 Zimmerman.
 MR. ZIMMERMAN: Here.
 MR. SCHOPP: Joan Huisman.
 MS. HUISMAN: Here.
 MR. SCHOPP: Gibs Nielsen.
 CHAIRMAN CORNALE: All right, I'd like to
 take this opportunity to welcome everybody back.

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1 There are several of you out there, familiar faces,
 2 seen you at a lot of these meetings, so I believe
 3 the applicant this evening has with him Hankard.
 4 MR. BLAZER: Correct.
 5 CHAIRMAN CORNALE: Roberts.
 6 MR. BLAZER: Yes.
 7 CHAIRMAN CORNALE: Ellenbogen.
 8 MR. BLAZER: Yes.
 9 CHAIRMAN CORNALE: And Mr. Parzyck.
 10 MR. BLAZER: Correct.
 11 CHAIRMAN CORNALE: I think the plan for
 12 this evening, we understand that Dr. Ellenbogen
 13 travels quite a distance to get here. I guess we'd
 14 like to focus on him first so that in an effort to
 15 try to finish him up this evening. So that, of
 16 course, depends on Mr. Luetkehans, his line of
 17 questioning. We may have a few questions and the
 18 public may have some questions for him.
 19 So with that, counsel, is there --
 20 MR. BLAKEMAN: We're going to do Dr.
 21 Ellenbogen first and then ZBA questions followed
 22 by --
 23 CHAIRMAN CORNALE: One quick housekeeping
 24 item that we're going to take care of before we get

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1 Dr. Ellenbogen up. I've got five exhibits that I'd
 2 like to put into evidence. UCLC 20 is a copy of
 3 Alec Salt and Jeffrey Lichtenhan's document entitled
 4 Perception-based protection from low frequency
 5 sounds may not be enough. UCLC 21, copy of Articles
 6 in Press, Hearing Research, Review Article titled
 7 Responses of the ear to low frequency sound,
 8 infrasound and wind turbines. UCLC 22, copy of a
 9 special -- of a Bulletin of Science, Technology and
 10 Society with a title of Infrasound From Wind Turbine
 11 Could Affect Humans. UCLC 26, copy of a document
 12 titled Systematic Review 2013: Association Between
 13 Wind Turbines and Human Distress. UCLC 29, copy of
 14 Report No. 122412-1 issued December 24, 2012, with a
 15 title of A Cooperative Measurement Survey and
 16 Analysis of Low Frequency and Infrasound at the
 17 Shirley Wind Farm in Brown County, Wisconsin.
 18 With that, the order for Dr. Ellenbogen
 19 will be ZBA, then we'll look to the county board --
 20 or not county board but local government with school
 21 districts, then we'll go interested parties
 22 represented by a licensed attorney, and then other
 23 interested parties will be the order of questioning
 24 this evening.

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1 With that, fellow board members, do we
 2 have any questions pressing at this point for Dr.
 3 Ellenbogen?
 4 **MS. HUISMAN:** I will but not right now.
 5 **CHAIRMAN CORNALE:** Okay, we'll take and
 6 reserve our opportunity to question Dr. Ellenbogen.
 7 Mr. Luetkehans -- oh, yeah, any school board or
 8 local government entities out there with questions
 9 for Dr. Ellenbogen? All right, Mr. Luetkehans.
 10 **QUESTIONS BY**
 11 **MR. LUETKEHANS:**
 12 Q. Dr. Ellenbogen, you're a sleep medicine
 13 specialist; is that correct?
 14 **A. Yes, sir.**
 15 Q. Okay. As a sleep medicine specialist,
 16 would you agree that sleep is essential for the
 17 restoration of health and a person's well-being?
 18 **A. Yes.**
 19 Q. In fact, disruptive sleep is known to be
 20 associated with several health ailments, correct?
 21 **A. Yes.**
 22 Q. It's known to be associated with
 23 hypertension, correct?
 24 **A. Yes.**

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1 Q. It's known to be associated with
 2 cardiovascular and coronary disease, correct?
 3 **A. Certain kinds of sleep problems, yes.**
 4 Q. Okay. It would also -- can also be
 5 associated with impaired immune function, correct?
 6 **A. Could you just remind me what the "it"**
 7 **pronoun is?**
 8 Q. Yes, sorry. Disruptive sleep is known to
 9 be associated with impaired immune function,
 10 correct?
 11 **A. I would just offer a modest clarification**
 12 **of disrupted sleep. Obviously there's disruptive**
 13 **and disruptive. It would be really chronic,**
 14 **frequent disruption or prolonged disruption. If**
 15 **that's what you mean, then yes.**
 16 Q. That's what I mean. Let's continue on
 17 with that. That type of disruptive sleep is also
 18 known to be associated with elevated stress hormone
 19 response, correct?
 20 **A. That is correct.**
 21 Q. It is also known to be associated with
 22 attention and memory deficits, correct?
 23 **A. Yes.**
 24 Q. And depressed mood as well?

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1 **A. Absolutely, yes. Sometimes elevated mood**
 2 **actually.**
 3 Q. Okay. In fact, sleep loss causes profound
 4 impairments in cognitive behavioral performance,
 5 correct?
 6 **A. Yes.**
 7 Q. As a doctor, I assume one of your general
 8 goals is to promote the well-being of your patients,
 9 correct?
 10 **A. Yes.**
 11 Q. And as a sleep medicine specialist, your
 12 focus is trying -- is on trying to help your
 13 patients improve their sleep, correct?
 14 **A. Certainly.**
 15 Q. And that's because you know that the loss
 16 of sleep or poor sleep can have profound impairments
 17 on people's health and their cognitive dis -- their
 18 cognitive abilities, correct?
 19 **A. Yes.**
 20 Q. Okay, I had a question. Are -- guinea
 21 pigs, it's my understanding, have ears that are
 22 anatomically very similar to human ears; is that
 23 correct?
 24 **A. I'm a human physician. I'm not aware of**

1 **the comparison.**

2 Q. So -- I'm sorry, I didn't mean to cut you
3 off. So you don't know one way or the other?

4 **A. I don't.**

5 Q. Okay.

6 **A. I know it's used sometimes as a model. I
7 don't know the degree to which they're similar.**

8 Q. It's just outside of your expertise.

9 **A. Yes.**

10 Q. Okay. Let's talk about something that's
11 clearly within your expertise and that's that you're
12 a panel member of a panel which drafted a wind
13 turbine health impact study for the Massachusetts
14 Department of Environmental Protection and
15 Massachusetts -- I can't even say Massachusetts
16 today -- Department of Health, correct?

17 **A. That's correct. And spelling
18 Massachusetts is even harder.**

19 Q. Yeah, I got no chance with that. And
20 that's Petitioner Exhibit 59. And I saw you bring a
21 document up. I assume that's the one you brought.

22 **A. Yes, sir, in case you had a question
23 about --**

24 Q. Yeah, that's a good idea. You were going

1 over a hundred pages.

2 **A. Yes, it's more than.**

3 Q. Okay, fair enough. To my understanding,
4 the panel did not interview anyone with complaints
5 allegedly due to wind turbines, did they?

6 **A. To my knowledge, we were not allowed to
7 interview people, but what we did was we solicited
8 information so that they could provide us emails or
9 letters and we reviewed all of those --**

10 Q. Okay.

11 **A. -- but we did not interview those --**

12 Q. So you didn't, weren't able to under the
13 parameters of your assignment, and I'm trying to
14 understand the parameters of the assignment.

15 **A. That's exactly right, yeah.**

16 Q. Okay.

17 **A. We did request that, but it wasn't -- we
18 were told that it was impractical for many medical
19 legal reasons as I understand it.**

20 Q. You know what, you cut off for a second.
21 You said for many medical --

22 **A. Medical legal reasons as I understand it,
23 that they weren't just -- people weren't allowed
24 to -- there was some issues about identification,**

1 to get one one way or the other. Had you done any
2 wind turbine study research before -- and I'm just
3 going to call it the Massachusetts project.

4 **A. Okay.**

5 Q. Had you done any wind turbine study
6 research before that Massachusetts project?

7 **A. No, I had not.**

8 Q. Okay. And the panel did not conduct any
9 new research, correct?

10 **A. That's correct. We evaluated the existing
11 research, debated it at great length, solicited
12 information, but we didn't conduct research per se,
13 no.**

14 Q. Okay, and the panel I assume conducted
15 most of its research in 2011?

16 **A. That's exactly right.**

17 Q. Because it was issued early 2012.

18 **A. Yes.**

19 Q. It's not something they do overnight.

20 **A. Right. No, this was an extensive
21 year-long process as you can imagine, but you're
22 absolutely right, 2011 was sort of the signature
23 year.**

24 Q. I don't know how many pages, but it's well

1 **and they said, well, why don't we just take
2 everybody's word for what they're saying at face
3 value and we'll hunt these potential issues down one
4 at a time.**

5 Q. Okay. So in this case, what the panel
6 actually did was review existing literature and
7 information and information they solicited to arrive
8 at conclusions and recommendations, correct?

9 **A. That's correct.**

10 Q. In your testimony, you said something to
11 the effect that a medical literature review is a
12 study but not really a study; it's really an
13 examination of existing knowledge.

14 **A. That's right. I think when I typically
15 use the word study I often -- in that vernacular
16 more often would refer to an existing -- the
17 development of novel data. There is a kind of study
18 that is called an analysis, which this wasn't, in
19 which people aggregate data and create novel data
20 not by creating new data but by merging data
21 together.**

22 **This is a lower level than that, this
23 is -- but an important piece, which is taking all
24 the existing data, deliberating it in a multiple**

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1 **disciplinary fashion, and coming up with generating**
 2 **an opinion based on the existing data. So it is not**
 3 **creating new data in that sense, no.**
 4 Q. So a study creates new data, correct?
 5 **A. Yes.**
 6 Q. And the medical literature review which
 7 you did in Massachusetts compiles and then analyzes
 8 that data?
 9 **A. Exactly.**
 10 Q. Okay. The panel -- and obviously the
 11 Massachusetts, we're still talking about the
 12 Massachusetts project.
 13 **A. Yes.**
 14 Q. But the panel concluded that wind turbines
 15 can produce unwanted sound, correct?
 16 **A. Could you repeat that?**
 17 Q. Yeah, the panel concluded that wind
 18 turbines can produce unwanted sound; is that
 19 correct?
 20 **A. That is correct.**
 21 Q. Okay. The panel also found that there
 22 were many different factors which affected the
 23 nature of sound which an individual hears, correct?
 24 **A. Yes.**

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1 Q. And those things would include items such
 2 as the distance from a turbine, correct?
 3 **A. Yes.**
 4 Q. It would also -- strike that. Whether
 5 someone was upwind or downwind from the turbine
 6 affects the sound, correct?
 7 **A. Correct.**
 8 Q. The air temperature gradients affect the
 9 sound, correct?
 10 **A. Correct.**
 11 Q. And the terrain affects the sound,
 12 correct?
 13 **A. Correct. Wind speed, the degree of a**
 14 **person and their personal views of wind turbines**
 15 **probably were two of the higher ones.**
 16 Q. And time of day affects the sound,
 17 correct?
 18 **A. To my knowledge, I think that that's more**
 19 **complicated, has more to do with wind, but to the**
 20 **extent that wind is affected by time of day, then**
 21 **yes.**
 22 Q. In fact, the panel found that the noise
 23 from the wind turbine is more intense at night than
 24 it is during the day, correct?

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1 **A. If I recall correctly, the ambient sound**
 2 **is less during the evening, but I would defer to our**
 3 **acoustic colleague for that in greater detail. I'm**
 4 **not an acoustician, but --**
 5 Q. Okay. Would you agree that the report
 6 says that the audible input to modulated noise from
 7 wind turbines, or whooshing, is perceived to
 8 increase in intensity at night?
 9 **A. I haven't memorized the literature. Could**
 10 **you point me to where --**
 11 Q. Yes, it's the executive summary, page 4 of
 12 that, Section 4.1.
 13 **A. Yeah.**
 14 Q. And it's subparagraph 1D as in David.
 15 Sorry if you -- didn't mean to get too far ahead.
 16 **A. Executive summary 4.**
 17 Q. Page 4.
 18 **A. Uh-huh.**
 19 Q. Section 4.1.
 20 **A. Uh-huh.**
 21 Q. Subparagraph 1D as in David.
 22 **A. 1D as in David. May I read that for a**
 23 **moment?**
 24 Q. Sure.

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1 **A. Agreed. So the key word there is**
 2 **perceived, which is to say that this same -- for any**
 3 **given wind and position and topography and so forth**
 4 **for a given turbine, that if the ambient noises were**
 5 **to reduce, all of the noises that we're constantly**
 6 **surrounded by, both infrasound, low frequency and**
 7 **within the normal audible range sounds that we're**
 8 **exposed to on a regular basis, if those sounds, like**
 9 **traffic and trains, are reduced in the evening, then**
 10 **the existing sounds, such as a wind turbine, might**
 11 **be perceived more readily, yes.**
 12 Q. So when you say ambient sound, in this
 13 case we mean sounds other than a turbine, normal
 14 day-to-day sounds.
 15 **A. That's right.**
 16 Q. The panel also concluded, didn't it, that
 17 it is possible that noise from some wind turbines
 18 can cause sleep disruption, correct?
 19 **A. Could you repeat that?**
 20 Q. Yeah, the panel also concluded that it is
 21 possible that noise from some wind turbines can
 22 cause sleep disruption; is that correct?
 23 **A. The panel concluded that any sound, given**
 24 **the right circumstances, can cause sleep disruption,**

1 **including those from wind turbines, correct.**
 2 Q. Okay. In fact, you acknowledge that noise
 3 from wind turbines can disturb people's sleep,
 4 correct?
 5 **A. The noise from -- any object that creates**
 6 **a noise, given the correct circumstances, can**
 7 **disturb sleep, yes.**
 8 Q. Including wind turbines.
 9 **A. Including wind turbines.**
 10 Q. Particularly in vulnerable populations,
 11 correct?
 12 **A. Yes.**
 13 Q. And what's a vulnerable population?
 14 **A. A vulnerable population would be someone**
 15 **who had very impaired sleep, maybe someone with**
 16 **post-traumatic stress disorder, anxiety, a mood**
 17 **disorder, something that would make them very light**
 18 **sleepers and so would be more readily disrupted.**
 19 Q. How about age, does that have an effect
 20 on --
 21 **A. Age does --**
 22 Q. -- vulnerable populations?
 23 **A. Age does to a modest degree, yes. People**
 24 **tend to sleep deeper in earlier stages of their**

1 enough evidence to provide particular sound pressure
 2 thresholds at which wind turbines cause sleep
 3 disruption and that further studies are needed,
 4 correct?
 5 **A. Could you point out to where --**
 6 Q. Yes. It's again the same, Petitioner
 7 Exhibit 59.
 8 **A. Yes.**
 9 Q. ES page 6, paragraph 3.
 10 **A. Could you repeat your question?**
 11 Q. Sure. The report also says that there is
 12 not enough evidence to provide particular sound
 13 pressure thresholds at which wind turbines cause
 14 sleep disruption and that further studies are
 15 needed. Is that correct?
 16 **A. One of the things that we did when we**
 17 **looked at the existing data was to try and figure**
 18 **out what were the sound pressure levels that were**
 19 **disturbing people. We looked at the medical**
 20 **problems that were -- that we felt were not merging**
 21 **from the scientific literature, and we left this as**
 22 **an open-ended opportunity, a solicitation for**
 23 **someone to come along and do a study that showed**
 24 **sound pressure level. We expected that the sound**

1 **life.**
 2 Q. Okay, but that would not --
 3 **A. To clarify, normal aging is not considered**
 4 **a vulnerable population, would not be -- plenty of**
 5 **people in advanced age sleep very well. So no, I**
 6 **would not include normal aging in the vulnerable**
 7 **population. I would offer that people as they get**
 8 **older tend to sleep a little bit lighter, but not to**
 9 **the degree that we're talking about in this**
 10 **executive summary, no.**
 11 Q. How about children?
 12 **A. Children would not. To the contrary, they**
 13 **would be quite protected.**
 14 Q. How about people with autism?
 15 **A. Not to my knowledge.**
 16 Q. Okay. I'm going to say something and I do
 17 this a lot worse than you, but she can't take down
 18 both of us. So there's going to be times when you
 19 know what I'm asking and -- in normal conversation,
 20 but she's going to kill one of us and it will most
 21 likely be me. So I do it worse than you do, but
 22 let's -- we'll try and focus on that if we can,
 23 Doctor.
 24 The report also says that there's not

1 **pressure levels would be substantially higher than**
 2 **their existing levels because we were not seeing**
 3 **medical effects from wind turbine communities or the**
 4 **scientific literature.**
 5 Q. But the panel did not find enough evidence
 6 to provide particular sound pressure thresholds at
 7 which wind turbines cause sleep disruption, correct?
 8 **A. The panel was charged to look at the**
 9 **medical implications of existing wind turbines, and**
 10 **we did not find evidence to support medical**
 11 **consequences from wind turbines. We also offered**
 12 **that to the extent that someone would like to look**
 13 **at the physiology and compare the physiology of**
 14 **sleep to the sound pressure levels, we would welcome**
 15 **that data. We found that it was quite likely that**
 16 **those sound pressure levels would be quite higher**
 17 **than the sound pressure levels that we're looking at**
 18 **today. But you are correct that we did not have a**
 19 **definitive sound pressure level to hang our hat on.**
 20 Q. Nowhere in the executive summary does it
 21 say that the levels would be higher than what people
 22 thought they were as of that day, correct?
 23 **A. That's correct. But several places it**
 24 **says that there was limited or no evidence that**

1 existing wind turbines were causing health
2 consequences, and so there is -- I mean I was there
3 in those discussions, the dates -- I wrote this. So
4 while we didn't say those exact words, it was clear
5 in my mind and sort of implied on paper that the
6 existing sound pressure levels were not that of
7 concern for health and well-being.

8 Q. You wrote this executive summary yourself?

9 A. I wrote it in collaboration with --

10 Q. With six other people, correct?

11 A. Yes.

12 Q. I did it that time, sorry. There is some
13 level at which wind turbines cause sleep disruption,
14 isn't there?

15 A. There is some level in which any sound can
16 cause sleep disruption, yes.

17 Q. Including wind turbines.

18 A. Including wind turbines.

19 Q. We're just not sure what that level is,
20 correct?

21 A. Well, we're quite certain that it's not at
22 the existing levels. We are not seeing medical
23 consequences as a result of wind turbines in
24 existence. So yes, we are certain. We're just not

1 question repeatedly. I think it's time to move on.

