

STATE OF ILLINOIS  
PIATT COUNTY ZONING BOARD

**GOOSE CREEK WIND, LLC**  
**APPLICATION FOR A SPECIAL USE PERMIT**

12/15/2022  
6:06 P.M. - 10:11 P.M.

PIATT COUNTY ZONING OFFICER:  
Keri Nusbaum

HEARING FACILITATOR:  
Scott Kains, Esq.

PIATT COUNTY ZONING BOARD MEMBERS:  
Loyd Wax - Chairman  
William Chambers  
Paul Foran  
Jim Harrington  
Kyle Lovin

PIATT COUNTY BOARD MEMBERS:  
Jerry Edwards  
Todd Henricks  
Michael Beem  
Kathleen Piatt

COUNSEL FOR THE PIATT COUNTY BOARD:  
Andrew J. Keyt, Esq.

COUNSEL FOR THE APPLICANT:  
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APPLICANT - APEX CLEAN ENERGY:  
Alan Moore, Senior Project Manager

COUNSEL FOR THE OBJECTORS:  
Phillip A. Luetkehans, Esq.

COURT REPORTER: Holly Wingstrom, CSR, RPR, CRR

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1           MR. KAINS: As Mr. Wax is absent tonight,  
2 and the vice-chair of this zoning board,  
3 Mr. Harrington, is absent tonight, I guess it falls  
4 to me to call this meeting to order, so we'll call  
5 the meeting to order and begin with the Pledge of  
6 Allegiance to the Flag.

7           (PLEDGE OF ALLEGIANCE.)

8           MR. KAINS: Mr. Keyt has just informed me  
9 that Kari Nusbaum, the zoning board administrator,  
10 and Mr. Wax and Mr. Harrington as well are at  
11 another meeting and will be here shortly.

12           I was going to struggle through and do  
13 Kari's job of rollcall, but in lieu of that, I think  
14 we'll just hold off on doing the rollcall until she  
15 arrives because I think, if I were to do it, I would  
16 goof it up. So, I think that would be appropriate  
17 because I don't want to waste any more time.

18           Let's get started. So, when she arrives,  
19 then we will do rollcall.

20           And somebody might have to remind me,  
21 Mr. Keyt.

22           We are ready for more witnesses from  
23 Mr. Luetkehans in opposition to the application for  
24 special use permit.



1 **manager with RAS Aviation out of Mansfield,**  
2 **Illinois.**

3 Q. Okay. And you are familiar with the  
4 location of the proposed location of these wind  
5 turbines?

6 **A. Yes.**

7 Q. And is it in a service area of your  
8 company?

9 **A. Yes.**

10 Q. Do you have concerns about the proposed  
11 wind farm as it relates to your operations?

12 **A. Yeah. We service about a 50- to 60-mile**  
13 **radius around Mansfield covering about probably**  
14 **about 15 to 16 different counties. So, we've had a**  
15 **fair amount of experience with working in and around**  
16 **different wind farms in central Illinois.**

17 Q. And do you have concerns about your pilots  
18 working in and around wind farms?

19 **A. Yeah. You know, like --**

20 Q. Please, just proceed. You don't have to  
21 wait for my questions anymore. Go for it.

22 **A. Yeah, our main concern -- we have concerns**  
23 **about property values like everything else, but**  
24 **really our main concern is safety. That's our**

1 biggest opposition.

2 Our pilots have continually stated their  
3 concerns. I work with the pilots and our schedule.  
4 When we approach a field, we have to determine how  
5 to spray the field based on the geography of the  
6 land, the wind direction, a lot of different  
7 factors, telephone lines, tree lines, and the  
8 addition of the wind turbine towers as another  
9 dimension of factor that we have to factor in to  
10 spraying the field.

11 We usually start downwind, and that means  
12 that you turn in to the wind to maintain lift as far  
13 as the safety thing because of you're carrying extra  
14 weight with the chemicals.

15 When we have to spray a field with a wind  
16 turbine, we have to circle the tower like kind of a  
17 corkscrew and work out of it. So, we are turning  
18 into the wind, we are out of the wind, and we are  
19 circling. It's, like, not a normal maneuver that  
20 our pilots would make.

21 It increases the cost to the customer,  
22 that we have to charge additional for each wind  
23 turbine that is in a field. We have to spray over  
24 the access road or the driveways that are put in.

1 We can't turn the application off and back on, you  
2 know, within like a 12, 15. So, they are getting  
3 basically charged for spraying a road that there is  
4 no crop there, so that is an additional expense that  
5 some of our customers don't like.

6 When they are spraying, they have to focus  
7 on a navigation piece of equipment that guides them.

8 There is also safety equipment on the  
9 helicopter that warns them of obstructions, but it  
10 doesn't typically warn them of anything that has  
11 been placed there recently.

12 The other problem is they are focusing and  
13 trying to cover a straight line, and a lot of them  
14 have stated, or several of the pilots that we've  
15 had, in the their peripheral vision of the motion,  
16 it's not like a constant fixed object. You know,  
17 it's constantly turning, and even sometimes while we  
18 are in the field it will change directions, not  
19 forward to back, but as far as if the wind changes,  
20 they will turn.

21 We have to what we call ferry to different  
22 customers, so a lot of times, based on the  
23 regulations from, like, the Regional Airport, we  
24 have to stay within under like 500 feet, but we'll

1 actually have to ferry around a wind farm rather  
2 than try to navigate through it to reach a  
3 destination of a customer's field. So, there is an  
4 extra expense in cost and time and fueling, and that  
5 is very expensive to us.

6 We've ran into some frustrations this  
7 summer navigating around the new wind turbine farm  
8 around Bellflower. We were north spraying, and we  
9 typically will spray until sundown and get as many  
10 hours as we can. Coming back through that area,  
11 some of the towers that were under construction had  
12 very weak or temporary lights. There were actually  
13 some that didn't have any lights on it at all that  
14 were fully erected.