2 MR. LUETKEHANS: He has not answered that
3 question once.

4 MR. BLAZER: I believe he has. Three
5 times.

6 CHAIRMAN CORNALE: All right. We believe
7 the question has been asked and answered, but if
8 you'll ask it again and get an answer. Go ahead.

9 MR. LUETKEHANS: Any chance?

10 (Requested portion of the deposition was
11 read by the court reporter.)

12 A. Which people are you referring to?

13 Q. People that you were talking about that
14 you -- the scientific literature that you were
15 reviewing, they said that there was limited or no
16 effects.

17 A. We reviewed countless communities. I
18 could try to begin from my memory to say what the
19 levels were, but I think it would be best if I sort
20 of appeal to common sense that we were looking at
21 the existing communities in plural, looking at all
22 the available scientific literature, and not coming
23 up with compelling evidence from any of them that
24 they were causing health effects.

1 certain what level higher than the existing levels
2 are causing problems.

3 Q. Where in this report does it say that the
4 existing levels are not sufficient to cause
5 problems?

6 A. It says over and over that there's limited
7 evidence to support any health effect whatsoever
8 from wind turbines, and I don't know what level. We
9 were using data from existing communities, from --

10 Q. What -- go ahead, I'm sorry.

11 A. So it doesn't say those words, but it --
12 certainly that was the signature process, was we
13 were looking at the scientific literature emerging
14 from the communities in which these wind turbines
15 exist.

16 Q. So you were looking at the scientific
17 literature and you don't know as you stand here
18 today what levels those people were being subjected
19 to, do you?

20 MR. BLAZER: Mr. Chairman, I think that
21 question has now been asked at least twice, possibly
22 three times.

23 MR. LUETKEHANS: No, I --

24 MR. BLAZER: The witness has answered the

1 Q. So you weren't able to find causation is
2 what you're saying.

3 A. We certainly were not able to find
4 causation. I don't know if that's all I'm saying,
5 but I'm certainly saying that.

6 Q. Okay. Were you -- were you saying that
7 you were unable to find association?

8 A. I think in any instance in which we found
9 associations between wind turbines and health
10 effects, particularly sleep but any, any such health
11 effect, they were marked by severe problems and were
12 sparse in nature, severe problems meaning the actual
13 study themselves were problematic and they were
14 extremely infrequent.

15 So what we did was we looked at that, and
16 as a community, as a committee, we chose the
17 language, for better or worse, to say what we found,
18 which is there was limited evidence to support the
19 health effects of wind turbines. And that was
20 coming from a whole host of communities, all of whom
21 had the opportunity to be examined and studied and
22 reported.

23 Q. Your report did not rule out the
24 possibility that noise from wind turbines could

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1 cause sleep disruption, did it?
 2 **A. Can you explain what ruled out means?**
 3 Q. Well, it didn't say it was impossible, did
 4 it?
 5 **A. I wouldn't say anything is impossible.**
 6 Q. In fact, your report goes, "It is possible
 7 that noise from wind turbines can cause sleep
 8 disruption." Correct?
 9 **A. And let me remind myself if that's from**
 10 **census about vulnerable populations. Hang on just a**
 11 **minute.**
 12 Q. It's page 6, paragraph 2. It's a direct
 13 quote.
 14 **A. Yes, at that -- that sentence, and I'll**
 15 **read it, "There is limited evidence from**
 16 **epidemiologic studies suggesting an association**
 17 **between noise from wind turbines and sleep**
 18 **disruption."**
 19 Q. And then it goes on to say, "In other
 20 words --
 21 **A. But let me just explain what that means**
 22 **and then I'm -- may I just answer?**
 23 Q. Uh-huh.
 24 **A. I won't take long, I promise. When that**

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1 **sentence finishes, what we're saying is looking at**
 2 **the available scientific literature, listening to**
 3 **concerns, we're not finding sleep disruption. That**
 4 **said, it is possible and it is certainly -- it is**
 5 **certain that all noises at some level will wake**
 6 **people up. So we wanted to leave open the**
 7 **possibility that someone would come and help clarify**
 8 **that higher, presumably higher level. That is what**
 9 **was intended. I admit to you that that is not**
 10 **precisely what is written.**
 11 Q. It's clearly not what's written, correct?
 12 **A. Not correct.**
 13 Q. It's clearly not -- nothing in this report
 14 goes to the extent you just said it does. It
 15 doesn't say what you said.
 16 **A. If -- if wind turbines were to cause sleep**
 17 **disruption, we would see sleep disruption from wind**
 18 **turbines. Since we're not seeing those, what would**
 19 **you conclude?**
 20 Q. So what you're saying is that the studies
 21 you reviewed did not find any association -- found
 22 limited evidence of association between wind
 23 turbines and sleep disruption.
 24 **A. I think limited is a generous word**

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1 **actually, but yes, limited evidence.**
 2 Q. It's the word you used, correct? It's not
 3 the word I used. It's the word you used in the
 4 study.
 5 **A. That's correct.**
 6 Q. Okay. The report also says that further
 7 study would provide what the -- would be able to
 8 provide what those levels of disruption are,
 9 correct?
 10 **A. Could you point out to where you're**
 11 **reading?**
 12 Q. Well, I'm just talking about in general
 13 right now.
 14 **A. Yes. Excuse me for interrupting. Yes, in**
 15 **general somewhere on this page, and certainly we did**
 16 **say that we were in some ways soliciting studies to**
 17 **help clarify what those levels were with an**
 18 **assumption, albeit not written here, that they would**
 19 **be substantially higher.**
 20 Q. You did find some evidence, whether or not
 21 conclusive, as to causal effect that suggested an
 22 association between noise from wind turbines and
 23 sleep disruption, didn't you?
 24 **MR. BLAZER:** Mr. Chairman, again, I think

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1 we've been through this question multiple times and
 2 the witness has answered it multiple times.
 3 **BY MR. LUETKEHANS:**
 4 Q. Well, let me ask this question. The New
 5 Zealand study that you looked at found some evidence
 6 that suggested an associated -- association between
 7 noise from wind turbines and sleep disruption,
 8 didn't it?
 9 **A. Any study that demonstrated any**
 10 **relationship between sleep and wind turbines were no**
 11 **better than a survey study that had substantial**
 12 **problems in the methodology.**
 13 Q. Okay, so all of the studies that found
 14 some association you found problems with. Is that
 15 the point?
 16 **A. Many problems.**
 17 Q. Many problems with. The -- is it possible
 18 that mere annoyance can cause sleep issues?
 19 **A. Can you explain annoyance?**
 20 Q. I don't know. It was a term I think you
 21 used the first night, it was an annoyance, you found
 22 annoyance. You didn't find health problems, you
 23 found annoyances.
 24 **A. On any given night someone could be**

1 **annoyed enough to have trouble sleeping, sure.**

2 Q. Okay. And if that annoyance occurred over
3 time after time after time, it could cause trouble
4 for more than just one night, correct?

5 **A. I think to the extent that someone had**
6 **repeated severe sleep problems as a consequence of**
7 **annoyance, I would rather they be seen and evaluated**
8 **by a psychiatrist or a psychologist who could help**
9 **to under -- now, that's not to say that there aren't**
10 **real things that annoy people, but if they're**
11 **standing out from the population, I think I would**
12 **like to make sure that the annoyance is related one**
13 **on one from this response.**

14 **Now, if that were the case, that normal**
15 **human response, I would think, would be to pursue**
16 **some activity to resolve that annoyance if the**
17 **person were not able to cope with that.**

18 Q. Such as move?

19 **A. I was speaking more in general. Can you**
20 **tell me what you mean move? You mean if they're**
21 **near a wind turbine --**

22 Q. Let's talk about -- let's assume for my
23 hypothetical that a wind turbine -- and I know you
24 haven't found any association or causation. Let's

1 **their neighborhood ugly. If moving is a reasonable**
2 **way to deal with that, if it's that severe, I'm not**
3 **going to stand in the way of that, but I think if**
4 **the issue is wind turbines, I'm really uncomfortable**
5 **with the idea that we're just going to blow off the**
6 **idea that people are annoyed because. Because of**
7 **what?**

8 Q. Well --

9 **A. Because of misinformation? Because of an**
10 **unrealistic expectation that wind turbines cause a**
11 **full body potpourri of severe medical problems,**
12 **which is absolutely unsubstantiated or unsupported**
13 **by medical or scientific literature.**

14 Q. Let's stay with one thing at a time
15 because the question is annoyance. That's where we
16 were, that's where we started, that's where we're
17 staying, Doctor. I didn't take you past -- anything
18 past annoyance.

19 And you said if you're annoyed on a night
20 to an extent from some outside influence, whatever
21 it may be, that you can have sleep disruption,
22 correct?

23 **A. I think to the extent that the**
24 **conversation we're having is about cause and**

1 assume I lived -- and this is an extreme example, I
2 will admit that, but let's assume that I live a
3 hundred feet from a wind turbine, okay, and that
4 annoyance created the need for me, as you said, to I
5 think avoid the situation. And you didn't use those
6 words, but I'm kind of paraphrasing. Correct?

7 **A. Number one, I don't think it would be**
8 **constructive for this group to consider a**
9 **hypothetical that isn't possible and doesn't exist.**

10 Q. I guess --

11 **A. Number two -- I would like to finish my**
12 **answer.**

13 Q. Yes.

14 **A. Number two, I think, rather than move, I**
15 **would really prefer that someone were to consider**
16 **the possibility that actually the concern that they**
17 **have and the annoyance that they have from a wind**
18 **turbine is partly, if not totally, caused by an**
19 **unreasonable set of knowledge about the fact that**
20 **wind turbines cause medical problems. And I think**
21 **this has been the big disservice. This is where**
22 **probably a lot of us in this room will disagree.**

23 **Now, if you find a wind turbine ugly, I**
24 **think there are lots of people that find items in**

1 **effect --**

2 Q. We're not having a conversation.

3 **A. -- then I think we should have --**

4 **MR. BLAZER:** Mr. Chairman, I would
5 appreciate it if you'd instruct counsel not to
6 interrupt the witness when he's trying to answer his
7 question.

8 **MR. LUETKEHANS:** If he was answering my
9 question, I wouldn't have to interrupt.

10 **A. I'd really prefer --**

11 **MR. BLAZER:** Hang on, hang on a second,
12 Dr. Ellenbogen.

13 **CHAIRMAN CORNALE:** Dr. Ellenbogen, please
14 do your best to simply answer the question that Mr.
15 Luetkehans has without --

16 **A. Yes.**

17 **CHAIRMAN CORNALE:** -- extrapolating.

18 **A. Yes.**

19 **CHAIRMAN CORNALE:** Okay.

20 **A. I think that he asked me if I thought it**
21 **was reasonable for people to move if they became**
22 **annoyed with wind turbines, and my response is I**
23 **think it's more reasonable to think about what are**
24 **the issues that are causing people to be annoyed by**

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1 **the wind turbine. If it's a concern about medical**
 2 **problems, I think the best thing to do would be to**
 3 **become educated about wind turbines, because they**
 4 **simply don't cause that potpourri of medical**
 5 **problems that people are concerned about. That's my**
 6 **answer.**
 7 Q. And you've made that statement a number of
 8 times and I'm asking a different question, okay? My
 9 question is we started off with annoyance could
 10 cause someone to have disturbed sleep from some
 11 outside factor, it may be noise, it may be a wind
 12 turbine, it may be whatever, and then -- correct?
 13 **A. Uh-huh.**
 14 Q. And then you went, you went on to say that
 15 if it happened numerous times, that they should
 16 maybe look at some other action.
 17 **A. And that action can include cognitive or**
 18 **behavioral therapy, which includes getting realistic**
 19 **expectations about what are making people annoyed.**
 20 **I can't answer the question the way --**
 21 Q. Okay, well --
 22 **A. -- you want me to. I can only answer the**
 23 **question the way I have it in my head.**
 24 Q. Okay. Well, let's talk about the question

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1 that I'm asking. I live next to the el in Chicago.
 2 You know what the el is in Chicago?
 3 **A. Yes.**
 4 Q. Okay. That el goes by in the middle of
 5 the night 50 times, correct, or whatever it may be.
 6 It goes by a lot. Live right under it. I hear that
 7 50 times a night. That's annoying to me. You
 8 may -- it may not be annoying to someone else,
 9 someone else can live with it, but it's annoying to
 10 me.
 11 Would you agree that that's a possibility,
 12 that people could be annoyed by living underneath
 13 the el tracks in Chicago?
 14 **A. Of course.**
 15 Q. And because of the sound, we know it
 16 generates sound, correct?
 17 **A. Okay.**
 18 Q. If I don't -- if that sound gets so
 19 annoying to someone, one of their options is to
 20 move, correct?
 21 **A. Yes, of course. If I understand that**
 22 **analogy, if I may, the annoying part to you was that**
 23 **it's disrupting sleep or merely the fact that it**
 24 **goes by every so often and you hear it or --**

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1 Q. The noise, the noise that disrupts the
 2 sleep.
 3 **A. Okay. It would be -- I think there are --**
 4 **you know, I'm not in a position to suggest which**
 5 **question you ask or don't, but --**
 6 Q. Well, then don't please.
 7 **A. Good idea.**
 8 Q. And as you testified earlier, sleep
 9 disruption can cause numerous health problems,
 10 correct? And those problems occur regardless of the
 11 cause of that sleep disruption, correct?
 12 **A. Sorry, could you repeat the beginning of**
 13 **that?**
 14 Q. Yes. You testified -- and I'm not trying
 15 to get you to answer a question many times, but I'm
 16 just trying to set up the next one. You testified
 17 earlier that sleep disruption can cause numerous
 18 health problems, correct?
 19 **A. Yes.**
 20 Q. Okay. And those health problems occur
 21 with sleep disruption regardless of the cause,
 22 whether it be an el or -- whether it be el tracks or
 23 whether it be something else, correct?
 24 **A. Absolutely not. There are numerous forms**

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1 **of sleep disruption and one is not like the other.**
 2 **I could go into many examples if you like.**
 3 Q. Okay, so my question is -- no. We talked
 4 about sleep disruption can cause health problems,
 5 correct?
 6 **A. Yes.**
 7 Q. Okay. Whether that sleep disruption is
 8 coming from a water dripping on my head every ten
 9 minutes or from noise or whatever it may be, that
 10 sleep disruption, if I can't sleep for two weeks or
 11 however long it takes, I could have a health
 12 problem, correct?
 13 **A. That is not the way a sleep medicine**
 14 **specialist would think about that issue. So I would**
 15 **be happy to tell you how I do think about that.**
 16 Q. I don't want to know how you think about
 17 it. I just want an answer to my question.
 18 **A. I'm trying to answer it.**
 19 Q. So you're saying to me that if I --
 20 **MR. BLAZER:** Mr. Chairman, I think the
 21 witness should be allowed to answer the question.
 22 **MR. LUETKEHANS:** You know, he didn't --
 23 **MR. BLAZER:** I think the witness should be
 24 allowed to answer the question.

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1 **MR. LUETKEHANS:** He wasn't answering my --
 2 **MR. BLAZER:** I think the witness should be
 3 allowed to answer the question.
 4 **CHAIRMAN CORNALE:** All right, all right,
 5 all right. The question has been asked and
 6 answered. Well, Mr. Luetkehans, he answered the
 7 question in his expertise.
 8 **AUDIENCE VOICE:** No, he didn't.
 9 **MR. LUETKEHANS:** I would ask that the
 10 transcript show that -- the transcript will show
 11 that he never answered the question. He wanted to
 12 answer a different question and he refused to answer
 13 the question that I asked.
 14 **MR. BLAZER:** That is completely incorrect.
 15 Mr. Luetkehans may not like the answer --
 16 **CHAIRMAN CORNALE:** Mr. Blazer, Mr. Blazer.
 17 Mr. Luetkehans, Dr. Ellenbogen answered the
 18 question. You asked if the drips were on your head,
 19 if all those situations, and he said no. He said
 20 no. It's in the transcript.
 21 **BY MR. LUETKEHANS:**
 22 Q. Have you ever actually treated a patient
 23 who complained to you that noise from a wind turbine
 24 was disrupting his sleep?

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1 **A. No.**
 2 Q. You treat patients who complain of sleep
 3 problems all the time, correct?
 4 **A. Yes.**
 5 Q. And in assessing those patients who make
 6 complaints, they make complaints to you about what
 7 is ailing them, correct?
 8 **A. Yes.**
 9 Q. And you don't dismiss those complaints,
 10 correct?
 11 **A. To the contrary, I take them very**
 12 **seriously.**
 13 Q. And you investigate the validity of those
 14 complaints as best you can, correct?
 15 **A. Yes.**
 16 Q. And you try to determine the cause of the
 17 ailment that they're complaining about, correct?
 18 **A. Yes.**
 19 Q. As a doctor, when trying to treat a
 20 patient, you're sometimes limited to their
 21 subjective statements of complaints, correct?
 22 **A. Yes.**
 23 Q. And if you're able to get objective proof
 24 of what their problem is, that helps you to treat

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1 them, correct?
 2 **A. Certainly.**
 3 Q. But you can't always get objective
 4 evidence of what their ailment is, can you?
 5 **A. I can -- I can't always get objective**
 6 **evidence? Do you mean like if their insurance**
 7 **denies a test or something or can you give me an**
 8 **example?**
 9 Q. No, I'm saying if you -- are there times
 10 when you are aware of a subjective complaint and
 11 cannot ever, not finally or just resolve exactly the
 12 purpose or what is causing that complaint? That's
 13 never happened to you?
 14 **A. I can tell you what has never happened to**
 15 **me. I've never had someone come to me and report a**
 16 **subjective complaint and we just ended there. I**
 17 **always take a very detailed history, which includes**
 18 **them not only reporting the concern that they have**
 19 **but answering directed questions that may or may not**
 20 **relate to that problem to find the most likely**
 21 **problem that they do have. And sometimes when we**
 22 **have objective tests beyond my physical examination**
 23 **and history taking that are available, sometimes,**
 24 **for whatever reason, those tests could either not be**

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1 **ordered or not be able to be ordered. Yes, I'm**
 2 **sometimes in that position.**
 3 Q. And sometimes they're ordered and they
 4 come back negative.
 5 **A. Yes.**
 6 Q. You seem to dismiss the complaints of
 7 those who claim health problems as a result of wind
 8 turbines, don't you?
 9 **A. I find that offensive. I don't dismiss**
 10 **any complaint by any person. I treat it very**
 11 **seriously, and I would say that probably in this**
 12 **room I'm the person that's spent the most time on**
 13 **this issue.**
 14 Q. Have you -- if someone came to you today
 15 and said I have a -- I'm having sleep disruption and
 16 I believe it's because of the wind turbine, would
 17 you think that that is a correct statement?
 18 **A. I don't know that the expression "correct**
 19 **statement" is the appropriate thing. What's correct**
 20 **is that that's their concern and that's the concern**
 21 **that would go down. I'd take a detailed history,**
 22 **exam, get tested. That's the process that we do.**
 23 **We don't end with the subjective concern. I take it**
 24 **very seriously. If someone were to say they had a**

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1 **problem with a wind turbine, you bet I would think**
 2 **about that and that would be on my list. But also**
 3 **given what I know and what I've looked at, I would**
 4 **be thinking about a whole host of other problems as**
 5 **I often do when someone has a medical concern or**
 6 **complaint.**
 7 Q. Including bias against wind turbines?
 8 **A. Can you explain what you mean by that?**
 9 Q. Well, I think we've heard a lot of
 10 statements in your opinion that much of the wind
 11 complaints or people's complaints against wind
 12 turbines are due to preexisting bias towards wind
 13 turbines. Is that a fair statement or --
 14 **A. That is not a fair statement. I've had**
 15 **the opportunity, probably the only one that I know**
 16 **of, to interview and examine individual people who**
 17 **raised concern about their health and well-being as**
 18 **a consequence of sleep disruption -- of medical**
 19 **problems due to wind turbines.**
 20 Q. Four people, correct?
 21 **A. Four people, that's correct. I spent**
 22 **hours with each of them, with their families and**
 23 **their neighborhood. I did history, I did exam. And**
 24 **for each of those people, I found compelling reasons**

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1 **for their concerns which they were attributing to --**
 2 **their health to the wind turbines. Now, does that**
 3 **make me having a bias?**
 4 Q. Well, I'm not talking about your bias.
 5 **A. Oh, excuse me.**
 6 Q. I was not talking about a bias for you.
 7 **A. Oh.**
 8 Q. I was talking about the bias -- a bias
 9 against wind turbines for people living near
 10 turbines that are having these complaints and that
 11 it's caused by their bias not your bias.
 12 **A. I see. Anybody that had a complaint and**
 13 **they said it was because of whatever they think it's**
 14 **because of, I take that seriously. If someone says**
 15 **it's because of the wind turbine, I would take that**
 16 **seriously. Today I would still take that seriously.**
 17 **But that doesn't mean that I think that that's the**
 18 **most likely factor. I'd probably think that that's**
 19 **the least likely problem, but I would take it**
 20 **seriously because that's a real concern raised by a**
 21 **real person.**
 22 Q. Okay. Since the publication of your 2012
 23 report, you're aware of additional research having
 24 been published, correct?