15 That is another point, that the light on  
16 the tower isn't actually the top of the obstruction  
17 because of the blades, so the pilots have to factor  
18 that. The pilot couldn't navigate. There was  
19 actually a low cloud ceiling that night, and he  
20 couldn't navigate through that Bellflower wind farm.  
21 The turbines weren't on any kind of aerial map that  
22 he had. He actually had to set it down on a country  
23 road and we had to go up with our trailer and load  
24 it on the trailer and actually bring it back home

1 because he just felt that it wasn't safe.

2 And even though I work with the pilot and  
3 we work with wind speed and construction and all the  
4 different factors, the pilot always has the final  
5 say as to whether he feels it's safe or not.

6 We have had experience with my partner's  
7 spouse was killed in a helicopter accident in 2014.  
8 So, we've had firsthand experience with accidents  
9 and people's lives. It's not just an inconvenience,  
10 but it's actually a safety thing that can affect  
11 people's lives.

12 The other thing that the pilots state is  
13 that they have to factor in the wind turbulence, and  
14 there is a lot of buffering and turbulence as they  
15 come around the towers and blades. They have to  
16 stay back as far as they can, but yet they have to  
17 do a good job for the customer because the farmer  
18 will farm as close to them as they can, and if we  
19 can't, you know, spray to that degree to as close as  
20 what they can with a ground rig.

21 So, mainly it's the extra expense. It's  
22 the safety. We are insured, but that is always a  
23 concern that we have as far as additional liability  
24 insurance when you are flying additional obstacles

1 and there's additional obstructions, so that is  
2 always something that we are concerned about as  
3 well.

4 Q. Anything else you would like to tell the  
5 board, or is that it?

6 A. No. Just on a personal opinion, I know  
7 that, like, there is a lot of communication about,  
8 like, you know, wind farms have been decommissioned  
9 and taking them down. But even in our area, there  
10 is a railroad track that goes through our area and  
11 there's old telephone lines along that track that  
12 are falling down or rotting. They are not used  
13 anymore. And I've asked different people about it,  
14 and they said, when they inquire the company always  
15 says, well, that is not us, that was a former  
16 company and that company went bankrupt, and now the  
17 people there are just left to deal with the eyesore  
18 of this mess. So, that is the other concern, is we  
19 don't want that our kids someday will have to deal  
20 with the situations and problems that we are putting  
21 into place now.

22 MR. LUETKEHANS: Thank you. I have no  
23 further questions, Mr. Bauer.

24 MR. KAINS: Very good. Thank you.





1 **variables that you have to consider.**

2 MR. KAINS: Any other questions for  
3 Mr. Bauer from the board?

4 Mr. Chambers?

5 EXAMINATION

6 BY MR. CHAMBERS:

7 Q. So do you have to -- since there's many  
8 different wind farms around, say you are going into  
9 one or the other, do you have to coordinate with  
10 them or have any sort of contact with them before  
11 doing that?

12 A. **We haven't. We haven't been instructed**  
13 **that that was required. I mean we just work with**  
14 **the customers and if they've got a field and there's**  
15 **existing turbines or towers, we access according to**  
16 **that.**

17 Q. Okay. My follow-up was going to be, if  
18 there was, did they curtail the turbines or shut any  
19 of them down during the spraying. But if there is  
20 no contact, then I assume they are all fully  
21 operational while you spray?

22 A. **Most of the time they are operating. Very**  
23 **few times -- I mean usually during the day there is**  
24 **enough wind that they are moving.**



1 you. They can make you wait. So, it's just it's  
2 not -- you know, we just try to avoid and stay out  
3 of their area if at all possible.

4 Another point that I didn't mention was  
5 the ADLS program. We are aware of that, but that  
6 doesn't really affect our safety at all. That is  
7 more of a system that is going to benefit the  
8 residents in not having to look at the lights. It  
9 doesn't really add any safety to the operator or to  
10 our operation at all.

11 MR. KAINS: Mr. Wax?

12 EXAMINATION

13 BY MR. WAX:

14 Q. Is your spray pattern that you put out  
15 typically adequate that you can safely cover all the  
16 crop acreage close to or regionally close to a wind  
17 farm/wind turbine tower?

18 A. Yeah. They have two different patterns.  
19 They can go back to back, which is like back and  
20 forth, or they do what they call a racetrack, which  
21 basically they start on the outside and just keep  
22 going around until they get to the inside.

23 But once they get to the tower, he'll do a  
24 corkscrew or go around it and work his way out, and

1     **then, as he passes through that area, he'll turn it**  
2     **off and then turn it back on to minimize, but there**  
3     **is still some overlap, and there is still some**  
4     **customers that objected to it.**

5             **You know, I mean it's not a precision,**  
6     **like some of the modern farm equipment will get to**  
7     **the hundredth of an acre and they can turn off**  
8     **within six inches of the end. You know, like, our**  
9     **guy is going 60 miles an hour, and he's pretty**  
10    **accurate, but there is going to be some overlap.**  
11    **So, the plat book might show it at 80 acres and the**  
12    **precision farming map might have it at 78.64, but**  
13    **when we actually spray it we might come up with 85**  
14    **or 86 because of the overlap, and that additional**  
15    **acres is fuel, we have to pay our pilot per acre.**  
16    **So, there is additional expense.**

17            **Q.     Thank you.**

18            **A.     Some farmers have objected. Some haven't.**

19                    **MR. KAINS: Any other questions for**  
20    **Mr. Bauer from members of the Zoning Board of**  
21    **Appeals?**

22                    **Questions for this witness from members of**  
23    **units of local government, including school**  
24    **districts?**

1                   Questions from interested parties  
2 represented by licensed attorneys?

3                   Mr. Gershon?

4   EXAMINATION

5           BY MR. GERSHON:

6           Q.     Thank you, Mr. Bauer. We appreciate you  
7 being here.

8                   I just want to get some sense on a couple  
9 of things up here to try and separate out what you  
10 are talking about.

11                   Are you aware that Apex has made  
12 commitments -- and I wasn't there when you talked to  
13 Alan, but Apex has made commitments in the past to  
14 coordinate with aerial sprayers to address the  
15 issues you are concerned with.

16           **A.     No. We weren't aware of that. Nobody has**  
17 **ever contacted us. It's a pretty small industry,**  
18 **and I don't know of anybody else that I've ever**  
19 **talked to. The airplanes are even worse about being**  
20 **around the turbines than the helicopters, but we**  
21 **were never made aware of that. No.**

22           Q.     It's not so much a question, but we would  
23 like to make you aware of that and have you feel  
24 free to come talk with them about this because they

1 do work with aerial sprayers in other areas.

2 Do you know -- you mentioned the telephone  
3 company that left poles up. Do you know if that  
4 telephone company that left those poles up had to  
5 execute a decommissioning agreement and provide for  
6 the kind of security that we are required to provide  
7 to remove their improvements?

8 **A. No. I don't know that. I just know that**  
9 **they are there and nobody wants to take care of**  
10 **them.**

11 Q. I appreciate that. Are you aware that  
12 there are currently approximately 70,000 wind  
13 turbines in the United States?

14 **A. Yeah. That's approximately what I've**  
15 **read.**

16 Q. And I am trying to -- can you give me a  
17 sense -- are you aware that numerous of the aerial  
18 sprayers that are operating both in this area and  
19 around the country do not charge -- I am sorry --  
20 are you aware there are numerous aerial sprayers  
21 around the country working within those turbines?

22 **A. Yes. And we do spray, like, in Oklahoma**  
23 **in early spring, and there are quite a few wind**  
24 **turbines out there and anybody, competitors or other**

1     **people that we work with in the industry are also**  
2     **charging out there as well for the obstruction and**  
3     **the extra time. So, I think it's a pretty standard**  
4     **thing in the industry to charge for that.**

5           Q.     Are you aware that many of the aerial  
6     sprayers that have worked with Apex and other wind  
7     farm operators in Illinois do not charge additional  
8     for doing that?

9           **A.     I would be unaware of that.**

10          Q.     Okay. Do you limit your aerial spraying  
11     when there are high winds?

12          **A.     Yeah. Of course, because there's a safety**  
13     **factor.**

14          Q.     Do you use -- I think you mentioned this.  
15     You mentioned GPS, but I want to understand. Do you  
16     use GPS, a GPS system, within helicopters for  
17     location of obstacles?

18          **A.     Yes. The pilots have different aviation**  
19     **apps and they show obstacles, and then there is also**  
20     **a guidance system on board that warns them of**  
21     **obstacles, and then there is a navigation that**  
22     **guides them as far as keeping like a straight line.**

23          Q.     And are you aware that Apex is obligated  
24     -- when Apex establishes -- this is with FAA, one of

1 their approvals -- that they, therefore, establish  
2 GPS locations with the FAA that then become  
3 available on the GPS maps for your use?

4 **A. Right, and that is why I stated in the new**  
5 **construction that we went around but some weren't on**  
6 **the aviation maps yet. There were no blades on**  
7 **them, but the towers were up. Some were lit and**  
8 **some weren't. We just had to be extra careful**  
9 **around them. So, I don't know what the turnaround**  
10 **time for that to get listed is.**

11 MR. GERSHON: Thank you very much. Again,  
12 we look forward to having a chance to talk with you  
13 more about this.

14 MR. KAINS: Very good. Thank you,  
15 Mr. Gershon.

16 Questions from interested parties  
17 represented by licensed attorneys?

18 Any other licensed attorneys in the room  
19 with questions for this witness?

20 Questions from other interested parties,  
21 members in support of the application or neutral on  
22 the application?

23 MR. KAINS: Mr. Johnson, is it?

24 MR. JOHNSON: Yes.

1 MR. KAINS: Please step forward.

2 Holly, we are going to need to go off the  
3 record for just a minute.

4 (PAUSE IN PROCEEDINGS.)

5 MR. KAINS: Back on the record.

6 Sir, could you please state your name for  
7 the record?

8 MR. JOHNSON: Christian Johnson.

9 MR. KAINS: And you have testified  
10 previously?

11 MR. JOHNSON: Yes, I have.

12 MR. KAINS: Very good. Go ahead,  
13 Mr. Johnson, with your questions for Mr. Bauer.

14 EXAMINATION

15 BY MR. JOHNSON:

16 Q. Mr. Bauer, a quick question for you: The  
17 way you made it sound was that having obstructions,  
18 I think you called them, on a piece of property  
19 would increase the price of your spraying  
20 activities, but it wouldn't prevent being able to  
21 spray in the area; is that correct?

22 A. Correct.

23 Q. So, you can still farm on that land; you  
24 are just going to have to, in your opinion, pay more

1 money for that?

2 **A. Right.**

3 Q. So, it would seem to me that since the  
4 vast majority of participants in the project area  
5 are going to -- that is a decision the landowner is  
6 making, wouldn't that be kind of a business  
7 decision, sort of a landowner can choose to pay the  
8 extra money as a business decision if they think  
9 that the wind turbines are going to bring in capital  
10 and that maybe they are not going to make  
11 100 percent capital because some of it is going to  
12 be invested into your efforts to spray, but that is  
13 a business decision, correct?

14 **A. Correct. And in the offset, because**  
15 **sometimes the farmer will use what we call a ground**  
16 **rig, which is a wheeled unit, but as the season gets**  
17 **long or we get rain or get too muddy, they can't do**  
18 **that, and that is when they typically call an aerial**  
19 **applicator in.**

20 **But a lot of our customers will do tests**  
21 **each year and, given on corn, typically the benefit**  
22 **is, and university studies have shown this, too, but**  
23 **a 10- to 15-bushel increase when they spray. We are**  
24 **spraying fungicide, which makes the plant healthier,**



1           Q.     No, no.  Don't you spray farms that have  
2     turbines at other places?

3           **A.     Yeah, because we go to Ford County, McLean**  
4     **County.**

5           Q.     What does it make any difference?

6           **A.     Because it's not -- it adds additional**  
7     **obstacles, adds additional danger.**

8           Q.     Well, you take care of Ford County, don't  
9     you?

10          **A.     Yeah, but I am not saying it's not**  
11     **dangerous just because we are in Ford County.  It's**  
12     **just --**

13          Q.     You can't handle it, so you need somebody  
14     else?

15                   MR. KAINS:  Mr. Jordan, would you please  
16     ask questions?  Please, do not argue with the  
17     witness.