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1 **A. Yes.**
 2 Q. Do you know of a doctor in the United
 3 Kingdom by the name Christopher Hanning,
 4 H-A-N-N-I-N-G?
 5 **A. Off the top of my head, the name does not**
 6 **ring a bell, no.**
 7 Q. In your 2012 report, you actually identify
 8 him in the bibliography. Can you find that for us?
 9 **A. I couldn't possibly in the -- would you**
 10 **like me to --**
 11 Q. Yeah, it's in the bibliography, page B4.
 12 I'm just making sure I'm not mistaken.
 13 **A. Okay, then if you know the page that --**
 14 Q. B4.
 15 **A. Yes. I see an article from 2009 by that**
 16 **author.**
 17 Q. Okay. And he's an M.D., correct? Do you
 18 know that?
 19 **A. I already said I don't think I know him or**
 20 **recall who that person is.**
 21 Q. Okay. Do you know that in late 2012 Dr.
 22 Hanning pushed a study with several other doctors
 23 regarding the effects of wind turbine noise on sleep
 24 and mental health?

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1 **A. I would need to see that article. I**
 2 **cannot possibly have memorized every article that**
 3 **has come into the scientific literature, but if you**
 4 **have it, I would be glad to look at it.**
 5 Q. It's actually one of the studies that your
 6 counsel, that Mr. -- Mr., excuse me, Blazer put into
 7 evidence. It's Petitioner's Exhibit 79.
 8 **MR. LUETKEHANS:** Do you have a copy of it
 9 for him, Mike?
 10 **MR. BLAZER:** I do not.
 11 **CHAIRMAN CORNALE:** Got it.
 12 **BY MR. LUETKEHANS:**
 13 Q. Showing you what has been marked as
 14 Pleasant Ridge Exhibit 79, have you ever seen this
 15 before?
 16 **A. Can I take a moment to look at it please?**
 17 Q. Sure.
 18 **A. Okay.**
 19 Q. In Dr. Hanning's study on page 242 under
 20 conclusions, he concluded that the noise emissions
 21 of -- from wind turbines disturb sleep, can cause
 22 daytime sleepiness and impaired mental health to
 23 residents living within 1.4 kilometers of the
 24 turbine, correct?

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1 **A. If you'd point out to where you were**
 2 **reading so I can follow.**
 3 Q. Conclusion, page 242, first sentence.
 4 **A. Industrial wind turbine noise is more**
 5 **annoying than road, rail, aircraft --**
 6 Q. No, conclusion on page 242.
 7 **A. "We conclude that noise emissions of**
 8 **industrial wind turbines disturb sleep and cause**
 9 **daytime sleepiness and impaired mental health to**
 10 **residents living within 1.4 kilometers of the two**
 11 **industrial wind turbine installation studies."**
 12 **I do notice that I had referred to this, I**
 13 **apologize, as the Nissenbaum study, I just mentioned**
 14 **the first doctor, but I am aware of this, yes.**
 15 Q. Okay. And Dr. Hanning and his coauthors
 16 on page 240 stated on the right-hand side, first
 17 full sentence, "The levels of sleep disruption and
 18 daytime consequences of increased sleepiness
 19 together with the impairment of mental health, and
 20 that those response relationships they observed in
 21 their study, strongly suggest that the noise from
 22 wind turbines resulted in similar health impacts as
 23 other causes of environmental noise." Correct? Do
 24 you see that?

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1 **A. I did not read that along with you, but**
 2 **I'll take your word for it that that's what they**
 3 **said.**
 4 Q. Okay, your January 2012 study did not have
 5 the benefit of having this study by Dr. Hanning
 6 available to review at the time, correct?
 7 **A. Correct.**
 8 Q. You're aware of who Dr. Salt is, correct?
 9 **A. Dr. who?**
 10 Q. Salt.
 11 **A. Yes, sir.**
 12 Q. How about Dr. Lichtenhan,
 13 L-I-C-H-T-E-N-H-A-N?
 14 **A. Top of my head, no, but maybe you can**
 15 **correct my memory with a paper.**
 16 Q. Okay. Are you aware that they published a
 17 report in August '12 regarding the effects of low
 18 frequency sound entitled "Perception-based
 19 protection from low frequency sounds may not be
 20 enough?"
 21 **A. I have heard of that article, yes. This**
 22 **is a research study or this is their opinion study?**
 23 **I know of two studies by them. One is --**
 24 Q. I'm going to show you the study and you

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1 can...
 2 **A. Yes, I'm familiar with this study.**
 3 Q. Okay. And you're aware that they
 4 concluded that the physiological effects of low
 5 frequency sounds are more complex than is widely
 6 appreciated, correct?
 7 **A. I would agree that that's what their**
 8 **conclusion was, correct.**
 9 Q. Okay. Would you agree with them that low
 10 frequency sounds can affect people in ways that are
 11 not yet fully understood?
 12 **A. I would have serious concerns with this**
 13 **paper that I would be delighted to share with you.**
 14 Q. My question is would you agree that low
 15 frequency sounds can affect people in ways that are
 16 not yet fully understood?
 17 **A. I couldn't possibly agree with the**
 18 **conclusions of a paper that I have great issue with.**
 19 Q. My question isn't whether you agree with
 20 the conclusion. My question is are you agreeing
 21 with the statement.
 22 **A. Okay, then try again please.**
 23 Q. Are you -- would you agree that low
 24 frequency sounds can affect people in ways that are

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1 not yet fully understood?
 2 **A. You're asking me to agree that things that**
 3 **we don't know might exist? I'm trying to --**
 4 Q. No, listen to the -- low frequency sounds,
 5 they exist, correct?
 6 **A. Yes, sir.**
 7 Q. And would you agree they affect people in
 8 ways that we may not yet understand?
 9 **A. I couldn't possibly answer that kind of**
 10 **question. Everything could affect things in ways we**
 11 **can't possibly understand.**
 12 Q. Okay.
 13 **A. You're asking me to acknowledge --**
 14 Q. Okay.
 15 **A. -- what isn't known.**
 16 Q. And again, your group did not have the
 17 benefit of this UCLC Exhibit 20 at the time you
 18 filed your January 2012 report, correct?
 19 **A. That's correct, but if we had --**
 20 Q. You acknowledge --
 21 **MR. BLAZER:** I'm sorry, Mr. Chairman. He
 22 wasn't done answering the question. I would ask
 23 that he be allowed to finish answering the question.
 24 **MR. LUETKEHANS:** He answered the question.

1 If he wants to go answer another question, Mr.
2 Blazer I'm sure is going to have the opportunity to
3 ask or somebody else can ask him. I'm looking for
4 the answers to my questions not what he wants to
5 answer.

6 **CHAIRMAN CORNALE:** I do agree that he did
7 answer the question and he wanted to extrapolate
8 again. So I'm going to remind you, answer the
9 question that he poses and stop.

10 **A. Okay, it is hard to be forced to a yes or**
11 **no when there is a sentence to be had, but --**

12 **CHAIRMAN CORNALE:** Unfortunately it's a
13 yes or no dialogue we have here.

14 **BY MR. LUETKEHANS:**

15 Q. You did acknowledge in your report that if
16 infrasound -- the Massachusetts report, that if
17 infrasound comes into a structure, a person inside
18 the structure could feel it, correct?

19 **A. I believe that's the exact wording. I**
20 **didn't memorize the report.**

21 Q. Okay. So even if they cannot hear the
22 noise, they can feel it in their home. That's
23 really what it means, correct?

24 **A. If it's of sufficient sound pressure**

1 Q. Okay. Rob Rand, R-A-N-D?

2 **A. Off the top of my head, no, but perhaps**
3 **you can remind you.**

4 **MR. BLAZER:** I'm sorry, if we could get
5 some clarification. I've never heard of a Dr.
6 Stephen Ambrose. I've heard of a Stephen Ambrose
7 who's an acoustician who's not a doctor. Are we
8 talking about the same person?

9 **BY MR. LUETKEHANS:**

10 Q. All right, he's Stephen Ambrose. Have you
11 heard of Stephen Ambrose?

12 **A. Yes.**

13 Q. Okay, thanks. Have you ever heard of
14 Carmen Krogh, K-R-O-G-H?

15 **A. No.**

16 Q. Okay. Are you aware that in August 2012
17 they presented a study regarding wind turbine
18 infrasound and low frequency noise measurements?

19 **A. Off the top of my head, no, but if you**
20 **supply me with it, like the previous one, it could**
21 **probably jog my memory.**

22 Q. I'm going to show you for the record what
23 has been marked has UCLC Exhibit 32.

24 **A. Will we have the opportunity to return to**

1 **level, then yes.**

2 Q. Okay. And those types of feelings of
3 disruption in your home that we just talked about,
4 not any other ones, just the ones about sound coming
5 into your home, that's been shown to cause feelings
6 of uneasiness, findings of uneasiness, correct?

7 **A. I'm not aware of that specific complaint,**
8 **but yes, low frequency sounds, infrasounds, that are**
9 **of a very high sound pressure level can make people**
10 **feel uneasy to use your term. I probably wouldn't**
11 **find it in this report, I didn't memorize that**
12 **language, but yes.**

13 Q. Whether you agree with how the studies
14 were done or not, you would have -- you would agree
15 that there are numerous reports which state that
16 individuals living near wind turbines have made
17 complaints that commonly includes chronic sleep
18 disturbance, correct?

19 **A. Correct, and that's precisely why this**
20 **kind of group participation and independent**
21 **evaluation is necessary.**

22 Q. Okay. You're familiar with Dr. Stephen
23 Ambrose?

24 **A. I -- yes, mildly.**

1 **the other articles or would you like these back?**

2 Q. I don't need them back. You can hold on
3 to them. I think the only one that I can recall
4 we're going to use again is your -- is your report.
5 But don't hold me to it; my memory's not that great.

6 Okay, you now have before you UCLC Exhibit
7 32?

8 **A. Sorry, I don't have that, excuse me.**

9 Q. You do or don't? I thought I handed it to
10 you.

11 **A. I now have it, yes.**

12 Q. Okay. It's entitled Falmouth,
13 F-A-L-M-O-U-T-H, Massachusetts, Wind Turbine
14 Infrasound and Low Frequency Noise Measurements,
15 correct?

16 **A. Correct.**

17 Q. Okay. Have you seen this report before?

18 **A. I have not. I've heard of it though.**

19 Q. Are you aware that the report found a
20 strong correlation with wind speeds, power output
21 and health symptoms?

22 **A. I'm not.**

23 Q. Again, this was a report you would not
24 have had the benefit of in January 2012 when you did

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1 your report.
 2 **A. That's true. Although I have kept up with**
 3 **a fair bit of literature, I haven't memorized all of**
 4 **them, but if you want, I would be happy to look at**
 5 **this and make comment on it.**
 6 Q. That's okay. Doctor, you're familiar with
 7 a report written by Paul Schomer and a colleague in
 8 which they -- or excuse me, are you familiar, I
 9 shouldn't assume it, are you familiar with a report
 10 written by Paul Schomer and a colleague in which
 11 they critique your January 2012 report? It's the
 12 article's A Critical Analysis of the Wind Turbine
 13 Impact Health Study?
 14 **A. I'm not aware of that critique, although**
 15 **there have been many critiques that I'm aware of,**
 16 **yes.**
 17 Q. Okay. I'm going to show you what has been
 18 marked as UCLC Exhibit 33. You're not familiar with
 19 this report?
 20 **A. No.**
 21 Q. Okay. This critique on page 3, about
 22 almost half the way down, it says the MA study --
 23 that's your Massachusetts report, correct?
 24 **A. Uh-huh.**

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1 Q. -- ignores the major findings by Van den
 2 Berg, V-A-N space D-E-N space, capital B-E-R-G, 2004
 3 that appear to be contrary to the findings of the
 4 Massachusetts study. Do you see that?
 5 **A. Yes.**
 6 Q. And that was one of their critiques of
 7 your study, correct?
 8 **A. Correct, that that's the sentence that**
 9 **you've just read, yes.**
 10 Q. Okay. Another -- if you go to page 5,
 11 another criticism by Schomer, it's right underneath
 12 B, Human Response, is that your report appears to
 13 find something wrong with every study that is
 14 done -- that has been done regarding annoyance
 15 generated by wind turbines, correct?
 16 **A. I can't say that there was a single paper**
 17 **that didn't have some problems. Some were much more**
 18 **severe than others.**
 19 Q. But that's his criticism of your report,
 20 correct?
 21 **A. You want me to confirm his criticism?**
 22 Q. Well, I'm just reading this off --
 23 **A. Sure.**
 24 Q. Okay.

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1 **MR. BLAZER:** Mr. Chairman, could I ask
 2 what the relevance is of counsel reading a report
 3 that this witness has never seen? If he has a
 4 witness somewhere down the road that's going to try
 5 to authenticate this or the --
 6 **MR. LUETKEHANS:** Are we now dealing with
 7 the rules of evidence and foundation here all of a
 8 sudden?
 9 **MR. BLAZER:** No, my --
 10 **MR. LUETKEHANS:** Can I finish? My
 11 foundation -- my foundation objection on the first
 12 night was ruled out of hand because we're not
 13 dealing with federal rules of evidence for
 14 foundation.
 15 **MR. BLAZER:** This isn't an issue of
 16 foundation. It's an issue of what is the relevance
 17 of asking the witness whether or not he can read
 18 comments from a report that he's never seen.
 19 **MR. LUETKEHANS:** You just said the
 20 objection's foundation.
 21 **CHAIRMAN CORNALE:** All right. We're going
 22 to allow the question in that we do feel it is
 23 important that you address possibly some criticisms,
 24 to either clarify it or to acknowledge it and maybe

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1 give us insight on the shortfall that they see in
 2 it.
 3 **A. Sure, although I would welcome a question**
 4 **that allows me to do that. He was just asking for**
 5 **confirmation that the sentence --**
 6 **BY MR. LUETKEHANS:**
 7 Q. Well, right now I'm asking are you aware
 8 of the study of the effects of wind turbine noise in
 9 Shirley, Wisconsin?
 10 **MR. BLAZER:** Well, you see, there we go,
 11 Mr. Chairman. There's the problem. The witness is
 12 trying to explain his answer. Counsel doesn't want
 13 to hear that explanation, which you just suggested
 14 is something the ZBA is interested in hearing, and I
 15 would agree we'd all be interested in hearing the
 16 witness's explanation if he has one, but that's not
 17 what counsel wants to hear.
 18 **MR. LUETKEHANS:** Correct, it's not what I
 19 want to hear.
 20 **CHAIRMAN CORNALE:** All right.
 21 **MR. LUETKEHANS:** I want to hear an answer
 22 to my questions not his.
 23 **CHAIRMAN CORNALE:** Here's what we're going
 24 to do. It's 7:30. We're going to take a ten minute

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1 break. You guys are going to cool down a little
 2 bit. You're going to have the opportunity to read
 3 through this study. Take a look at it. That way
 4 you can better address it when we return. So I've
 5 got 7:30. Let's try to get going at 7:40, 7:41, all
 6 right?
 7 (Recess at 7:30 p.m. to 7:42 p.m.)
 8 **CHAIRMAN CORNALE:** All right, make our way
 9 back to our seats. All right, we'll get going
 10 again. During the break, we had the opportunity to
 11 talk about some further scheduling, so I can put
 12 this out there. Everybody want to get something to
 13 jot these dates down and some times and locations?
 14 We're going to have to start alternating locations
 15 here as we move forward just based on availability.
 16 So looking into next year, there won't be
 17 anything between now and January the 12th. January
 18 12th we'll resume again. That will be here at the
 19 Walton Centre at 6:30. We'll have a meeting on the
 20 14th. That will be at the Pontiac High School at
 21 6:30. The next week down, we'll have a meeting on
 22 the 21st. That's Wednesday the 21st. That will be
 23 at 6:30.
 24 **AUDIENCE VOICE:** Where?