18                   MR. JORDAN:  I am not arguing.

19                   MR. KAINS:  This goes for everyone:  Cross  
20     examination is a time to ask questions.  It's not  
21     time for folks to get angry or upset with people.  
22     What we need to do is simply just ask him a  
23     question.

24                   Please proceed.

1 BY MR. JORDAN:

2 Q. Are there other spray units in the area  
3 that can do your job?

4 **A. Not with a helicopter that I know of.**

5 Q. But they can do it with a plane?

6 **A. They don't because the plane can't get as  
7 close as we can get.**

8 Q. Oh, okay.

9 **A. And they are going 130 miles an hour, and  
10 we are going 50 miles an our.**

11 Q. Can you go under the high lines?

12 **A. No. We don't.**

13 Q. Do the planes go under the high lines?

14 **A. They are not supposed to. That doesn't  
15 mean they don't. They are not supposed to.**

16 MR. JORDAN: Okay.

17 MR. KAINS: Very good. Thank you,  
18 Mr. Jordan. Any other questions for Mr. Bauer from  
19 the public?

20 THE WITNESS: In relation to the power  
21 lines, power lines are fixed. They are not moving.  
22 So, that is the other difference.

23 MR. KAINS: Any other questions for  
24 Mr. Bauer from the general public, persons in

1 support of the application or neutral?

2 Very good. Thank you.

3 Questions from Piatt County staff and  
4 consultants?

5 Any redirect, Mr. Luetkehans?

6 MR. LUETKEHANS: Real quick.

7 FURTHER EXAMINATION

8 BY MR. LUETKEHANS:

9 Q. You get hired by the farmers, correct?

10 **A. We get sometimes hired by the farmer,**  
11 **sometimes the local ag services will hire us. Like**  
12 **FS or Weldon Fertilizer will hire us on behalf of**  
13 **the farmer.**

14 Q. Okay. But the farmer is not always the  
15 landowner; is that correct?

16 **A. Correct. Most of the time they are not.**

17 MR. LUETKEHANS: Nothing further.

18 MR. KAINS: Very good.

19 Anything from you, Mr. Gershon?

20 MR. GERSHON: No. Thank you.

21 MR. KAINS: Okay. Very good. And the  
22 final questions for Mr. Bauer come from the board.  
23 Any questions, final questions, for Mr. Bauer from  
24 members of the ZBA?

1           Very good. All right.

2           Thank you, Mr. Bauer, for your testimony.

3           You are excused.

4           Now, because we took things out of order,  
5           we called the meeting to order, we did the Pledge of  
6           Allegiance, and now we will have the rollcall.

7           Ms. Nusbaum?

8           MS. NUSBAUM: Mr. Larson?

9           MR. LARSON: Here.

10          MS. NUSBAUM: Mr. Harrington?

11          MR. HARRINGTON: Here.

12          MS. NUSBAUM: Mr. Lovin?

13          MR. LOVIN: Here.

14          MS. NUSBAUM: Mr. Wax?

15          MR. WAX: Here.

16          MS. NUSBAUM: Mr. Chambers?

17          MR. CHAMBERS: Here.

18          MS. NUSBAUM: Mr. Foran?

19          MR. FORAN: Here.

20          MS. NUSBAUM: And now, if I could, I'll  
21          call the county board.

22          MR. KAINS: Yes, ma'am.

23          MS. NUSBAUM: Mr. Henricks?

24          MR. HENRICKS: Here.

1 MS. NUSBAUM: Mr. Edwards?

2 MR. EDWARDS: Here.

3 MS. NUSBAUM: Mr. Beem?

4 MR. BEEM: Here.

5 MS. NUSBAUM: Ms. Jones?

6 MS. JONES: Here.

7 MS. NUSBAUM: Ms. Piatt?

8 MS. PIATT: Here.

9 MR. KAINS: Thank you. Thank you, Kari.

10 Mr. Luetkehans, call your next witness.

11 MR. LUETKEHANS: We would could call

12 Dr. Punch, Dr. Jerry Punch, who is available remote

13 on the screen.

14 MR. KAINS: Hello, Dr. Punch. Can you

15 hear me?

16 DR. PUNCH: Good evening. Yes, I can.

17 MR. KAINS: All right. Very good, sir.

18 Could you please raise your hand to be sworn?

19 **JERRY PUNCH, Ph.D.,**

20 a witness herein, called by the opposition, after having

21 been first duly sworn, was examined and testified as

22 follows:

23 MR. KAINS: Mr. Luetkehans, you my proceed

24 with questions of your witness.

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EXAMINATION

BY MR. LUETKEHANS:

Q. Dr. Punch, I will say you are going to have to speak a little bit louder so that everyone can hear you. We can hear you but it's a little soft. Could you please state your name and spell your name for the record?

**A. Jerry Punch. J-e-r-r-y P-u-n-c-h.**

Q. Okay. The board has in front of it Objectors' Exhibit 8, which is your PowerPoint presentation. Feel free to proceed.

**A. Okay. My voice, unfortunately, is a little horse tonight. I am speaking to you from my home in --**

MR. KAINS: Dr. Punch, could you go a little bit slower and state just what you just stated? We couldn't quite understand, please.

THE WITNESS: Okay. I said I am speaking to you from my hometown of Okemos, Michigan, which is a suburb, a small suburb of East Lansing, Michigan.

Can you hear me okay now?

MR. KAINS: Yes, sir.

BY MR. LUETKEHANS:

1 Q. Okay. Go ahead.

2 A. I am going to begin giving a presentation  
3 that, based on a couple presentations I've given in  
4 the past, I have updated the presentation. It has  
5 basically the same title as I've used before, Wind  
6 Turbine Noise Effects on Human Health.

7 I notice that Dr. Ellenbogen has given a  
8 talk with essentially the same title. I think  
9 you'll find that we have fairly diametrically  
10 opposed views on the matter.

11 I'll get right into it. The major topics  
12 I'll be talking about are a little bit of my  
13 professional background in how I got into to this  
14 area of wind turbine noise.

15 I'll talk a little bit on the  
16 characteristics of wind turbine noise that makes it  
17 somewhat unique in comparison to other environmental  
18 and industrial noises.

19 I'll mention annoyance a few times during  
20 the talk, annoyance from audible sound and  
21 infrasound from wind turbines.

22 I'll talk about -- most of my talk will be  
23 how to get the causal links that we have that link  
24 up infrasound and low-frequency noise with adverse

1 health effects and some relevant noise guidelines  
2 that I think we should be following in terms of  
3 levels to which we should restrict noises from wind  
4 turbines.

5 As I go I'll stick in some observations  
6 from personal interviews and some analyses that I've  
7 done.

8 My first view of wind turbines was in  
9 Huron County, Michigan, when a friend of mine who  
10 was an acoustician, Rick James, invited me to  
11 accompany him to talk to a family, just to sit and  
12 interview with the family about their experiences  
13 living near wind turbines.

14 We stopped along the road, and down the  
15 road quite a distance in the oval area were about  
16 five or six wind turbines, very small looking, but  
17 obviously fairly far away. We checked the odometer,  
18 and the distance to those turbines for the nearest  
19 turbine which was almost exactly five miles. So,  
20 obviously, they were quite tall. That was my first  
21 experience in around 2009.

22 The family lived in a renovated family  
23 home that they had inherited from their family.

24 The nearest turbine was, in the slide on

1     **the left, in the picture on the left, was about**  
2     **1300 feet from the house. The close-up of that**  
3     **turbine was on the right side of that.**

4             **The family was sleeping in a motel during**  
5     **the nights when the turbines were fully operational,**  
6     **so they really couldn't sleep in their home when --**

7             MR. KAINS: Dr. Punch, I am going to  
8     interrupt you for just a moment.

9             I thought we were going to get into more  
10    of his educational background but, Mr. Gershon --

11            MR. LUETKEHANS: That is actually next.

12            MR. KAINS: Oh, it's next?

13            Well, I am just going to jump the gun  
14    anyway.

15            Mr. Gershon, do you have any objection to  
16    this witness testifying as an expert?

17            MR. GERSHON: My understanding is that he  
18    is not a medical expert, not an epidemiologist, but  
19    is testifying as a consultant on these projects. I  
20    am not sure exactly what his foundation is as an  
21    expert.

22            MR. LUETKEHANS: Well, that's --

23            MR. KAINS: We'll get to it and then raise  
24    the issue then. Sorry I jumped the gun. I thought

1 he was going into talking about this family that was  
2 unable to sleep. So, I jumped the gun.

3 So, Dr. Punch, you may proceed with your  
4 PowerPoint.

5 BY MR. LUETKEHANS:

6 Q. All right.

7 A. You asked about my educational background  
8 I believe. I have a master's degree in the hearing  
9 speech sciences from Vanderbilt University and a  
10 Ph.D. in audiology from Northwestern University.

11 My background, generally, before I got  
12 involved with wind turbine noise was as a clinical  
13 audiologist and research audiologist.

14 Audiologists deal with hearing, hearing  
15 disorders, fitting of hearing aids, and other kinds  
16 of rehabilitative measures with people with hearing  
17 loss.

18 So, I visited this family in Huron County  
19 in 2009.

20 I came home a little puzzled about what  
21 was going on, and I read a book by Paul Gipe which  
22 was fairly positive about the future of wind turbine  
23 noise -- excuse me -- wind turbine energy  
24 production. I reviewed the literature.

1 I ended up writing an article in a  
2 magazine, Audiology Today, in 2010.

3 I won't go through the whole list.  
4 Basically, I chaired a workgroup that was in  
5 Michigan at the state level to revise the statutes  
6 and regulations regarding the siting of wind  
7 turbines.

8 I presented, invited comments and gave  
9 legal testimony in a number of states.

10 I co-authored a three-part article, and  
11 eventually I interviewed and ultimately I wrote an  
12 article with Richard James in 2016. It's a fairly  
13 long article summarizing literature. We titled the  
14 article Wind Turbine Noise and Human Health: A  
15 four-decade history of evidence that wind turbines  
16 pose risks.

17 I have also interviewed a number of  
18 individuals and families who have abandoned their  
19 homes or are about to abandon their homes and  
20 recently written/co-authored a couple articles with  
21 a Canadian group about families who have had  
22 negative experiences with industrial wind turbines,  
23 some of whom had left their homes entirely.

24 Q. Is that your educational and professional

1 background in relation to this?

2 Dr. Punch, is that a summary of your  
3 education?

4 **A. I am sorry. Would you -- I didn't hear it**  
5 **very well.**

6 Q. Yeah. Is that a summary of your  
7 educational and professional background in this  
8 area?

9 **A. Well, I could talk about a lot. I could**  
10 **go on, but it will cut into my time in terms of what**  
11 **I want to present here. Could we hold off for**  
12 **questions on that later?**

13 MR. LUETKEHANS: Dr. Punch, just let me --

14 At this time I will ask that the witness  
15 be qualified or allowed to testify as an expert  
16 under the hearing rules in the past?

17 MR. KAINS: Mr. Gershon?

18 MR. GERSHON: No objection to him  
19 testifying as an audiologist as he's identified.

20 MR. KAINS: Very good.

21 Dr. Punch will be allowed -- Doctor, you  
22 will be allowed to testify as an expert witness with  
23 respect to wind turbine noise, audiology and any  
24 health impacts relating those areas.