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1 **CHAIRMAN CORNALE:** Pontiac High School.
 2 Thursday, the 22nd, will be back here, Walton
 3 Centre, 6:30. Looking even further ahead, Monday
 4 the 26th at the high school, Pontiac High School,
 5 6:30. Wednesday, the 28th, back at this location at
 6 6:30.
 7 So that gives us a pretty good snapshot
 8 looking ahead. I can go through them real quick
 9 again. Did everybody get pretty much everything?
 10 Or from talking to their neighbors can get those
 11 dates if they had questions? Very good.
 12 All right. With that, Mr. Luetkehans, you
 13 may continue with Dr. Ellenbogen.
 14 **BY MR. LUETKEHANS:**
 15 Q. Dr. Ellenbogen, are you aware of the study
 16 of the effects of wind turbines on -- turbine noise
 17 in Shirley, Wisconsin?
 18 **A. I am aware of it although not in great**
 19 **detail.**
 20 Q. Okay. Again, that study was completed,
 21 and I'll just say for the record, December 2012, so
 22 that, again, that was after your Massachusetts
 23 study, correct?
 24 **A. Correct.**

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1 Q. Are you aware that that report was done by
 2 four separate investigating firms?
 3 **A. No, I was not.**
 4 Q. Okay. Are you aware of a study titled
 5 Systematic Review 2013: Association Between Wind
 6 Turbines and Human Distress?
 7 **A. Not off the top of my head, no.**
 8 Q. Okay. If I told you it was a study done
 9 by, and the lead author, and I don't know if that
 10 means anything, the first author, by Ian Arra,
 11 A-R-R-A, does that sound at all familiar to you?
 12 **A. By memory, no, I apologize.**
 13 Q. That's okay. Again, if this study was
 14 done in 2013, it looks like it was published,
 15 actually published May 23rd of 2014, Massachusetts
 16 wouldn't -- your Massachusetts report didn't have
 17 the ability to look at this study, correct?
 18 **A. Correct.**
 19 Q. Okay. Would you agree that science is
 20 still trying to quantify the relationship between
 21 wind turbines and subjective complaints of people
 22 who live near wind turbines?
 23 **A. To the extent that the people here in the**
 24 **room have the question, absolutely, but looking at**

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1 **the available scientific literature, I don't think**
 2 **that that is a terribly live issue, no.**
 3 Q. But there's no denying that people in
 4 different parts of the country have made complaints
 5 about similar symptoms, correct?
 6 **A. That is correct.**
 7 Q. Those complaints have included headaches,
 8 sleep disturbances, ear problems, vertigo, nausea,
 9 correct?
 10 **A. And many more, yes.**
 11 Q. Okay. You discussed the World Health
 12 Organization 2009 study in your 2012 Massachusetts
 13 report. Do you recall that?
 14 **A. Briefly, yes.**
 15 Q. But you recall it was in there. And I'm
 16 not --
 17 **A. Yes.**
 18 Q. I'm not going to ask you a bunch of
 19 questions about it without giving it to you, I
 20 promise you that.
 21 The World Health Organization is also
 22 known as the WHO, correct?
 23 **A. Yes.**
 24 Q. Okay. And they also did a study in 1999.

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1 Are you aware of that study?
 2 **A. I am in a faded memory sort of way, but**
 3 **yes.**
 4 Q. Okay, I'm going to give it to you so you
 5 don't have to faded memory it. One second.
 6 Okay, you now have in front of you UCLC
 7 Exhibit 36, correct?
 8 **A. Correct.**
 9 Q. Okay. And this is a 1999 report by the
 10 WHO entitled Guidelines for Community Noise; is that
 11 correct?
 12 **A. I don't immediately see the date here, but**
 13 **I'll take your word for it, yes.**
 14 Q. Okay, I think it's in that box on the
 15 first page.
 16 **A. Yes, I see it, correct.**
 17 Q. And that study was not specific to
 18 nighttime noise; is that correct?
 19 **A. Just to clarify the use of the term study,**
 20 **you asked me to clarify for my study, but like my**
 21 **study, this I believe is not a study. It is a**
 22 **report.**
 23 Q. Okay. So I'll try and call it a report.
 24 I may call it a study because that's what my notes

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1 say, but you cleaned that up. So if I do, I'm not
 2 trying to call it anything other than what you
 3 understand it to be, okay?
 4 In this 1999 report, the organization on
 5 page 9 of the executive summary at the bottom of
 6 that page noted that uninterrupted sleep is a
 7 prerequisite for good physiological and mental
 8 function. Would you agree with that statement?
 9 **A. Yes.**
 10 Q. Okay. And --
 11 **A. I might qualify that to think about what**
 12 **is a reasonable degree of uninterrupted sleep.**
 13 **Everybody, even in some healthy sleep patterns, has**
 14 **some degree of sleep interruption.**
 15 Q. And people my age, you always have
 16 interrupted sleep. We'll just leave it at that.
 17 **A. That's fine.**
 18 Q. The organization on that same page,
 19 slightly thereafter, also identified the primary
 20 effects of disturbed sleep, correct?
 21 **A. You said page 9, but I didn't --**
 22 Q. It's in the executive summary, so it's
 23 romanette 9.
 24 **A. Oh, okay, romanette. Oh, I see it.**

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1 Q. One of my teachers told me it was called
 2 romanette, I don't know.
 3 **A. Yeah, I got you.**
 4 Q. I think that's right.
 5 **A. Okay, I'm on that page.**
 6 Q. Okay. So one of the things the study
 7 identifies is primary effects of disturbed sleep,
 8 correct?
 9 **A. Could you point to a sentence? I**
 10 **didn't --**
 11 Q. Yeah, it's actually the last one, the last
 12 sentence, it starts kind of at the last line on that
 13 page and goes to the top of page 10.
 14 **A. Can I take a moment to read it?**
 15 Q. Yeah, please.
 16 **A. Yes. It's a very funnily worded sentence,**
 17 **but I see it.**
 18 Q. Well, they're English, what do you want?
 19 **A. It also says that the effect of sleep**
 20 **disturbance is sleep disturbance.**
 21 Q. Okay, but the effects they mention are
 22 pretty similar to the ones I think we mentioned
 23 earlier, including difficulty falling asleep,
 24 increased blood pressure, heart rate, pulse, cardiac

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1 arrhythmia and others.
 2 **A. Yes.**
 3 Q. Okay. And it also identified secondary or
 4 aftereffects in the following day or days after
 5 disturbed sleep, correct?
 6 **A. Right.**
 7 Q. You can go on a little bit, but later on
 8 that same -- part of the last sentence of that same
 9 paragraph it will be.
 10 **A. That is their comment, yes.**
 11 Q. Would you disagree with their comment?
 12 **A. I would disagree slightly. I think that**
 13 **many people have reduced perceived sleep quality,**
 14 **and there's plenty of published literature on the**
 15 **issue of the inability of people to objectively**
 16 **quantify their sleep, either for good or bad. I**
 17 **mean there are many people that would say I have**
 18 **terrific sleep and don't, there's many people that**
 19 **would say my sleep is poor and do, so that would be**
 20 **the only issue I take with it.**
 21 Q. All right. And the symptoms they mention
 22 are reduced perceived sleep, which is what you just
 23 talked about, and quality, right? Perceived sleep
 24 quality, increased fatigue, depressed mood and

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1 decreased performance, correct?
 2 **A. Correct.**
 3 Q. I mean I think we would all understand if
 4 we can't sleep we'd have some of these
 5 I'm-pretty-terrible-at-my-job kind of things the day
 6 after I can't sleep, correct?
 7 **A. Right.**
 8 Q. Okay. The 1999 study -- report, excuse
 9 me -- on page 10 again, the next paragraph goes on
 10 to say, "For a good night's sleep, the equivalent
 11 sound level should not exceed 30 decibels" -- and I
 12 assume that's A weighted.
 13 **A. A weighted, that's what it means, yes.**
 14 Q. "-- for continuous background noise."
 15 That's what the organization found, correct?
 16 **A. That is what this sentence says here. I**
 17 **would defer to my acoustic colleagues because I**
 18 **thought the 30 dB(A) level was for inside the**
 19 **bedroom. I would have to double-check that.**
 20 Q. Okay. And it also goes on to say that
 21 individual noise events exceeding 40 decibels A
 22 weighted should be avoided, correct?
 23 **A. It says 45.**
 24 Q. 45. I read that wrong. I wasn't trying

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1 to trick you; I just can't read some days.
 2 The organization also stated that noise
 3 exposure -- now I'm in the next paragraph after
 4 physiological functions. "Noise exposure may have a
 5 large temporary as well as permanent impact on
 6 physiological functions." Would you agree with that
 7 statement?
 8 **A. May I take a moment and just read that**
 9 **sentence?**
 10 Q. Sure.
 11 **A. Could you repeat the question? I'm sorry.**
 12 Q. Yeah. The sentence of "Noise exposure may
 13 have a large temporary as well as permanent impact
 14 on the physiological functions," do you have any
 15 reason to disagree with that statement?
 16 **A. No, but I would throw in the full sentence**
 17 **which includes "People living near airports,**
 18 **industrial and noisy streets, noise exposure may**
 19 **have a large temporary as well as permanent impact."**
 20 Q. Okay.
 21 **A. I would agree with that.**
 22 Q. It didn't say industrial and noisy
 23 streets. I think like you did --
 24 **A. Industries.**

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1 Q. Industries and noisy streets, correct?
 2 **A. Industries, okay.**
 3 Q. Just so we're clear on it.
 4 **A. Touche.**
 5 Q. Well, I'm not trying -- I wasn't trying to
 6 point out your -- I've been reading wrong all night,
 7 so don't worry.
 8 And then it goes on to say, the next
 9 sentence, "After prolonged exposure, susceptible
 10 individuals in the general population may develop
 11 permanent effects, such as hypertension and
 12 ischemic, I-S-C-H-E-M-I-C, heart disease, associated
 13 with exposure to high sound levels." Do you have
 14 any reason to disagree with that statement?
 15 **A. The only thing I would like clarification**
 16 **on is prolonged exposure. I'm less concerned with**
 17 **the exposure than the process that the exposure**
 18 **does. If it's repeated sleep disruption due to the**
 19 **exposure, then someone can develop prolonged or**
 20 **permanent effects, yes.**
 21 Q. Okay. So based -- with that caveat, you
 22 don't have a problem with the statement?
 23 **A. No.**
 24 Q. Okay. Also goes on under performance on

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1 that same page, "That it has been shown, and it's
 2 mainly in workers and children, that noise can
 3 adversely affect performance of cognitive tasks."
 4 Is that correct?
 5 **A. That's correct.**
 6 Q. Do you have any reason to disagree with
 7 that statement?
 8 **A. None at all.**
 9 Q. And according to the study, about two
 10 sentences later it says "Reading attention, problem
 11 solving and memorization are among the cognitive
 12 effects most strongly affected by noise." Do you
 13 have any reason to disagree with that statement?
 14 **A. I am not aware of the entire body of**
 15 **literature on the cognitive effects of noise per se.**
 16 **There may be many effects. So I'd have to give that**
 17 **a little more thought, but --**
 18 Q. Okay.
 19 **A. -- it seems reasonable.**
 20 Q. And would we all agree that the World
 21 Health Organization is a reputable body though?
 22 **A. Very.**
 23 Q. Okay. On the next page, study -- let's go
 24 to the top of the second full paragraph, it's page

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1 romanette 11. The study, the report, on that found
 2 that stronger reactions to noise occur when the
 3 noise was accompanied by low frequency components,
 4 correct?
 5 **A. You're asking me whether that's what it**
 6 **says on the page or --**
 7 Q. Let's start there.
 8 **A. Yes.**
 9 Q. Would you -- do you have any reason to
 10 disagree with that statement?
 11 **A. I'm just -- out of context, stronger**
 12 **reactions, I'm struggling with that expression**
 13 **without understanding the context.**
 14 Q. Okay.
 15 **A. Stronger reactions have been observed.**
 16 **What reactions are we talking about? This is a**
 17 **section on social and behavioral effects, annoyance?**
 18 Q. Appears to be, yes.
 19 **A. Yes.**
 20 Q. Okay. So stronger annoyance, let's say,
 21 has been observed when noise is accompanied by
 22 vibrations and contains low frequency components.
 23 Do you have any reason to disagree with that?
 24 **A. Sure. If a noise that was not accompanied**

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1 **by a low frequency component but had a very large**
 2 **sound pressure level, that could be more annoying,**
 3 **or one that had a low frequency component could be**
 4 **more annoying.**
 5 Q. Okay, I guess what I -- how I read it,
 6 maybe you read it differently, if you do, please
 7 tell me, that noise at one level versus with no low
 8 frequency may have a strong -- people may have a
 9 stronger reaction to -- let's just -- I'm throwing
 10 out any number here, I don't -- doesn't matter what
 11 number, let's just say 60 hertz or 60 decibels or a
 12 thousand hertz. I'm just throwing out a number. It
 13 doesn't really matter.
 14 **A. Uh-huh.**
 15 Q. That people may have a stronger reaction,
 16 may have -- that may have a stronger reaction when
 17 that 60 hertz is accompanied by low frequency noise
 18 instead of just the 60 hertz.
 19 **A. Sure.**
 20 Q. Or the 60 decibels.
 21 **A. That sounds -- so, in other words, not**
 22 **only is the noise that annoys someone present, but**
 23 **now there's an additional noise? Then that would be**
 24 **more annoying.**

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1 Q. Okay.
 2 **A. Seems reasonable, yes, of course. To the**
 3 **extent that that low frequency component was**
 4 **perceived.**
 5 Q. Yeah, it's two different noises in
 6 essence, or maybe not noises we hear, but they're
 7 still noises, correct?
 8 **A. Well, not exactly. Dr. Hankard explained**
 9 **earlier that as we get into the lower frequencies,**
 10 **the sound pressure level required to perceive those**
 11 **pressures are higher. So it's conceivable that one**
 12 **would not perceive the low frequency at all, in**
 13 **which case it wouldn't make someone more annoyed.**
 14 Q. Okay, but if they did, we're having two
 15 different perceptions going on at the same time, and
 16 it would obviously affect a little more than a
 17 single perception.
 18 **A. Definitely.**
 19 Q. Okay. The 1999 report on page 13, again,
 20 executive summary, so it's that romanette 13, also
 21 found -- you've already answered the question. We
 22 don't need to go through it again.
 23 And as we were just talking about, the WHO
 24 recommends now, the first -- I'll just point your

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1 attention to the first full paragraph on page
 2 romanette 13. "The WHO found that when noise is
 3 continuous, the equivalent sound pressure should not
 4 exceed 30 decibels, again A weighted, indoors in
 5 order to avoid negative effects on sleep." Correct?
 6 **A. That is what they wrote, correct.**
 7 Q. Okay. Now --
 8 **A. I believe they also added that there is a**
 9 **correction for the dB(A) that's on the outside of**
 10 **the room versus the inside of the room. In other**
 11 **words, I think it's something like 17 dB(A). So a**
 12 **30 dB(A) inside would lead to a 47 outside, but I**
 13 **could -- we could ask our acoustical expert.**
 14 Q. But that's outside your area of expertise.
 15 We're talking about inside levels of 30 decibels,
 16 okay?
 17 **A. Both inside and outside levels are outside**
 18 **of my expertise.**
 19 Q. Okay. So what the level is that should be
 20 avoided is outside your area of expertise?
 21 **A. My area of expertise is on the medical**
 22 **effects of anything that would impact sleep**
 23 **including noise.**
 24 Q. Okay.

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1 **A. But I would defer to an acoustician for**
 2 **the very specific levels because of the -- well, the**
 3 **disciplinary nature of the --**
 4 Q. So you would defer to an acoustician to
 5 say if it should be 30, 40, 50, whatever it is.
 6 That's not what your focus has been on.
 7 **A. My focus is entirely on if there's a**
 8 **health consequence. If there is, we would measure**
 9 **the level if that's -- and we would discuss with the**
 10 **acoustician whether that was inappropriately too**
 11 **high and that kind of thing.**
 12 Q. Okay. Now, there is a 2009 study that we
 13 talked about you relied upon in the Massachusetts
 14 report from the WHO, correct? Just --
 15 **A. Correct.**
 16 Q. Okay, she can't take down the nods. And
 17 that is seen as an extension of the '99 study. It's
 18 not -- doesn't get rid of the '99 study; it's an
 19 extension of it, correct, to your knowledge?
 20 **A. To my knowledge, yes. I don't know if**
 21 **extension was their word. They may have -- there**
 22 **may be nuances in that report that supplant others.**
 23 **I can't carte blanche agree to that, no.**
 24 Q. Okay. Well, I was hoping I wouldn't have

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1 to get there, but we'll go through it real quick I
 2 promise.
 3 **A. Okay.**
 4 Q. Okay, if you could go to again romanette
 5 9, which is part of the executive summary of UCLC
 6 Exhibit 37, and for the record this document is
 7 entitled Night Noise Guidelines for Europe, correct?
 8 Just --
 9 **A. Correct to answer your question. I don't**
 10 **see where the -- oh, here, Roman 9.**
 11 Q. It's up in the top right. It's a little
 12 bit displaced but --
 13 **A. Okay.**
 14 Q. And it says in there, second sentence on
 15 that page, the document -- "This document can be
 16 seen as an extension of WHO Guidelines For Community
 17 Noise 1999?"
 18 **A. Correct.**
 19 Q. So this is an extension of the UCLC
 20 Exhibit 36.
 21 **A. Correct.**
 22 Q. Okay. And it goes on on page romanette 18
 23 at the very bottom of that page.
 24 **MR. BLAZER:** Which page?

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1 **MR. LUETKEHANS:** 18.
 2 Q. Again, in the executive summary.
 3 **A. Uh-huh, yes.**
 4 Q. "The organization reiterated that the
 5 recommendations made in the 1999 guidelines are
 6 complementary to the 2009 guidelines and still
 7 should be considered valid and relevant." Correct?
 8 **A. Could you point out to where you're**
 9 **reading from --**
 10 Q. Yeah.
 11 **A. -- so I can follow?**
 12 Q. It's actually the last sentence. If you
 13 want me to say it again, I can.
 14 **A. That's correct.**
 15 Q. Okay. On page 11, again of the executive
 16 summary, I'm going back, sorry, romanette 11, the
 17 study, the organization WHO found that there was
 18 sufficient evidence that night noise is related to
 19 sleep disturbance, correct?
 20 **A. Could you point out to where you're**
 21 **reading?**
 22 Q. Yeah. I'm looking at definition of
 23 sufficient and limited evidence, that section. See
 24 that?