1           Go ahead, Mr. Luetkehans, your witness can  
2 proceed.

3 BY MR. LUETKEHANS:

4           Q.     Dr. Punch, please proceed with your  
5 PowerPoint.

6           A.     I've never professed to be a medical  
7 doctor, okay? I am a Ph.D. audiologist. I am not  
8 an epidemiologist. I do know something about sound  
9 and acoustics. I draw distinctions between specific  
10 and general causation.

11                   Specific causation has to do with the area  
12 that physicians deal with, and that is they look at  
13 symptoms and diagnose problems in individual  
14 patients, whereas general causation looks at --  
15 general consists of scientists and other researchers  
16 and experts who look at symptoms of people in the  
17 population and draw links between certain  
18 environmental events like cigarette smoking and  
19 disease like lung cancer.

20                   I think these two have similar  
21 backgrounds. Obviously, they are somewhat  
22 different, but I think each one should deal with the  
23 individual patient. In case of general causation,  
24 any expert should have a research background and do

1 site visits and also do some interviews of the  
2 residents who live near turbines.

3 In my slide, you'll see frequent mention  
4 of at least these three abbreviations, these three  
5 organizations or terms: Adverse health effects,  
6 World Health Organization, and wind turbine noise.

7 Frequencies between 20 hertz and 20,000  
8 hertz, you may have heard that before, elephants and  
9 some other animals hear; that's called infrasound,  
10 below 20 hertz.

11 Ultrasound is frequently associated with  
12 radar and sounds that are over 20,000 hertz. Even  
13 though we don't perceive, typically, as humans,  
14 infrasound as sound per se, our body can pick up  
15 vibrations. The tissues and organs of the body can  
16 actually vibrate and give us some very strange  
17 perception that something is happening in the fact  
18 that we can't really receive it or interpret it as  
19 sound as such.

20 The things that make wind turbine noise  
21 unique are that it's amplitude modulated. It  
22 doesn't stay at the same level. It's impulsive, up  
23 and down in intensity as what I referred to it as a  
24 minute ago and just now as amplitude modulation.

1           Sometimes it's tonal. Tonal sounds can be  
2 more disruptive than broadband sounds. Perception  
3 of wind turbine noise varies with a number of  
4 elements or factors, including distance. The  
5 terrain or hilly terrain creates more noise or  
6 higher intensity noise, and wind direction also  
7 affects it.

8           It's also unpredictable. You can't really  
9 predict when it's going to occur. Even when the  
10 turbines are turning, sometimes it's more disruptive  
11 than other times. We can't control it, and that's  
12 somewhat aggravating and annoying in itself.

13           It occurs most often in low background  
14 sound levels. Like in rural areas at night, that is  
15 where you'll find wind turbines, of course, which  
16 can disturb sleep in a lot of people.

17           Infrasound and low-frequency noise can  
18 easily cross boundaries and penetrate barriers, so  
19 it's hard to guard or prevent it really from  
20 happening, from occurring.

21           So, these are the things that make it, I  
22 think, unique from other industrial and  
23 transportation noises.

24           Nuisance is a very common term in the

1 state and local regulations when it comes to noise  
2 control. Those regulations typically have to do  
3 with protecting the use and enjoyment of personal  
4 property.

5           The World Health Organization treats  
6 nuisance and annoyance as basically the same thing.  
7 The World Health Organization also defines health in  
8 a very broad way as a state of complete physical,  
9 mental and social wellbeing and not merely the  
10 absence of disease or infirmity.

11           Scientific studies show wind turbine noise  
12 is known to a number of people, a lot of people, and  
13 the World Health Organization considers  
14 noise-induced annoyance a potential factor in  
15 deterioration of health.

16           There is a direct and an indirect link  
17 between noise and health. The line straight from  
18 noise to health is a direct link. It happens fairly  
19 suddenly. It can cause sleeplessness, sometimes  
20 depression and burnout over time. It can cause --  
21 noise can cause noise annoyance, which can lead to  
22 stress effects that result in high cortisol levels  
23 that can be measured physiologically.

24           At the very top of this graph is

1 effort-reward imbalance, which I think of as risky  
2 reward. If, for example, people are compensating  
3 for wind turbines near their homes, they tend to be  
4 more tolerant of them. They tend to complain less.  
5 Although, in many, at least in the past, in many  
6 wind turbine noise ordinances, people who sign  
7 leases are prohibited from making negative comments  
8 or advocating against wind turbines.

9 I won't read this, of course, but there  
10 are lots of studies that link annoyance with  
11 low-frequency noise from various sources. The ones  
12 on this list with the asterisk by them are those  
13 that deal with specifically studies that really talk  
14 about wind turbines per se.

15 You may understand this already. Let's go  
16 very quickly, though. Mathematically wind turbines,  
17 if they turn at 20 rotations per minute, of course  
18 they have three blades, that means 60 times per  
19 minute a blade passes the tower.

20 More commonly rotation is around 16  
21 rotations, although in that rotation it can vary  
22 quite a bit. Sixteen per minute. So, with three  
23 blades, that is 48 times a minute that the blade  
24 passes the tower, and that results now, instead of 1

1 hertz with 20 rotations, it's .8 hertz, so it's  
2 actually below 1 hertz, 1 cycle per second that  
3 these amplitude-modulated pulsations occur.

4 I apologize for my voice.

5 An Australian acoustician, Steven Cooper,  
6 has made a recent delineation between what we think  
7 of as infrasound, that is constant noise that's  
8 below 20 hertz, to the infrasound in wind turbine  
9 noise, which he defines it as dynamically  
10 amplitude-modulated pulsations occurring at an  
11 infrasonic rate.

12 So, I think it's important to get our mind  
13 around that content. Basically, there might be a  
14 pretty steady noise that exists in the background  
15 from turbines, and then every .8 seconds or about  
16 every second there is a whooshing sound and an  
17 amplitude modulation that accompanies that turning  
18 of the blade.

19 These pulsations can occur at around  
20 roughly 10 dB or 11 dB, maybe a little higher than  
21 the constant level sound, and those are what stir  
22 people, I think, the most.