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1 **A. Yes.**
 2 Q. First sentence. I guess I'm paraphrasing,
 3 but the organization found that there was sufficient
 4 evidence that night noise is related to sleep
 5 disturbance. Would you agree with that?
 6 **A. I'm sorry, I'm just not seeing where**
 7 **you're --**
 8 Q. I'm not quoting, so if you want to read
 9 the whole sentence, that whole subparagraph that
 10 says sufficient evidence, feel free.
 11 **A. Okay, I think if you're asking me to**
 12 **confirm what this document says, we should stick to**
 13 **what the document says.**
 14 Q. Well, I'm asking you right now if you
 15 would agree with my -- let's just say this, okay?
 16 Would you agree that there is sufficient evidence
 17 that night noise is related to sleep disturbance?
 18 **A. I'm sorry, could you repeat that?**
 19 Q. Yeah. Would you agree that there is
 20 sufficient evidence that night noise is related to
 21 sleep disturbance?
 22 **A. I would agree that any noise during any**
 23 **form of sleep, night, nap, day, can disturb sleep if**
 24 **it's of the correct pressure and characteristic.**

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1 Q. Okay.

2 **A. Yes.**

3 Q. And according to the World Health

4 Organization, that means that a causal relation has

5 been established between exposure to night noise and

6 the health effects, correct?

7 **A. That's correct, that's what it says.**

8 Q. Okay. Let's go to the four people you

9 interviewed in Michigan real quick. And to set it

10 up real quick, these are people you interviewed that

11 complained of problems they had that they associated

12 with the wind turbines, correct?

13 **A. That's correct.**

14 Q. Okay. And did you perform any objective

15 tests on any of the four people in Michigan who you

16 interviewed?

17 **A. Yes.**

18 Q. Okay. What objective tests?

19 **A. Physical examinations.**

20 Q. Okay. Other than that, did you provide

21 any -- get any outside tests?

22 **A. No.**

23 Q. Okay. Did you treat them at all?

24 **A. I was not their treating physician, no.**

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1 Q. Okay. And do you recall how many turbines

2 there were within a mile of their residence?

3 **A. Off the top of my head, no.**

4 Q. Do you recall how far they were from the

5 nearest turbine?

6 **A. No.**

7 Q. Do you know how many decibel levels they

8 were subjected to on an nightly basis?

9 **A. No.**

10 Q. Okay. You found other possible causes for

11 these complaints, correct?

12 **A. Many.**

13 Q. Okay. And did you meet with these people

14 more than one day?

15 **A. No.**

16 Q. And as you said, you weren't their

17 treating physician, so you didn't continue to treat

18 them after the one time you met with them.

19 **A. I never treated them.**

20 Q. Okay. I didn't, wasn't trying to --

21 wasn't trying to tie your relationship into a

22 treating one. I was just trying to get it clear.

23 You don't know whether they went and saw

24 their doctors after meeting with you, correct?

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1 **A. I have no idea what happened after I left,**

2 **no.**

3 Q. Okay.

4 **A. Yes, that's correct.**

5 Q. Thank you. We all got the gist, don't

6 worry. You didn't know whether further treatment --

7 strike that, excuse me.

8 So we don't know as we're sitting here

9 whether they were treated for these other possible

10 causes of the symptoms that you found.

11 **A. Correct.**

12 Q. And we don't know whether after treatment

13 or resolving of the problems that you saw, whether

14 or not they still suffered any symptoms, correct?

15 **A. I have no idea.**

16 Q. Okay. Would you agree with me that one

17 interview of four people is not a -- is not a

18 significant enough sample size to make a

19 determination with a medical degree of certainty as

20 to the cause of the symptoms you were advised about?

21 **A. The notion of sample size is a very**

22 **specific term in reference to relationship of**

23 **studies to affect sizes and their standard**

24 **deviation, so I'm not sure that that's -- maybe**

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1 **could we try rephrasing the question so I -- do you**

2 **mean it in the colloquial sense. Or I'm not sure**

3 **how to answer.**

4 Q. There might have been a few questions in

5 there, so let's try to slow it down a little. Would

6 you agree that an interview -- that interview of

7 four people is not a significant enough sample size

8 to make a determination that all people with

9 symptoms they associate with wind turbines are

10 actually having symptoms because of other reasons?

11 **A. I would take it one step further. I don't**

12 **think any study can answer questions about all the**

13 **people for any issue.**

14 Q. Okay.

15 **MR. LUETKEHANS:** Can I have about two

16 minutes to talk to my clients?

17 Mr. Chairman, I have no further questions

18 of Dr. Ellenbogen.

19 **CHAIRMAN CORNALE:** Okay, thank you. All

20 right, we may have a few questions for you, Doctor.

21 **A. Yes, please.**

22 **CHAIRMAN CORNALE:** You're still up here.

23 All right. The board has a couple questions. Pass

24 the mic back.

1 QUESTIONS BY
2 MS. HUISMAN:

3 Q. We've heard a little bit about the
4 vestibular system and that part of the complaint of
5 wind turbine syndrome affects that system. Can you
6 help me understand the vestibular system just a
7 little bit better? Is there a central part in our
8 body that kind of heads up or controls our
9 vestibular system?

10 A. Yes, this is such a good -- I'm so glad
11 you're asking this question, because if I can lead
12 into the first thing that comes up that I think is
13 absolutely essential to know is that there is the
14 vestibular system, which is the system about
15 balance, okay, and position sense.

16 It's one of the 12 so-called cranial
17 nerves, which is a nerve not like the one that goes
18 to my arm or leg, but it's the one -- it's one of
19 the 12 that comes out of my head and it's very
20 critical. The others would be vision and smell and
21 touch of my face and taste and so forth.

22 The one thing that's so critical here is
23 that that nerve is really the vestibulocochlear
24 nerve. It is two -- it's called one nerve, it's the

1 exceeded the stimulation of the vestibular system in
2 one particular direction. I think -- I forget if
3 it's yaw, pitch or roll. I think it's yaw that way.

4 And anyway, not to get into more detail
5 than you want, but it is the system that's deciding
6 both where we are in space and whether we're moving.
7 So if you've been on a roller coaster and you get
8 that whee sensation.

9 So -- and the reason why it had come up,
10 with respect to bringing it back to wind turbines,
11 is because one of the many, many concerns that
12 people had raised was either dizziness or double
13 vision or imbalance, and the vestibular system is
14 one of the four systems that govern our -- those
15 things, and so that was why it sort of came up as
16 one area of the nervous system that we should look
17 at.

18 And just one last piece if I may. So
19 there's a peripheral nerve, meaning a nerve on the
20 outside, and it's deep in the inner ear but it has
21 nothing to do with sound. The acoustic nerve is
22 sound, the vestibular is balance, vestibulocochlear
23 -- sorry, the vestibular system is made of the
24 cochlea on the outside and then it goes into the

1 eighth cranial nerve, but it's actually two
2 independent nerves, nerves that have nothing to do
3 with each other except that they travel together.

4 And so people -- just to make a first
5 opening comment, when people talk about the eighth
6 cranial nerve, I see a lot of papers that say
7 vestibular when they mean acoustic or say acoustic
8 when they mean vestibular. Acoustics is how the
9 brain processes sound, and vestibular is how the
10 brain processes position sense or movement. And so
11 I know it's kind of a funny -- I have to review that
12 every so often just to get the jargon right myself.

13 The vestibular system is concerned with --
14 is one of the four primary components to how we
15 decide where we are in space. And one of the key
16 things that it does -- and you may have heard of
17 these semicircular canals. At the peripheral nerve
18 before it goes into the brain, there are three
19 circular, semicircular canals that govern how the
20 head and body feel with respect to motion.

21 So if I start spinning, I get that
22 sensation, if you've ever seen a small kid spin,
23 spin, spin and stop and then, whoa, be off balance
24 and have vertigo and fall, that's because they've

1 brain stem, crosses over a bit and stays on both
2 sides and goes up to perceptual areas of the brain.

3 And so when people say the central
4 vestibular system, they're referring to where that
5 signal has already gone upstream, or downstream
6 rather, so to speak, and into the brain stem or the
7 brain itself. When they say peripheral vestibular,
8 they mean the part of that nerve that is sort of
9 sensing our balance and hasn't yet shot that
10 information into the brain.

11 MS. HUISMAN: Okay, so when you mentioned
12 cochlear and cochlea, is that your ear?

13 A. The cochlea is in the inner ear, and the
14 cochlea is the sound part of that vestibulocochlear
15 system. So the cochlea is not balance; it's the
16 semicircular canals and a few other organ -- small
17 organ structures that are part of the vestibular
18 system. It's the vestibulocochlear system, the
19 balance and hearing system. So the cochlea is
20 sound, and the way I remember that is people have
21 cochlear implants when they have deafness, or some
22 people do, and the vestibular system is balance.

23 Q. So if there's some stimulus that is
24 aggravating my vestibular system, particularly

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1 pressure in my ears, is there any treatment for
2 that?

3 **A. I guess it would be -- there shouldn't be**
4 **pressure in your ear. One reason you would have**
5 **that would be an ear infection or tumor or**
6 **hemorrhage.**

7 Q. Or you feel it in your ear, maybe I should
8 clarify. Like I feel sometimes pressure in my ears,
9 and if I can make my ears pop, it relieves that
10 pressure. Is there any -- if wind turbines caused
11 somehow the pressure, the sound, the infrasound,
12 whatever, if there was some -- say there is some
13 link or it causes someone who's very sensitive to
14 pressure and sound to have negative effects, is
15 there any kind of treatment, medical treatment that
16 can help reduce those effects?

17 **A. Yeah. And I'm going to answer that, but I**
18 **just want to add one more piece to this because we**
19 **talked about vestibular and cochlear, but if it's**
20 **not hearing and it's not balance, just pressure,**
21 **that's actually a pain sensation, which is a**
22 **different cranial nerve, believe it or not, that**
23 **governs just merely sensation of pain and pressure.**
24 **So the vestibular neither -- hearing is**

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1 **the vibration, be it slow or fast, fast being high**
2 **frequency, slow being low frequency. Balance and**
3 **the vestibular system is govern by movement not**
4 **pressure, and pressure would lead to pain.**

5 **So if somebody -- if there was a very low**
6 **frequency sound that was causing a sense of**
7 **pressure, or even scuba diving or in a swimming pool**
8 **maybe, you feel that pressure in your ear and you**
9 **blow on your nose. The key is equalling the**
10 **pressure of the inner and outer ear, and sometimes**
11 **people do that with nasal decongestants or removing**
12 **the cerumen in their external ear canal.**

13 **And I want to make sure I answer your**
14 **question. You asked about someone who might be**
15 **particularly sensitive, and I'm trying to think of**
16 **who or what circumstance that might be.**

17 Q. I'm thinking of a little, a child that I'm
18 aware of that has sensory integration disorder.

19 **A. I see, yeah.**

20 Q. And that little person is affected by many
21 things that impact his senses, not just -- I
22 wouldn't say it would be wind turbines because he
23 doesn't live by any right now, but could a little
24 person like that be impacted, and if they were, how

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1 do you help them? How do you treat them if they
2 come to you with problems? Is there therapy? Is
3 there treatment? Is there medication? Is there
4 anything that can help reduce the effects?

5 **A. Yeah, this is a great question.**
6 **Unfortunately I'm not a pediatrician or someone that**
7 **treats specifically that issue, so I think I would**
8 **ask for some help from colleagues or I would be**
9 **delighted to get back to you.**

10 **But in a general sense that person might**
11 **fall under the, what we were referring to in our**
12 **report as a special population that might be more**
13 **vulnerable, folks with anxiety, depression, problems**
14 **with sensory integration. So these might be indeed**
15 **special populations that would need special**
16 **treatment.**

17 **I don't -- now, that isn't to give up on**
18 **the ability to treat those folks and their primary**
19 **problem and get them back to closer to normal, but**
20 **to the extent that they're not, I would give them a**
21 **special category I suppose.**

22 Q. Okay. And then on a somewhat unrelated
23 topic, I cannot recall why -- what was the purpose
24 of you interviewing the four folks in Michigan? I

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1 can't remember the tie to those four people.

2 **A. The context was that there was a group of**
3 **community folks who already had wind turbines**
4 **installed in their neighborhood and there was a**
5 **complaint that was raised to another company, not**
6 **Invenergy but a related company, unrelated but**
7 **similar like, and they were having trouble in their,**
8 **I guess, how to see the circumstances. And so they**
9 **asked me to come -- the wind turbine company asked**
10 **me to come out --**

11 Q. Okay.

12 **A. -- to help them, to provide them with an**
13 **independent evaluation to gauge the degree of their**
14 **problem, what problems were they having, what would**
15 **you do next, how seriously to take it -- not how**
16 **seriously to take it in the sense that they took it**
17 **very seriously, but how to relate it potentially to**
18 **the turbines and to give us some context so that**
19 **we'd know what steps to take next.**

20 Q. Okay. And just one last question. For
21 the group that you researched with, did any of you
22 spend any time near wind turbines as part of your
23 research?

24 **A. We did several field trips, but they were**

1 not formal in any way. One of the members of the
2 committee has a research laboratory and he studies
3 wind turbines, he's around them frequently, and he
4 was the mechanical engineer of the group and he was
5 sort of the primary lead in that, in the sort of
6 physics and engineering piece of it. But we did do
7 some informal field trips.

8 Q. Okay.

9 A. But nothing with -- of the variety that
10 I've seen in various reports of people taking proper
11 measurements and things like that. I wouldn't
12 submit it to you as any -- the value of my trip was
13 more for my, really my own context than --

14 Q. All right, I just wanted to know if you
15 had some personal experience --

16 A. Yes.

17 Q. -- with sounds and the feelings of being
18 near one.

19 A. Yeah, and kind of going around, I mean my
20 process was going and just kind of chatting with
21 folks in the neighborhood and just sort of getting a
22 feel for their understanding. That was so anecdotal
23 I won't bore you with the details, but it was
24 interesting for me to just kind of stand there and

1 information, let's try to critically appraise it,
2 describe their attributes and their limitations, and
3 then move through it, and then assign some level of
4 hierarchy with respect to how good the paper was,
5 the research was, with respect to how well -- how
6 much of it influenced our thinking about it.

7 So the point of sharing the limitations
8 was to allow people to formulate their own opinion
9 about those and to understand why we might have
10 given either credit or discredit to some of the
11 studies that came to light. But they were all
12 included and all cited.

13 Q. Okay, I guess when I said that I meant the
14 surveys. I understand that you put out surveys to
15 individuals.

16 A. Yes.

17 Q. So they returned the surveys. You
18 solicited for surveys, you got them back.

19 A. Yes.

20 Q. Did you -- did you discount any of the
21 surveys? Did you as the panel of experts sit down,
22 and you made reference to this panel now again, did
23 the panel throw out any potentially what you felt
24 were erroneous statements or anything? I mean was

1 listen to it.

2 MS. HUISMAN: All right, that's all I
3 have.

4 CHAIRMAN CORNALE: All right, I've got
5 just a few for you.

6 QUESTIONS BY

7 CHAIRMAN CORNALE:

8 Q. As Mr. Luetkehans was asking you some
9 questions, something come up about you said
10 problematic evidence was removed from your study.
11 Was that survey data? And you made some reference
12 to problematic evidence.

13 A. We didn't remove anything. What we did
14 was any evidence that was brought to the discussion,
15 we highlighted their potential limitations, and that
16 was -- one of the papers that Mr. Luetkehans had
17 given me was a report where people, where one of the
18 authors, I apologize, I don't remember it off the
19 top of my head, but had raised -- I think it was an
20 acoustician had raised concerns that the
21 Massachusetts study was raising limitations about
22 several of the studies.

23 And I think that was really the spirit of
24 the work was to say, okay, let's take all the

1 there any level that you deserted because you didn't
2 feel that it was valid?

3 A. There was not a single concern that
4 someone raised that we discounted, and that was not
5 only because that was the charge that we were given
6 specifically by the Department of Public Health, but
7 also because -- the Department of Environmental
8 Protection, excuse me, I misspoke, they required us
9 to pursue as much and everything. And as I
10 mentioned in my last time, if you don't mind me
11 repeating, what the folks didn't want is to have
12 wind turbines pop up everywhere and then have
13 problems and then be sort of working them from the
14 back end. So they said to us even if you think that
15 something is kind of out there, follow it, explain
16 why you do or don't think that it's a reasonable
17 concern, and so there was nothing that was actually
18 thrown out.

19 Q. Okay, okay. You made reference to or we
20 discussed this World Health Organization submittal,
21 two of them, and you expressed great credibility for
22 these papers. Is that -- that's fair?

23 A. Yes, they're a very credible body that
24 makes advice for all kinds of social issues, yes.

1 Q. Okay. As I -- and it was brought to
2 light. As I look at this and I read through the
3 brief obviously, the 30 dB(A), "When noise is
4 continuous, the equivalent sound pressure level
5 should not exceed 30 dB(A) indoors." Direct quote
6 from this.

7 **A. I remember that.**

8 Q. Okay. Is there any reason that you feel
9 that we should allow a higher level indoors for any
10 -- I mean, and I need to cross-reference it with the
11 Hankard presentation, he had done inside acoustical
12 measurement, but if there are any measurements
13 higher indoors, do you feel based on this study that
14 us as a board, we need to really seriously consider
15 that as a problem?

16 **A. Okay, yeah, two things. The first is**
17 **that -- and I'm really not an acoustician, so I'd**
18 **like to defer to my expert who's right behind me**
19 **here, colleague, and if I'm not mistaken, the**
20 **correction for a measurement from the outside to the**
21 **inside is approximately 17 dB, so I think --**

22 Q. We have those. They're actually in --
23 they were presented.

24 **A. Okay.**

1 **effects. So I don't want to be the person to draw**
2 **that line in the sand.**

3 **The WHO is a very credible organization,**
4 **if you went with that, you'd be in good standing,**
5 **but to draw an absolute line there I think would**
6 **be -- would be stronger than I would care to state**
7 **for my own position.**

8 Q. Okay. The next question, and the last
9 one, there's been a lot of conversation about
10 infrasound, less than 20 hertz. We can exercise
11 that until we're blue in the face, and we talked
12 about vestibular systems and whatever. So we can't
13 hear sound less than 20 hertz. We've -- we've beat
14 that line, okay.

15 Is it plausible, I'm going to throw this
16 out there and you're not going to like that, but
17 that a sound generated at less than 20 hertz could
18 stimulate these systems, cochlear nerve, we not hear
19 it but we actually are stimulated by it, potentially
20 causing us -- causing some sleep disturbances?

21 **A. Uh-huh, uh-huh. I think that two things.**
22 **The first is that it would have to be an exceedingly**
23 **high sound pressure level at that very low hertz to**
24 **get to a point where it was soliciting some neuronal**

1 Q. So regardless of how we get there --

2 **A. Okay, so the other answer is I'm just a**
3 **little bit concerned with the ending in what you're**
4 **asking me, if there is any time that one exceeds 30,**
5 **that would be -- it doesn't strike me as that**
6 **absolute. These are recommendations. The WHO, I**
7 **believe, night noise guidelines are a year-round**
8 **average, so I don't think that they're saying that**
9 **you can't ever cross the 30 dB mark or you're kind**
10 **of in this camp of -- I certainly would not agree**
11 **that that would enter one into the camp of the**
12 **medical or psychological problems that they were**
13 **referring to. But that, as a whole, if you were to**
14 **have a higher level, I think that I would stick with**
15 **the WHO.**

16 Q. Okay. So the third -- again, the WHO you
17 feel is very credible and we should value this as
18 some of the best research out there.

19 **A. Yes, if I could -- but if I could add, my**
20 **concern is that we keep our eye on that which is**
21 **relevant here, which is are people having health**
22 **effects. And to the extent that they're not, it**
23 **could be that the levels for a bedroom could be**
24 **substantially higher and still not have those health**

1 **response. Remember that the ear only has three**
2 **entries to the brain, hearing, pain or balance, and**
3 **so there isn't a fourth thing. And so if it's not**
4 **something that you hear, if it's not something that**
5 **causes a linear or angular vibration to a vestibular**
6 **system, if it's not something that causes pain, then**
7 **I don't know what mechanism would be involved to**
8 **waking people up.**

9 **So I would say the answer is no. You**
10 **know, in a pure science sense, we always leave the**
11 **opportunity for novel discovery, but I think the**
12 **answer is no. I think if it's not causing pain, if**
13 **you're not hearing it and if it isn't causing**
14 **balance problems, then it's simply not getting into**
15 **the brain in that way.**

16 Q. Physically, physically outer hair cell,
17 could it be -- could it be stimulated? I mean the
18 vibration -- there's the stimulation, it's the
19 mechanical movement of the outer hair cell. Is that
20 being stimulated? We know that we can't hear it, we
21 already know that, so -- and it's not a pain level,
22 I mean every conversation isn't a pain level. I can
23 scream into this mic and it's a pain level. So
24 that's just normal -- is it stimulated constantly to

1 where it may cause that, possibly could cause that?
2 **A. And it's a reasonable question. I just**
3 **would like to clarify. The outer hair cell is the**
4 **-- its only avenue into the brain is through then**
5 **its impact on the inner hair cell, which is the main**
6 **neuronal system that enters sound into the brain, so**
7 **it's not -- the outer hair cell doesn't have**
8 **privilege to another modality.**

9 **So to the extent that -- to the extent**
10 **that one could stimulate the outer hair cell,**
11 **movement of the outer hair cells, that we -- that is**
12 **happening all around us all the time and that's**
13 **normal. That's happening right now as I'm speaking**
14 **and it isn't causing any medical effects, not pain,**
15 **not discomfort. So the fact that the outer hair**
16 **cell can move a bit is not concerning to me. If it**
17 **doesn't cause sound, then it's not going down its**
18 **pathway of -- it's neuronal pathway. There's no**
19 **other way for it to cause an influence on the brain.**

20 Q. Okay. One more and I promise this is it.
21 You spoke of the level at these low infrasound
22 levels. Do we -- do we know where the level is? We
23 discussed last night, we discussed at 6 dB there are
24 actual measurements discontinued, you can't measure

1 **Probably the low frequency from the turbine, the**
2 **turbo engine, was enormous.**

3 Q. Sure, okay.

4 **CHAIRMAN CORNALE:** All right. With that,
5 are there any other interested parties represented
6 by licensed attorneys? All right. Any other, yeah,
7 that were not represented by Mr. Luetkehans? How
8 about other interested parties with questions for
9 Dr. Ellenbogen? Carolyn, come on up. Over there
10 next to Mr. Luetkehans please.

11 Carolyn, you may go ahead. Carolyn,
12 please identify yourself for the court reporter.

13 **MS. GERWIN:** My name is Carolyn Gerwin,
14 G-E-R-W-I-N. I just have a few questions for you,
15 Dr. Ellenbogen.

16 **QUESTIONS BY**

17 **MS. GERWIN:**

18 Q. You indicated that annoyance -- I kind of
19 put this in quotes. I tried to write it as close to
20 what you said as possible. Annoyance is a personal
21 issue with a diverse set of causes. Does that sound
22 right?

23 **A. I don't know if I said that, but it sounds**
24 **good.**

1 it, the particular equipment can't measure lower
2 than that, but if you looked at the graph, the lower
3 the frequency got, the higher the decibels got. So
4 do we know what those decibel levels are?

5 **A. Do we know what the decibel levels are for**
6 **infrasound that could cause --**

7 Q. Infrasound --

8 **A. -- pressure, pain or hearing?**

9 Q. At that point, yeah, pain or hearing.

10 **A. I don't know the precise level. I think**
11 **that it's greater than 90 dB, but I would have to**
12 **check, but it would be something well above the**
13 **levels that you're measuring with respect to wind**
14 **turbines.**

15 **The infrasound that you're measuring are,**
16 **I believe, something on the level of 60, but I want**
17 **to be careful, I'll double-check that, and the level**
18 **for the threshold for pain is something**
19 **substantially higher than that. So I don't think**
20 **that infrasound is causing pain. I think it can. I**
21 **was on the airplane this morning and it certainly**
22 **did, but I think that was just sitting in a chair**
23 **and I had my sound pressure on and 90 decibels just**
24 **sitting, and that was in the audible range.**

1 Q. And also that annoyance causes physiologic
2 effects but no direct causation. Is that right?

3 **A. I'm not sure. If I did say that, I**
4 **probably would rephrase that.**

5 Q. Okay. How would you rephrase it?

6 **A. I would say that annoyance is a**
7 **psychological phenomenon.**

8 Q. Okay. And I guess where I was going with
9 that is what is the difference between direct and
10 indirect causation?

11 **A. With respect to annoyance?**

12 Q. Any kind of -- I mean, yes, with respect
13 to annoyance and physiological effects.

14 **A. Sure.**

15 Q. Either they're direct or not direct.

16 **A. Yes.**

17 Q. So what is -- I mean could they be
18 indirect then?

19 **A. Sure. Here's an indirect causation. I do**
20 **a study looking at lung cancer and I discover that**
21 **people who have lung cancer are likely to have**
22 **matches in their pocket or lighters and I discover**
23 **that I think there's a causal relationship between**
24 **carrying a book of matches in your pocket and having**

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1 **lung cancer. That would be an indirect**
 2 **relationship. The direct relationship is smoking,**
 3 **and the indirect is that the way to smoke is to**
 4 **ignite a cigarette.**
 5 **Are we on the topic of wind turbines still**
 6 **or are we --**
 7 Q. Yes, I'm just trying to understand the
 8 meaning of the statement that was made. Okay, so
 9 it's a -- you said a psychological phenomenon. Are
 10 you a psychologist?
 11 A. No.
 12 Q. Psychiatrist?
 13 A. No.
 14 Q. Study psychology or psychiatry?
 15 A. **I'm boarded by the American Board of**
 16 **Neurology and Psychiatry.**
 17 Q. Okay. So have you studied the effects of
 18 the psychological aspects of annoyance?
 19 A. **Have I studied the effects of the**
 20 **psychological -- can you repeat that, I'm sorry?**
 21 Q. Have you studied the effects of the
 22 psychological impacts of annoyance?
 23 A. **On?**
 24 Q. People in general.

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1 A. **I have not. In general, I feel that**
 2 **annoyance is not a medical issue.**
 3 Q. You feel that way.
 4 A. **I don't feel that way. I think that**
 5 **that's a generally accepted statement. There is no**
 6 **medical book that I'm aware of that includes a**
 7 **chapter on annoyance.**
 8 Q. Okay. What about children? Have you
 9 done -- any of these studies that you did, did they
 10 involve children?
 11 A. **To my -- to my knowledge, no, they did**
 12 **not, although I would have to double-check. I would**
 13 **be glad to get back to you.**
 14 Q. Okay. Have you ever had a friend or known
 15 someone or yourself experienced a situation where
 16 you have multiple annoyances going on at the same
 17 time?
 18 A. **If it's okay, I'd rather not talk about my**
 19 **personal experience.**
 20 Q. Yes, this experience right here, but the
 21 point is not personally, but I'm trying to relate it
 22 to real life, something that lay, you know, us lay
 23 people can understand. So -- and my point is that
 24 it seems to me that you've identified that there's

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1 annoyance and you don't see a direct causation, but
 2 what about situations where you're adding to
 3 people's stress, you're -- I mean would you agree
 4 you're adding to people's overall stress in their
 5 life?
 6 **MR. BLAZER:** Could we get some
 7 specification of what Ms. Gerwin is talking about
 8 because I'm not sure what the subject matter is that
 9 she's discussing and I don't know if the witness
 10 knows either.
 11 **MS. GERWIN:** I'm objecting to the
 12 objection because it's done for the purpose of
 13 distracting us and giving the witness time to think
 14 about it and warning the witness that they need to
 15 be careful here.
 16 **CHAIRMAN CORNALE:** Now, I'm confused.
 17 We're objecting to an objection? Okay, we're not
 18 going to do that anymore.
 19 **MR. BLAZER:** I'll join you, I'm confused
 20 too.
 21 **CHAIRMAN CORNALE:** All right. So,
 22 Carolyn, your question was -- give me your question.
 23 **MS. GERWIN:** Can you read it back for us
 24 please?

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1 (Requested portion of the deposition was
 2 read by the court reporter.)
 3 A. **I --**
 4 **MR. BLAZER:** And again, I'll object to
 5 that question. It's --
 6 **CHAIRMAN CORNALE:** Okay, let's just try to
 7 clarify the question. The question was having to do
 8 with annoyance and adding stress to the life, to an
 9 individual's life. Is that where you're going with
 10 this, Carolyn?
 11 **MS. GERWIN:** Yes, would the annoyance
 12 caused by turbines, which has been repeatedly
 13 referred to here, add to people's stress in their
 14 life.
 15 **CHAIRMAN CORNALE:** Okay, and that's --
 16 **MS. GERWIN:** That's kind of the definition
 17 of annoyance which is what I'm trying to get to.
 18 **CHAIRMAN CORNALE:** That's a good question.
 19 A. **Okay. Mr. Luetkehans asked this question**
 20 **earlier. I'm going to try to answer it in a more**
 21 **full-bodied way. My concern, if I can tie it into**
 22 **wind turbine syndrome you're asking me, is that**
 23 **people are getting annoyed because they have heard**
 24 **about medical problems caused by wind turbines and**

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1 that is making -- so you can get annoyed by the
 2 sound, you can get annoyed by the look, you can get
 3 annoyed by a bunch of things. That's not what I'm
 4 talking about. But there is a group of people who
 5 are annoyed because they fear legitimately that
 6 these things are causing medical problems to them,
 7 which is not legitimate, and I think that the more
 8 that we leave that issue unaddressed and the more
 9 that we fester about the idea that wind turbines
 10 cause things like wind turbine syndrome, the more
 11 disservice we do for people, including adding to
 12 their stress, yes.
 13 **BY MS. GERWIN:**
 14 Q. So basically you're saying it's all in
 15 their head, they're turbo phobic.
 16 **MR. BLAZER:** Seriously? I'll object to
 17 that.
 18 **AUDIENCE VOICE:** That's what he said.
 19 **AUDIENCE VOICE:** He's not answering the
 20 question.
 21 Q. So you're saying that they just need to
 22 man up.
 23 **CHAIRMAN CORNALE:** Hold on.
 24 Q. Is that what you're saying?

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1 **CHAIRMAN CORNALE:** Hold on, hold on.
 2 Okay, no, let's just all stop. Let's all figure out
 3 where we're going. All right. That is annoying.
 4 All right. Carolyn's asking if you
 5 believe that stress can be induced by the presence
 6 of a wind turbine. Is that an accurate statement,
 7 Carolyn? Is that --
 8 **MS. GERWIN:** Yeah, that was my first
 9 question. And we got a long answer, so I was trying
 10 to say it back to him to make sure that I understand
 11 it. And it sounded -- but maybe he can just restate
 12 it.
 13 **CHAIRMAN CORNALE:** I believe that he has
 14 stated that it can -- it can cause an annoyance
 15 based on the noise or the -- I'm not taking words
 16 out of your mouth, Dr. Ellenbogen, but the noise,
 17 the looks, the whatever, you did state that.
 18 **A. Yes.**
 19 **CHAIRMAN CORNALE:** Okay. So now what's
 20 the next part of your question, Carolyn?
 21 **MS. GERWIN:** Let's see if I can remember
 22 it at this time of night.
 23 **BY MS. GERWIN:**
 24 Q. Basically, if I understand what you're

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1 saying, that the annoyance is caused by their
 2 irrational fear of turbines?
 3 **A. Their misinformation.**
 4 Q. Their misinformation. So if they were
 5 ignorant, they would be fine. So if they had never
 6 heard of turbines --
 7 **A. If they would stop listening to people,**
 8 **and I don't specifically point to who, who**
 9 **unreasonably describe wind turbines as causing**
 10 **serious medical problems, then that would reduce the**
 11 **annoyance level I will bet, yes.**
 12 Q. You will bet? We're betting bigger than
 13 you are.
 14 **A. So I think the --**
 15 **MR. BLAZER:** I object, I object to that
 16 statement and move that it be stricken from the
 17 record.
 18 **CHAIRMAN CORNALE:** Okay, I probably agree.
 19 **MS. GERWIN:** Let's move on.
 20 **CHAIRMAN CORNALE:** Let's strike everything
 21 with bet. We're not in Las Vegas. All right, so --
 22 **BY MS. GERWIN:**
 23 Q. I have a question about your -- at one
 24 point you said something about there may be special

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1 populations and you listed some, there may be
 2 special subpopulations, and can you list what those
 3 were again?
 4 **A. You're talking about in my testimony or in**
 5 **some document?**
 6 Q. Yeah, just tonight. I tried to get it
 7 down.
 8 **A. Oh, I would think that people who had any**
 9 **disorder that caused severe impairment in their**
 10 **ability to maintain deep sleep.**
 11 Q. I thought there were some other ones.
 12 **A. Well, there are many things that cause**
 13 **that. Severe depression --**
 14 Q. Right, that was one of them.
 15 **A. Anxiety.**
 16 Q. Anxiety, okay.
 17 **A. You got a third thing you want?**
 18 Q. I don't have a whole list here. I could
 19 not -- I should have taken shorthand. But the point
 20 I want to make is have you studied what the -- how
 21 many in the population have one of those
 22 characteristics?
 23 **A. I have not singularly quantified all of**
 24 **those characteristics into a number, no, but a lot**

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1 of those are known numbers. For example, people who
 2 have insomnia, people who have sleep apnea --
 3 actually, no, not sleep apnea for this case.
 4 Depression. Maybe 1 in 7.
 5 Q. What about things like migraines, would
 6 that be a problem?
 7 A. Not to my knowledge, no.
 8 Q. But you don't know. Is that right? I
 9 mean you've not studied that particular
 10 subpopulation.
 11 A. Nobody has studied that subpopulation,
 12 that's correct.
 13 Q. And you indicated that you did spend some
 14 time in a wind turbine area, right?
 15 A. Correct.
 16 Q. You didn't say how long. How long did you
 17 stay in the area?
 18 A. I believe it was four days.
 19 Q. Did you sleep there?
 20 A. Did I sleep where?
 21 Q. In the wind turbine area.
 22 A. In the wind turbines?
 23 Q. Yeah, in like a home that is with a wind
 24 turbine within 1200 feet of it.

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1 A. No.
 2 Q. No, okay. The concept of nocebo, we just
 3 sort of touched on that related issue. I understand
 4 the concept behind placebo, people wishing to be
 5 well and because of their hope and belief that this
 6 perhaps could help them, whatever it is.
 7 MR. BLAZER: If I may, Mr. Chairman, that
 8 was the testimony from Dr. Roberts not from Dr.
 9 Ellenbogen.
 10 Q. Oh, you didn't talk about nocebo?
 11 CHAIRMAN CORNALE: That's correct.
 12 Q. Okay. And are you on -- you mentioned at
 13 one point, I believe it was you, that a study that
 14 you did had to get approval before you could do the
 15 study. Is that -- was that you with a reference to
 16 an institutional review board?
 17 A. Every study I do, every study everyone
 18 does, has to get reviewed.
 19 Q. What -- what is an institutional review
 20 board and are you on it?
 21 MR. BLAZER: I believe that was also --
 22 MS. GERWIN: Was that Dr. Roberts?
 23 MR. BLAZER: -- Dr. Roberts. That was Dr.
 24 Roberts' testimony not Dr. Ellenbogen's.

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1 MS. GERWIN: I thought they both did,
 2 but --
 3 A. Is this related to wind turbine?
 4 BY MS. GERWIN:
 5 Q. Well, you had to get approval to do this
 6 study and I was wondering what's the nature of that
 7 approval?
 8 A. An institutional review board is a medical
 9 board comprised of diverse experts who examine a
 10 potential study in order to determine whether it's
 11 ethical to do, to perform the study.
 12 Q. How -- what are the standards for whether
 13 it's ethical?
 14 A. I'm not on an IRB committee, so I don't
 15 know what exactly they do.
 16 Q. Okay. You had to jump that hurdle though,
 17 right?
 18 A. Correct.
 19 MR. BLAZER: I --
 20 Q. Okay. The four people that you talked to,
 21 how many other people were there that did not want
 22 to participate, that did not give you access to
 23 them, do you know?
 24 A. I don't believe there was anybody that

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1 didn't give me access to them. These were the four
 2 plaintiffs that were in this case that made
 3 themselves available.
 4 Q. So they were plaintiffs, they were
 5 actually already in litigation at that point?
 6 A. They were in -- maybe I'm using the
 7 incorrect legal term, but they were in mediation.
 8 Q. Mediation, okay. Do you know what
 9 happened with them?
 10 A. I don't.
 11 Q. Okay. When you talked to them, had they
 12 already been to their personal doctors?
 13 A. Yes.
 14 Q. Were you able to review their medical
 15 record?
 16 A. I did.
 17 Q. And you indicated that you thought that
 18 all their problems were caused by other things not
 19 the wind turbines.
 20 A. Have you seen my report?
 21 Q. Right, but I'm wondering, you know, it's
 22 just interesting. I wanted to ask you whether or
 23 not their doctors just missed it?
 24 A. Yeah, I would be --

1 Q. They went right for the turbines and they
2 didn't ask these questions about depression and, you
3 know, all these other things?

4 A. I am so glad that we're talking about
5 these four people because I think they really
6 highlight why this is a personal issue as well as a
7 professional one. These people went to their
8 professional doctor in the context of being
9 absolutely certain that they are due to -- their
10 symptoms were due to wind turbines. They had hired
11 an attorney. And they had gone to see a physician
12 who did an evaluation who said it seems reasonable
13 that maybe they're due to wind turbines, I don't
14 know.