23 A British physician -- or excuse me --  
24 physicist, Leventhall, has said that infrasound,

1 since it is below the audible threshold, it and can  
2 be of no consequence. What we can't hear cannot  
3 hurt us.

4 Alec Salt, nationally recognized and  
5 internationally recognized researcher on the ear,  
6 says this logic seems to apply only to hearing, and  
7 he asked us to consider what about the other senses.  
8 Do the things we can't hear -- excuse me -- can't  
9 taste, can't smell, can't see or touch, not hurt us?

10 In every case I would have to say they do.

11 There are some elements in each of those  
12 senses that can hurt us even though we can't taste,  
13 smell, see or touch them.

14 So why should hearing be different? The  
15 relationship between noise and health is based on  
16 audible sound and infrasound.

17 Audible sound or noise can cause annoyance  
18 and sleep disturbance directly.

19 Annoyance can also cause sleep disturbance  
20 in itself.

21 Infrasound can cause direct responses in  
22 terms of producing sleep disturbance as well as  
23 health effects, and the dash lines represent the  
24 indirect effects.

1                   **There is an indirect effect that sleep**  
2 **disturbance overtime is going to cause in most**  
3 **people, some adverse health effects. I have added**  
4 **the second dash line --**

5                   (CONNECTION WITH WITNESS LOST.)

6                   MR. KAINS: Holly, let's go off the record  
7 for a moment.

8                   (PAUSE IN PROCEEDINGS.)

9                   MR. KAINS: Back on the record.  
10                  Dr. Punch, we lost you. You were on a  
11 page.

12                  MR. LUETKEHANS: Page 15, Dr. Punch.

13                  MR. KAINS: Back on the record.

14                  Dr. Punch, when we lost you, sir, you were  
15 on a page that at the top it said Schomer classifies  
16 the effects of audible noise and infrasound on  
17 health (modified). The last thing we heard was you  
18 said I have added the second dash line.

19                  THE WITNESS: Okay.

20                  MR. KAINS: Can you go back to that part  
21 of your presentation? And you may resume your  
22 presentation where you talked about I've added the  
23 second dash line. Thank you.

24                  THE WITNESS: Okay. Thank you. I am

1 sorry for that. I don't know what happened on this  
2 end, if I did that.

3 Yes. I was saying I added that second --  
4 this is from somebody else's work, but basically  
5 it's Schomer and others summarizing a great deal of  
6 literature. I've added the second dash line on the  
7 right there between sleep disturbance and health  
8 effects. As I was saying, if you have health  
9 problems, health effects, that will also disturb  
10 sleep in and of itself, so it's another indirect  
11 effect, another indirect pathway between noise and  
12 hurt.

13 So, I'll go ahead now with the next slide.  
14 This slide shows and compares annoyance. There was  
15 a number of people -- that is 10 percent of people  
16 are annoyed at various levels, depending on the type  
17 of noise they are listening to.

18 That arrow that just came up on the right  
19 refers to traffic noise. Traffic noise produces  
20 high annoyance, extreme annoyance in about 10  
21 percent of the population.

22 The next graph or the line to the left is  
23 the wind turbine noise, and the arrow points to  
24 10 percent of the people who are highly annoyed when

1 wind turbine noise is only about 36 to 37 dBA. So,  
2 that just means that wind turbine noise is much more  
3 annoying at equal levels when compared to other  
4 kinds of noises in the environment.

5 The Health Canada study also found that  
6 people are highly annoyed. A certain number of  
7 people are highly annoyed to wind turbine noise. At  
8 least one in ten are annoyed, highly annoyed, when  
9 the noise levels are at above 35 dBA.

10 About 14 percent of people who are exposed  
11 to levels between 40 and 46 dBA will also experience  
12 high annoyance.

13 And I was going to -- let's go into some  
14 shortcomings, what I consider shortcomings anyway,  
15 with the Health Canada study. The study is not  
16 generalizable to the population at large because a  
17 number of people were excluded. The people who are  
18 most vulnerable were actually excluded from the  
19 study, people who were less than 18 years of age,  
20 over 79, and people who abandoned their homes; and  
21 the authors directly stated that the study cannot be  
22 generalized to other projects, wind turbine projects  
23 or other locales; yet, we constantly do hear that  
24 from the wind industry, and we are hearing it from

1 Goose Creek Wind Project as well, that the Health  
2 Canada study pertains most relevant to that  
3 particular project.

4 Noise levels were modeled in the Health  
5 Canada study. They were not measured; although,  
6 there were some random measurements to substantiate  
7 or validate the predicted measurements or the  
8 predicted values, but modeling was almost always  
9 subject to errors.

10 The study had no scientifically valid  
11 control group. Instead of using the general  
12 population, it used a group that was exposed to  
13 noise less than 25 dBA on the assumption that there  
14 would be no adverse health effects in that group,  
15 and that is an unreasonable assumption.

16 Fourth, the sampling and the analytic  
17 procedures used to compare hair cortisol levels in  
18 noise-exposed versus nonexposed residents or those  
19 exposed to very little noise have been studied by  
20 reputable medical and nonmedical instructors and  
21 have been found to be flawed.

22 The study didn't find any adverse health  
23 effects below 46 dBA, which contradicts a lot of  
24 information, a lot of data from the World Health

1 Organization and other sources, including  
2 researchers.

3 Because the study excluded the most  
4 vulnerable, the main conclusion that can be made or  
5 drawn is that non-vulnerable people can tolerate  
6 high levels of noise. That is not a very profound  
7 statement because, by definition, the people who  
8 can't tolerate high-level noise are the  
9 non-vulnerable.

10 I think this last one is a very  
11 significant shortcoming and probably the most  
12 significant.

13 The dBA metric that was used excludes low  
14 frequencies and essentially all of the infrasound.  
15 There is a lot of literature that does attempt to  
16 make/draw relationships between dBA and health  
17 effects, but dBA is really inadequate when we are  
18 trying to quantify the statistical relationship  
19 particularly between specific health complaints,  
20 especially if those complaints relate to the  
21 presence of infrasound because the infrasound is  
22 excluded from the dBA measurement to start with.  
23 Again, referring to Steve Cooper in his Australian  
24 study who made that basic discovery, that claim.