15 And that person, I read his reports and
16 they were woefully inadequate. The person was not
17 the appropriate type of physician. He performed an
18 absolutely incomplete history, a pathetic physical
19 examination, and made his conclusions based on
20 incredibly limited information, which I found
21 offensive to our field.

22 When I talked to these people, they had
23 serious -- they had serious medical problems that
24 had answers and treatment and they were not pursuing

1 A. But they're not paying for the loss I have
2 to seeing the patients that need me today and
3 tomorrow, so it's a fairly big deal to be here
4 actually.

5 Q. But that's a decision you made --

6 A. Oh, I think it was --

7 Q. -- at the request of Invenergy not the
8 county.

9 A. That's correct, and it was an essential --
10 I felt it was a good decision because I feel, as you
11 can see, passionately about this issue.

12 Q. Right. Okay. And now your advice could
13 form the basis for an irreversible decision and it
14 will impact approximately 800 families potentially
15 in the area. If it turns out that you're incorrect,
16 that there's just something you missed, will you be
17 making up for that? You know, if there are
18 problems, will you be reimbursing people?

19 MR. BLAZER: Objection, Mr. Cornale.
20 That's a completely improper question.

21 Q. How are you accountable?

22 MR. BLAZER: Objection.

23 CHAIRMAN CORNALE: All right. First,
24 we're beyond the scope of his presentation, and it's

1 them. And I think that that is a huge disservice to
2 these people and undoubtedly to many other people.

3 And so if you want to accuse me of saying
4 that it's all in their head, that I have wind
5 turbine phobia, sit down with someone who has a
6 serious medical problem that's treatable that
7 they're not pursuing because they think it's from a
8 wind turbine, and I think you'd think a little bit
9 differently of me.

10 Q. I'm limited to questions, so I will stick
11 with questions, until we have time later I guess.

12 All right, let's see. So tonight you're
13 here on behalf of Invenergy, right?

14 A. No.

15 Q. Who hired you?

16 A. I'm here on behalf of Invenergy? I'm here
17 asked by Invenergy to provide an independent
18 contribution to this discussion.

19 Q. Are they compensating you?

20 A. Yes. Are they compensating me? Yes.

21 Q. Okay. They're paying your expenses and so
22 on, right?

23 A. Yes.

24 Q. Okay.

1 not necessarily a proper question, Carolyn, you
2 know, so --

3 MS. GERWIN: I'm trying to get to the
4 point that there's really no downside for him to be
5 wrong, and I think it's a question of accountability
6 and the actual usefulness of the report for the
7 county, I mean the reliability of it.

8 MR. BLAZER: That question has nothing to
9 do with Dr. Ellenbogen's credibility or the
10 reliability of his testimony and it's completely
11 irrelevant.

12 CHAIRMAN CORNALE: The ZBA and the board,
13 I guess, will have to ultimately make that decision
14 of the credibility, so we'll determine that. The
15 county board can determine the credibility of the
16 witnesses. So next question.

17 MS. GERWIN: Okay. I believe that might
18 be my last one. Let me double-check. No, there's
19 one more. I'm sorry, there's a few more.

20 BY MS. GERWIN:

21 Q. You said the study concluded there was
22 insufficient evidence on some issues, not proof of
23 absence of data. Would you identify those issues?
24 I don't recall if those were listed. Which ones

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1 were -- there just wasn't -- there was insufficient
 2 evidence.
 3 **A. Would you like a copy of the report?**
 4 Q. I'm just asking you.
 5 **A. You're asking -- could you repeat the**
 6 **question?**
 7 Q. To highlight that for us, what the issues
 8 were that there was insufficient evidence.
 9 **A. Sure.**
 10 Q. No conclusion able to be --
 11 **A. Yeah, and I mean part of the way --**
 12 **understand, part of the issue of insufficient is**
 13 **very limited or no information, which is partly, if**
 14 **not probably, due to the fact that there are not**
 15 **these medical issues that have been described or**
 16 **discussed. In other words, sleep was one of them,**
 17 **there was -- what was another topic? High blood**
 18 **pressure. You know, I can't -- I'd rather not do**
 19 **things off the top of my head. If you have a**
 20 **specific question from the report, I think that**
 21 **would serve everyone a little bit better but --**
 22 Q. You've read Wind Turbine Syndrome by Nina,
 23 Dr. Nina Pierpont, right, and you commented on how
 24 you felt that it wasn't adequately peer reviewed, et

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1 cetera, et cetera, right?
 2 **A. Correct.**
 3 Q. How many people did she interview?
 4 **A. I think it was 38.**
 5 Q. Okay.
 6 **MS. GERWIN:** Thank you. I have no other
 7 questions for Dr. Ellenbogen.
 8 **CHAIRMAN CORNALE:** Thank you. All right.
 9 Do we have any other interested parties not
 10 represented by an attorney that would like to ask a
 11 question? Anything out there? Have you got a
 12 question, ma'am?
 13 **MS. DOUGLAS:** Yes.
 14 **CHAIRMAN CORNALE:** If you can come up
 15 here, come over here if you want to. You're not
 16 represented by counsel? Okay, come on over here
 17 unless you have a lot of questions.
 18 **MS. DOUGLAS:** No, just a couple. Susan
 19 Douglas.
 20 **QUESTIONS BY**
 21 **MS. DOUGLAS:**
 22 Q. All right, so how do the red flashing
 23 lights on turbines affect sleep?
 24 **A. I would expect they would not in any way**

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1 **affect sleep.**
 2 Q. People complain about them. If a person
 3 uses like a blackout curtain because they're trying
 4 to keep that light out and they're not being woken
 5 up in the morning by natural light, would that
 6 affect their health?
 7 **A. Not to my knowledge, no, unless they would**
 8 **leave the blackout blinds on after they woke up**
 9 **throughout the day.**
 10 Q. It's a she but --
 11 **A. He or she.**
 12 Q. All right. So you really don't think the
 13 red flashing lights would affect people's sleep?
 14 **A. No, I don't.**
 15 **CHAIRMAN CORNALE:** Thank you. Anybody
 16 else have any questions for Dr. Ellenbogen?
 17 Counsel? Chuck? Any member of the board have any
 18 question? All right.
 19 **MR. SLAGEL:** I have some.
 20 **CHAIRMAN CORNALE:** All right, we got a
 21 question out there. Come on up. If you only have
 22 one or two, it's probably easier here. If you want
 23 to sit down, we can move somebody around over there.
 24 Identify yourself.

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1 **MR. SLAGEL:** John Slagel.
 2 **QUESTIONS BY**
 3 **MR. SLAGEL:**
 4 Q. So a couple things I was -- I couldn't
 5 quite figure out from what you said. If -- in your
 6 study you said you didn't have anyone who couldn't
 7 sleep because of the windmills, correct?
 8 **A. Sorry, which are you referencing? The**
 9 **report that we did on the other studies or --**
 10 Q. Any of your research that you're
 11 presenting.
 12 **A. Yes.**
 13 Q. I think you made the comment like we
 14 didn't have anyone who couldn't sleep because of a
 15 windmill that we studied.
 16 **A. I think I said that there was nobody whose**
 17 **physiology of sleep was measured while they were**
 18 **near a turbine. I can't remember what the context**
 19 **was.**
 20 Q. So you did have people in your study that
 21 were coming to you with complaints that they
 22 couldn't sleep because of wind turbines?
 23 **A. There were people that reported difficulty**
 24 **sleeping, yes.**

1 Q. Okay. And are these the same people that
2 you said then you found out they had something else
3 going on?

4 A. Oh, you're referring to the people that I
5 examined?

6 Q. Correct.

7 A. Okay, yeah. These are people -- if memory
8 serves correctly, all three if not -- at least three
9 of the four had a sleep complaint or concern, and
10 all of those people had a serious compelling
11 alternative explanation for their sleep problem,
12 yes.

13 Q. Okay.

14 A. Sometimes several.

15 Q. Okay. What I'm wondering about is was
16 there any case where the person couldn't sleep
17 because of the windmill? Like they could sleep
18 perfectly fine before the windmill came in, then
19 their sleep was disturbed. I think the people
20 you're talking about were people who had issues over
21 time and got worse, but I'm saying the day the
22 windmills started, they said, oh, now I can't sleep.

23 A. There were people -- all of the people
24 that made a sleep complaint of the folks that I

1 were happening for them. And when we talked about
2 them in detail, actually it turned out some of them
3 were preexisting and some of them had a compelling
4 alternative explanation. That they really through a
5 full-bodied discussion and to the extent --

6 Q. Right, and I understand people that
7 actually had health issues, obviously they would go
8 see a doctor, but I'm talking about a person who
9 doesn't really have health issues. Just the
10 windmill wasn't there and he could sleep; the
11 windmill was there and he couldn't sleep, so he
12 moved. He would never go see a doctor. Would he
13 have been included in your study?

14 A. The only folks that I had access to were
15 the folks that made themselves available, so --

16 Q. Right, the people still living near
17 turbines.

18 A. Right.

19 Q. The healthy people that left because they
20 couldn't sleep are not in your study in any way,
21 shape or form.

22 A. That's true, although I'm not aware of any
23 folks from that neighborhood that actually left.

24 Q. Right, because they wouldn't be there

1 examined, they all said that they began at the time
2 of when the wind turbines became operational or a
3 couple of months thereafter and would go away when
4 they left their house or could sleep for a week on
5 vacation or with friends and family and -- at least
6 one of the folks said that. And I could use
7 specific details if you like. What question am I
8 answering though?

9 Q. That's a good question. I guess what I'm
10 wondering is I wouldn't think you would see a lot of
11 cases of people who could sleep before a windmill
12 came and then couldn't sleep afterwards because most
13 of those people if they had any sanity would know
14 that that's what happened and then they would move,
15 correct?

16 A. Yeah, but with, with -- all of these
17 people had sanity. They were all intelligent,
18 reasonable people. I spoke with them for hours. I
19 interviewed their family members. They were all
20 sane, reasonable, bright people. They had heard of
21 a lot of medical problems that are related to wind
22 turbines, and quite honestly I think that that
23 scared them, and I think that they tied in that
24 annoyance and fear into their medical problems that

1 anymore.

2 A. But -- I'm sorry?

3 Q. They left. Did you spend -- did you live
4 near a wind turbine?

5 A. No, and I don't think this is an
6 appropriate forum for sarcasm, but I think
7 that because I don't think anybody left that
8 community.

9 Q. Okay.

10 A. Keep in mind, these four people had real
11 sicknesses. I'm sure you --

12 Q. I --

13 A. -- have known people in your life too. I
14 do this for a living, I take it very seriously, and
15 I think that that's just an important context.

16 Q. Okay. Now, the other thing, children were
17 mentioned, but, you know, you say a lot of people
18 are bothered by this or annoyed by it because they
19 have been told of the effects. What about children?
20 Do you think it's the parents telling them they
21 should be bothered by the windmills so they couldn't
22 sleep?

23 A. I don't know if I could answer for every
24 kid that might have a concern. I think it's

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1 possible that some of the concerns that kids have
 2 are undoubtedly brought in by the anxiety, scarcity
 3 of knowledge or lack of knowledge by the parents. I
 4 don't think that that's the only thing that could
 5 happen, but I think that's one of the many plausible
 6 explanations.
 7 Q. Okay, I bring that up because of the
 8 Hartke story where his family, the windmills came in
 9 and his kid started not sleeping at night and that's
 10 when they noticed the issue. It wasn't that he was
 11 telling his kids. It was when he noticed the issue.
 12 A. I think with respect to somebody else, I
 13 think you should let them speak for themselves, so I
 14 could have the opportunity to talk with them. I'd
 15 be delighted to interview, examine and give you my
 16 opinion of that person or his children. I would
 17 also just take issue with the idea that how you
 18 would know what influence he's having on his
 19 children. It just may be a question for you to
 20 think about.
 21 Q. I think they didn't have concerns until
 22 the children started not sleeping, so...
 23 MR. SLAGEL: I think that's it for my
 24 questions, thank you.

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1 A. Thank you.
 2 CHAIRMAN CORNALE: So I believe if you
 3 guys -- we have another person. Sir, come on up.
 4 If you could state your name for us?
 5 MR. HAYES: John Hayes. One quick
 6 question. I'm a retired teacher, and if I would
 7 suspect there's child abuse, I would be -- I'd feel
 8 I would need to report it and by law I'm required to
 9 report it. If these four doctors that treated these
 10 people were, as you describe them, incompetent, did
 11 you report them to their state associations?
 12 A. I love that question and I would be
 13 delighted to. Unfortunately, the doctor that was
 14 treating them was also doing what was called an
 15 independent medical evaluation, which means he did
 16 not, quote, unquote, establish a patient/doctor
 17 relationship, which means I couldn't. I would have,
 18 but I'm not sure -- you know, I would have liked to.
 19 He was not their treating physician, so --
 20 MS. GERWIN: Can I just -- okay, so that
 21 was --
 22 CHAIRMAN CORNALE: Carolyn.
 23 MS. GERWIN: -- different from what we
 24 understood before, right?

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1 CHAIRMAN CORNALE: No, you're done, you're
 2 done. Okay. Any other interested parties out here
 3 with questions for Dr. Ellenbogen?
 4 All right. Does the ZBA have any other
 5 questions for Dr. Ellenbogen? Okay, Dr. Ellenbogen
 6 thank you. Interesting that we get a gentleman from
 7 Harvard to come out here and talk to us, kudos to
 8 you.
 9 So all right. What we're going to do now
 10 in the interest of possibly not having to have the
 11 witnesses back, we'll allow the public and the rest
 12 of the line to talk with either Roberts or Hankard,
 13 probably whoever is the furthest away, so --
 14 MR. BLAZER: Honestly they're both
 15 available generally speaking, Mr. Cornale, whenever
 16 we need them, so it's entirely up to you. Well, I
 17 have less sympathy for Hankard only because he lives
 18 in Wisconsin, but other than that. And all kidding
 19 aside, they're both available, so whichever way you
 20 want at this point.
 21 CHAIRMAN CORNALE: Okay, and Carolyn --
 22 okay, so let's do this. Dr. Robert, can you come
 23 up? We've got a little time. This might save you a
 24 trip back.

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1 Are there any units of local government or
 2 school districts that have any questions for Dr.
 3 Roberts? I see nothing. All right. ZBA members,
 4 do we have any outlying questions for Dr. Roberts?
 5 Joan, do you have some --
 6 MS. HUISMAN: I don't think I do.
 7 CHAIRMAN CORNALE: -- specifically? Okay.
 8 John, do you have anything?
 9 MR. VITZTHUM: (Shakes head).
 10 CHAIRMAN CORNALE: All right. Okay, so at
 11 this point, other interested parties not represented
 12 by an attorney, some specific questions for Dr.
 13 Roberts?
 14 MS. GERWIN: I have some.
 15 CHAIRMAN CORNALE: You have some, okay.
 16 Carolyn, go ahead.
 17 QUESTIONS BY
 18 MS. GERWIN:
 19 Q. So one of the things that you talked
 20 about, you said that 16 -- one of the figures you
 21 threw out was about 16 percent may be annoyed and
 22 you distinguish that from health effects, but where
 23 is the line between annoyance and health effects?
 24 A. There's not a fine line, there's not a

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1 **bright line. Everybody in this room has had some**
 2 **annoyance probably this evening. It all depends.**
 3 **As I've often said, when a baby's crying, that might**
 4 **be annoying to the mother watching the football**
 5 **game. It might be annoying to the father who has to**
 6 **change the diaper. Those are different annoyances**
 7 **that are not health effects. That's common, normal**
 8 **emotion.**
 9 Q. Right. Yeah, that was a very interesting
 10 analogy. One of your comments was that a crying
 11 baby sound might actually be pleasant in the sense
 12 that it assures that the baby is healthy, and either
 13 way it's not a health hazard if I understood your
 14 testimony correctly.
 15 **A. That reflects my thinking. I'm not sure**
 16 **about the testimony.**
 17 Q. Okay. So the interpretation is response
 18 to noise depends on the person hearing the noise not
 19 the noise itself, right?
 20 **A. That's one way that I described it, that's**
 21 **correct.**
 22 Q. Okay. So if going back to the crying
 23 baby -- I think that's a great analogy. Have you
 24 ever sat on an airplane next to a crying baby?

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1 **A. My own, yes.**
 2 Q. Yes, or -- and did you enjoy that?
 3 **A. Excuse me?**
 4 Q. I -- I take it you did not enjoy it.
 5 **A. Actually once the mother took care of it**
 6 **it was fine, so yes.**
 7 Q. Right. But I mean -- so you put up with
 8 it while it was happening until it was taken care
 9 of, right?
 10 **A. I continued on the flight, yes.**
 11 Q. Why -- I mean if -- have you ever had the
 12 experience of having someone else's baby on a flight
 13 where they just bawl?
 14 **A. Of course.**
 15 Q. Sure. And did you -- you couldn't leave,
 16 could you?
 17 **A. No, actually I wanted -- I felt really bad**
 18 **for the baby because what happens is the air**
 19 **pressure inside the ear changes and it hurts, and**
 20 **sometimes we can do things to the ears to make them**
 21 **feel better.**
 22 Q. But it's unpleasant to listen to the baby
 23 while --
 24 **A. It's unpleasant for me as a father,**

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1 **grandfather and physician. It's painful for me or**
 2 **it's uncomfortable for me to hear a baby cry if I**
 3 **can do something to help them.**
 4 Q. But if you can't do anything to help, you
 5 just have to listen to it, right?
 6 **A. I suppose so.**
 7 Q. What if you were on a flight that you were
 8 all strapped in, baby's crying, and the flight was
 9 never going to end, the flight was going to last 50
 10 years?
 11 **MR. BLAZER:** Mr. Chairman, Mr. Chairman.
 12 **CHAIRMAN CORNALE:** Carolyn, have we got --
 13 have you got a relevant question here? We're on the
 14 airplane, we're all on the airplane with you. We
 15 need to -- we need to talk about wind turbines and
 16 not airplanes.
 17 **MS. GERWIN:** Well, it comes back around to
 18 the issue of whether you have control over the
 19 source of the noise and how long it's going to last.
 20 There's various factors is what I'm getting at.
 21 **CHAIRMAN CORNALE:** All right.
 22 **MS. GERWIN:** Does that make sense?
 23 **CHAIRMAN CORNALE:** You just put that
 24 question out there, you put the question out there.

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1 **MS. GERWIN:** Yeah, I did.
 2 **BY MS. GERWIN:**
 3 Q. One of the reasons -- I guess one of the
 4 things I'd like to ask you is when it comes to, for
 5 example, a crying baby, we all put up with that,
 6 restaurant, airplane, whatever it is. Why do we put
 7 up with it?
 8 **MR. BLAZER:** Mr. Cornale, again, I think
 9 we need to leave the realm of crying babies and get
 10 to something relevant.
 11 **MS. GERWIN:** No, it's going to be
 12 relevant.
 13 **MR. BLAZER:** I object to the relevance.
 14 **CHAIRMAN CORNALE:** Okay, Carolyn.
 15 **MS. GERWIN:** Maybe a couple more
 16 questions.
 17 **CHAIRMAN CORNALE:** Streamline these
 18 questions.
 19 **MS. GERWIN:** I am. It's a simple question
 20 and I think the doctor should have a simple answer.
 21 Q. Why do we put up with a crying baby?
 22 **MR. BLAZER:** Same objection, Mr. Chairman.
 23 That has nothing -- this has no relevance to the --
 24 **AUDIENCE VOICE:** Let her get to it.

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1 Q. Let me put it in a yes or no way. Is it
2 because we value the baby?
3 **MR. BLAZER:** Objection, relevance.
4 **CHAIRMAN CORNALE:** Carolyn, okay, just --
5 you're getting to a question. Please just ask the
6 question.
7 **MS. GERWIN:** I'm doing this. I'm not --
8 **CHAIRMAN CORNALE:** We're not legal.
9 **MS. GERWIN:** Okay.
10 **CHAIRMAN CORNALE:** We're not lawyers.
11 **MS. GERWIN:** Right.
12 **CHAIRMAN CORNALE:** We're just -- just ask
13 him the question that you've got please.
14 **BY MS. GERWIN:**
15 Q. Does the annoyance factor depend on
16 whether the person values the source of the noise?
17 **A. Okay. Now I'm confused about who the**
18 **person is. Is it me or is it someone else?**
19 Q. It's a normal person, an average person.
20 **A. You know, one of the things -- okay, to me**
21 **it's very important to find out why that person is**
22 **crying or why that person is complaining. So if I**
23 **can help him with that, I try to help him.**
24 Q. Well, let's talk about traffic, a similar

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1 noise.
2 **A. Okay.**
3 **MR. BLAZER:** Mr. Chairman. Again, we're
4 not talking about traffic. We're talking about wind
5 turbines.
6 **MS. GERWIN:** It's an analogy. We've had
7 several analogies.
8 **CHAIRMAN CORNALE:** If it's on a similar
9 noise level of a similar noise structure, then I
10 guess it's a fair analogy.
11 **BY MS. GERWIN:**
12 Q. Would there be any reason to put up with
13 annoyance if the source of the annoyance had no
14 utility or value?
15 **A. That's a social question and I think you**
16 **have to ask -- I mean is it to me? Is it to that**
17 **person? Is it to the community? I don't know how**
18 **to answer that question. That's not an epidemiology**
19 **question. It's not a medical question.**
20 Q. Well, is it -- I mean you're talking about
21 crying babies. I mean what if a crying baby
22 actually isn't a crying baby, it's a fake baby.
23 **MR. BLAZER:** All right, Mr. Cornale --
24 **CHAIRMAN CORNALE:** Okay, Carolyn, how many

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1 more questions?
2 **MS. GERWIN:** I'm trying to make a simple
3 analogy here, but you're not going to allow me to
4 take it all the way, so --
5 **CHAIRMAN CORNALE:** We went from babies in
6 airplanes to cars and --
7 **MS. GERWIN:** The point is is there an
8 element to the annoyance factor related to the
9 utility of the source. So, for example, we put up
10 with traffic noise because we all like to ride on
11 the roads.
12 **MR. BLAZER:** And Dr. Roberts answered the
13 question. He said it's not a medical question, it's
14 a social question.
15 **MS. GERWIN:** A social question.
16 **CHAIRMAN CORNALE:** Correct.
17 **MS. GERWIN:** So it doesn't have any impact
18 on the level of annoyance, the impact on the person
19 that's receiving that --
20 **MR. BLAZER:** Again, asked and answered,
21 Mr. Chairman.
22 **MS. GERWIN:** Is it?
23 **CHAIRMAN CORNALE:** Yes, yes.
24 **MS. GERWIN:** All right. Well --

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1 **CHAIRMAN CORNALE:** It's a social question.
2 As a society, do we accept that? Not a medical
3 question; not an epidemiology question.
4 **MS. GERWIN:** Well, he just said there
5 wasn't a bright line, so there's a point at which it
6 pushes over into the physiological.
7 **CHAIRMAN CORNALE:** All right, have you got
8 another question on your sheet? Go ahead and throw
9 it out there.
10 **BY MS. GERWIN:**
11 Q. Have you tested any children?
12 **A. No, ma'am, I have not.**
13 Q. Have you established any standards for
14 noise levels for children?
15 **A. No, I have not.**
16 Q. Is there any reason to believe they would
17 be any different than they are for adults?
18 **A. I'd have to look at it, I don't know.**
19 Q. Okay. Have you ever studied a concept of,
20 and I'm not sure what the medical term is, but the
21 phenomenon of entrainment where a stimulus repeated
22 over and over again becomes -- your nerves kind of
23 go spastic and they become more receptive to it and
24 more sensitive to it?

1 **A. I don't think of entrainment that way. I**
2 **think of entrainment as learning about a noise or a**
3 **sound and responding to that. Entrainment to me is**
4 **-- gosh, I hate to bring this up again, but a baby's**
5 **crying. To a mother, to a mother it means one**
6 **thing. To a father, it means another.**

7 **AUDIENCE VOICE:** Objection.

8 **A. A fire engine, a siren, that if you're a**
9 **fireman, that's a call to action. If I'm driving,**
10 **that I'm looking to see where they're coming from so**
11 **I can pull over. So I've learned about sirens, so**
12 **to me that's entrainment. Now there's a**
13 **neurological part in that that I would leave to a**
14 **neurologist.**

15 Q. Is that a physiological thing?

16 **A. I don't think so. I think it's a learning**
17 **thing.**

18 Q. But that's -- that's your brain responding
19 to a stimulus, right?

20 **A. To a stimulus, yeah.**

21 Q. Okay. Let's see here. Now, I get
22 migraines and as such I'm a subpopulation and I
23 can't go to flickery movies. Are there going to be
24 subpopulations like that for sound and flicker?

1 flickering experience might be bad for a
2 subpopulation.

3 **A. You're making a good point and I think**
4 **we're communicating, but the other thing is the**
5 **epidemiology doesn't show us that wind turbines are**
6 **associated with migraine headaches.**

7 Q. I'm just trying to explore the concept of
8 the subpopulations, and how if you add up all the
9 subpopulations that might have a problem with the
10 total percentage of the populations that might have
11 an issue, would you be able to answer that?

12 **A. We all have problems and so you can't lump**
13 **them altogether. And so, you know --**

14 Q. I mean problems that are sensitive to
15 noise.

16 **A. As far as noise, I'm not aware of any**
17 **right off the top of my head.**

18 Q. Okay. Have you ever lived in or stayed
19 overnight in a house where people say they are
20 affected by turbine noise to experience it
21 firsthand?

22 **A. No, I haven't.**

23 Q. Have you ever sat with them when they were
24 complaining about noise?

1 **A. Not -- the only one for flicker that I can**
2 **think of is photosensitive epilepsy, which occurs at**
3 **a lot higher -- the light stimulus is a lot higher**
4 **frequency than what wind turbines produce. But here**
5 **again, this is a perfect example of you say**
6 **migraine. We'd have to ask the neurologist exactly**
7 **how many different causes there are, but it's very**
8 **important to know what the cause is to be able to**
9 **even interpret it. You've told me that flashing**
10 **lights stimulate that and you don't watch movies,**
11 **but do you use a computer?**

12 Q. I do.

13 **A. Okay, it flickers. So that tells me right**
14 **off the bat -- I mean I won't ask any more**
15 **questions, I know I'm not supposed to, but that**
16 **automatically tells me that there are certain**
17 **aspects of your migraines that are triggered by some**
18 **flash and other flashes are not triggering it, so**
19 **there's something going on, but the point being that**
20 **there are different causes of migraines and we have**
21 **to respond based on the cause.**

22 Q. So you might have to be very thorough
23 about checking different ranges of things. So one
24 flickering thing might be okay, but another

1 **A. In meetings, in meetings, but not in their**
2 **homes.**

3 Q. Not in their homes. And you were the one
4 that talked about nocebo, right?

5 **A. Yes, ma'am.**

6 Q. Okay. And as I was saying, placebo makes
7 sense to me, but nocebo, why would a sane person
8 wish to feel bad?

9 **A. Well, number one is if you believe in**
10 **placebo, then you have to believe in nocebo, because**
11 **if you believe this water is going to make my**
12 **headache better, okay, then it's more than likely**
13 **I'm going to feel better. If I feel that this water**
14 **is not going to make my headache better, then**
15 **there's a likelihood that I won't feel better.**

16 Q. But if I have no opinion about the water
17 to begin with, I won't have any of that, right?

18 **A. We all have opinions.**

19 Q. And we all -- well, now were you the one
20 that had the like thermometer of sound or was that
21 Mr. Hankard?

22 **A. I think we both did.**

23 Q. Okay.

24 **A. That first night of presentation.**

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1 Q. Right. And you said turbines are kind of
2 like a refrigerator humming, that kind of level?
3 **A. In some of those literature it talks about**
4 **that.**
5 Q. Right. And I hope I'm not backtracking at
6 all, but I think that there was some discussion
7 about the fact that there are international
8 conferences on wind turbine noise, correct?
9 **A. There have been some, yes.**
10 Q. And there's one coming up in 2015 again,
11 right?
12 **A. I don't know.**
13 Q. You're not aware. Are there any
14 international conferences on vacuum cleaner noise?
15 **CHAIRMAN CORNALE:** Carolyn.
16 **MS. GERWIN:** I'm making a point.
17 **CHAIRMAN CORNALE:** You're telling him
18 about conferences coming up. Do you have any
19 questions?
20 **BY MS. GERWIN:**
21 Q. Right. Well, I mean there's other common
22 sources of noise.
23 **A. Absolutely.**
24 Q. A lot of them -- and a lot of them are

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1 louder in the audible range than turbine noise.
2 **A. That's what I was talking about in that**
3 **and trying to explain.**
4 Q. But people aren't banding together and
5 creating citizens groups to protest those noises.
6 Why is that?
7 **A. I don't know.**
8 Q. Okay. Have any of your studies addressed
9 animal health?
10 **A. No.**
11 Q. Okay. And you said that infranoise would
12 be lost in the background sounds of the body at one
13 point, right?
14 **A. I certainly did.**
15 Q. But it's still extra noise, right?
16 **A. My heart's not extra.**
17 Q. Well, not the body part. The turbine
18 noise, the infranoise that you would add from a
19 turbine would not be -- it would be extra to what is
20 already there for the body.
21 **A. Well, might contribute to, and I'm going**
22 **to apologize to the acousticians, but it's going to**
23 **add to what we're already getting because we're**
24 **already exposed to all sorts of different**

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1 **frequencies of noise.**
2 Q. Did you study all the different kinds of
3 turbine noise? There's people report different
4 kinds of turbine noise.
5 **A. I'm not sure what you -- you know, they**
6 **break it down into two types that I recall. One is**
7 **the mechanical noise of the gears and that sort of**
8 **thing, and one of the things is that, in looking at**
9 **the epidemiology of wind turbines and the**
10 **complaints, the fact that the wind turbines are**
11 **changing and supposedly that part is getting**
12 **quieter.**
13 **The second part, then, is the noise of the**
14 **blades going through the air, and we heard last time**
15 **about some sort of modifications of the blades, so**
16 **there's also -- those are the two types of sound**
17 **generation that I'm aware of.**
18 Q. Those are in a normal turbine operation as
19 opposed to a mechanical problem, when there's a
20 mechanical problem occurring.
21 **A. I don't understand the question.**
22 Q. So those kinds of noises occur when the
23 turbine is fully and normally functioning, correct?
24 **A. To the best of my knowledge. I'm not a**

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1 **turbine expert, so I'm a little bit afield of my**
2 **area of expertise.**
3 Q. Are there times when turbines -- to the
4 best of your knowledge, are there times when
5 turbines make different noises because they're
6 having a mechanical problem or malfunction?
7 **A. Sounds reasonable, but I can't testify**
8 **about that because I don't know.**
9 Q. And you haven't studied that?
10 **A. No, I have not.**
11 **CHAIRMAN CORNALE:** Carolyn, let me
12 interrupt you for a second. Have you got a lot more
13 questions or -- while she's counting --
14 **MS. GERWIN:** I have a few.
15 **CHAIRMAN CORNALE:** Okay. While she's
16 counting, in the audience do we have any interested
17 parties that may have questions for Dr. Roberts? Is
18 there anybody out there?
19 All right. Based on that, we probably
20 should let you finish up your few if you got a few
21 more, and then that way Dr. Roberts won't have to
22 come back and visit us next year. So unless we have
23 some other questions?
24 Okay, Carolyn, continue on. It's 9:30, I

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1 understand everybody is tired and restless and all
 2 that, but --
 3 **BY MS. GERWIN:**
 4 Q. Okay, have you studied turbines of a
 5 certain age, like turbines that are older than a few
 6 years? What's the age range of turbines that you
 7 have studied?
 8 **A. I can't answer that directly. Indirectly**
 9 **I can say I started -- the papers that I've looked**
 10 **at that have done analysis of various populations**
 11 **and wind turbines go back to 1993 probably is the**
 12 **earliest report or earliest paper that I recall**
 13 **looking at.**
 14 Q. The papers. But has anybody been studying
 15 like what turbines -- do turbines sound different at
 16 five years, ten years, 20 years?
 17 **A. The only thing -- and I don't have an**
 18 **answer to that. The best answer I have is the fact**
 19 **that one of my considerations as an epidemiologist**
 20 **is the fact that looking at the papers, I look at**
 21 **the design, but I also look at, if I can, what type**
 22 **of turbine. Turbines have changed over time. We go**
 23 **from those that were downwind to upwind and all**
 24 **those sorts of things, so those could be factors**

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1 **that I would be interested in.**
 2 Q. And the annoyance factor, one of the -- is
 3 there an element of importance, is it important
 4 whether it is a randomly changing noise? Have you
 5 studied that?
 6 **A. I didn't. I don't recall that in the**
 7 **epidemiological papers that I looked at, so I don't**
 8 **have an answer for that.**
 9 **MS. GERWIN:** And I think that is all I
 10 have. Thank you.
 11 **CHAIRMAN CORNALE:** Very good. All right,
 12 one more time, real quick, any questions that
 13 anybody has out here specifically for Dr. Roberts?
 14 All right, I don't see anybody.
 15 Do you have a question for Dr. Ellenbogen?
 16 All right, John has got two questions for Dr.
 17 Ellenbogen. Come on up. We're trying to save
 18 everybody a trip back. I know, you guys, it's late,
 19 but bear with us here a little bit.
 20 **QUESTIONS BY**
 21 **MR. VITZTHUM:**
 22 Q. I don't remember the gentleman's name, but
 23 the retired school teacher asked you a question
 24 about the --

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1 **A. Yes.**
 2 Q. And I thought earlier in your comment you
 3 said that was their physician, and then when you
 4 commented, the way I took it, it was not their
 5 physician; that he reported to you that he wasn't
 6 his physician. Could you explain that to me?
 7 **A. Yeah, he is a physician and he was asked**
 8 **-- those four people asked him to perform an**
 9 **independent medical evaluation as a physician to**
 10 **provide, as I was doing, information to their**
 11 **discussion about how they and the company should**
 12 **handle the wind turbines and their effects on their**
 13 **health.**
 14 **So this is a physician, it's a certified**
 15 **physician who was seeing them at their request to**
 16 **help them to establish the potential link between**
 17 **wind turbines and the concerns that they had about**
 18 **their health.**
 19 Q. Did he -- I mean you said you met with
 20 them for like a day or whatever. Do you know, did
 21 he meet with them for a longer period of time or was
 22 his about the same as your visit?
 23 **A. I would say, judging by the details of his**
 24 **note, I would have guessed that he met with them a**

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1 **shorter period of time, but I don't know.**
 2 **MR. VITZTHUM:** That was all I had. Thank
 3 you.
 4 **CHAIRMAN CORNALE:** All right. Anything?
 5 All right. Okay. With that, just real briefly, the
 6 12th we'll be back here at 6:30, January 12th we'll
 7 be back here at 6:30. Wednesday, January 14th, will
 8 be at the high school at 6:30. Those date are out
 9 there. The rest of them, talk to your friends, get
 10 the dates.
 11 With that -- oh, on the 12th, from the
 12 applicant, I believe, MaRous and Thayer, they
 13 originally spoke with us about property values, so
 14 they'll be available the 12th and the 14th, along
 15 with probably Mr. Parzyck will be available. And I
 16 believe Mr. Hankard will -- if we can get Mr.
 17 Hankard there on the 12th, the public has an
 18 opportunity to question him and anybody else.
 19 **MR. BLAZER:** He'll be here.
 20 **CHAIRMAN CORNALE:** Hankard, Parzyck,
 21 Thayer and Mr. MaRous. All right. With that, I
 22 need a motion to recess.
 23 **MR. VITZTHUM:** I make that motion.
 24 **CHAIRMAN CORNALE:** Vitzthum motions.

1 Second?
 2 **MR. ZIMMERMAN:** Second.
 3 **CHAIRMAN CORNALE:** Zimmerman seconds. All
 4 in favor?
 5 **ALL MEMBERS:** Aye.
 6 **CHAIRMAN CORNALE:** Opposed?
 7 (Adjourned at 9:35 p.m.)
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1 STATE OF ILLINOIS)
 2 COUNTY OF FORD)SS
 3
 4 I, June Haeme, a Notary Public in and for
 5 the County of Ford, State of Illinois, do hereby
 6 certify that the following Livingston County Zoning
 7 Board of Appeals, Case SU-7-14 hearing was taken at
 8 the Walton Centre, 100 West Locust Street, Fairbury,
 9 Illinois, on December 17, 2014.
 10 That the said deposition was taken down in
 11 stenograph notes and afterwards reduced to
 12 typewriting under my instruction and that the
 13 deposition is a true record of the testimony given.
 14 I do further certify that I am a
 15 disinterested person in this cause of action; that I
 16 am not a relative, or otherwise interested in the
 17 event of this action, and am not in the employ of
 18 the attorneys for either party.
 19 IN WITNESS WHEREOF, I have hereunto set my
 20 hand and affixed my notarial seal this 23rd day of
 21 December, 2014.
 22
 23
 24

JUNE HAEME, CSR
 NOTARY PUBLIC

"OFFICIAL SEAL"
 June Haeme
 Notary Public, State of Illinois
 My Commission Expires:
 September 27, 2016

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