1           So, these observations, and particularly  
2 the fact that dBA metric itself was used  
3 exclusively, these are sufficient to, I think,  
4 render this Health Canada study invalid.

5           You heard from Dr. Jeffrey Ellenbogen.

6           And if you are listening, Dr. Ellenbogen,  
7 I would not in any way try to disparage you or your  
8 reputation, but there are things I consider factual.

9           You've testified -- he's testified, in the  
10 Goose Creek wind case, in very strong support, that  
11 the Health Canada study findings serve as definitive  
12 evidence that wind turbines do not cause adverse  
13 health effects.

14           He has often testified as an advocate for  
15 the wind industry. He is a member of the panel that  
16 coauthored the Massachusetts report in 2012. That  
17 panel recommended a 20 dBA limit on wind turbine  
18 noise in residential areas. The report has been  
19 strongly criticized by at least two people, Raymond  
20 Hartman, who has a Ph.D. in economics from MIT, and  
21 by Dr. Paul Schomer, Ph.D. in electrical  
22 engineering-acoustics from the University of  
23 Illinois.

24           You are all probably familiar by now with

1 Nina Pierpont came up with the term wind turbine  
2 syndrome. These are the different disorders/issues  
3 that she associated with wind turbine noise. I  
4 won't read them, but you see these coming up in very  
5 many different studies. And the more I've seen  
6 since that 2009 book -- and did I see a preprint of  
7 the book itself -- the more I believe many of these  
8 things are associated in some people with wind  
9 turbine noise exposure.

10 I am not saying and I've never said that  
11 everybody who is exposed to wind turbines is going  
12 to experience any or all of these things. I am  
13 saying that a significant percentage of people who  
14 have significant exposure such as those people who  
15 live very close to turbines, very, very often  
16 experience one or multiple of these conditions.

17 Cooper, in Australia, in both a field  
18 study and laboratory study, has shown that inaudible  
19 sound from wind turbines -- inaudible sound  
20 pulsations that occur at infrasonic rates cause very  
21 unpleasant perceptible sensations that are  
22 synchronized or were synchronized with wind turbine  
23 operations, such as when the turbines turned on and  
24 off or the turbines change in terms of their power

1 levels by 20 percent up or down.

2           These people kept diaries and were blinded  
3 to when the turbines cut on and off. It was a very  
4 unusual study in that the wind company, Cape  
5 Bridgewater, agreed to downgrade and turn on and off  
6 turbines at certain times so that these observations  
7 of these listeners or these people could be made.

8           The sensations that Cooper discovered that  
9 were occurring -- and he called them sensations, by  
10 the way, because he's not a medical doctor -- they  
11 included headache, pressure in the head, ears or  
12 chest, ringing in the ears or tinnitus, a heart  
13 racing condition or a sensation of heaviness in the  
14 chest primarily.

15           He identified a wind turbine signature  
16 that was associated with the production of  
17 infrasound which was measured during the study.

18           He said that alternative explanations,  
19 such as the so-called nocebo effect, have been  
20 refuted by the finding that there is no -- a finding  
21 that a direct cause-effect relationship between  
22 infrasound and adverse health effects. In other  
23 words, nocebo effect, maybe not to some extent, but  
24 he found a direct cause and effect relationship

1 between infrasound itself and adverse health  
2 effects, if you can call those sensations adverse  
3 health effects.

4           Besides Pierpont and Cooper's studies, I  
5 cite other references lately in literature, heard  
6 about them in papers that have been read. Some of  
7 these, I'll call them adverse health effects, I  
8 don't think all of them are firmly established, but  
9 these things have been mentioned more recently. I  
10 won't read them again, but increased suicide rate in  
11 one study is being touted as a possibility. I am  
12 not so sure personally.

13           Vibroacoustic disease has been associated  
14 with -- its an adverse health effect. It has been  
15 associated with wind turbine noise, but it requires,  
16 I think, a long-term exposure to a very, very high  
17 level and is not something that I personally think  
18 -- I don't know. I am not a medical doctor. I  
19 don't think it really causes a pronounced adverse  
20 health effect in very many people at all who are  
21 exposed to wind turbine noise. But things like  
22 headache, migration, anxiety, these are pretty well  
23 established actually. I interviewed parents and a  
24 child in a certain state, I'll call it state A, and

1 compared their symptoms which they checked off on a  
2 checklist. They had 71 conditions plus "other" they  
3 could check off. The mother, the father and the son  
4 all had at least half or more of the symptoms that  
5 Pierpont called wind turbine syndrome criteria or  
6 symptoms.

7 In another state, one individual who lived  
8 on a hill not far from a couple of turbines  
9 experienced seven of the ten symptoms. That is very  
10 unusual I think, and I was surprised and shocked  
11 that one person could experience so many of those  
12 symptoms.

13 By the way, those symptoms, we asked  
14 people to check off in a long questionnaire we gave  
15 them, those symptoms that developed after the  
16 turbines were installed or that worsened after the  
17 installation of the turbines.

18 Another point here is that sleep  
19 disturbance is the most well-documented symptom of  
20 exposure to wind turbines, and many of these studies  
21 are peer-reviewed literature, some are reports, long  
22 and short.

23 The NIH, or National Institution of  
24 Health, talks about these things occurring as a

1 result of sleep disturbance itself. We all know  
2 that if we are deprived of sleep for a long time --  
3 you've heard talk about chronic sleep disturbance,  
4 that you can develop these kind of symptoms:  
5 Hypertension, heart issues, hormonal issues,  
6 thinking and concentration and memory problems, it  
7 can cause or lead to disease, weight gain, negative  
8 effects on childhood growth and development and  
9 muscle tissue repair and so forth. It also can lead  
10 to negative effects on puberty and fertility. That  
11 is NIH.

12 As an audiologist, I think I got into this  
13 because I am an audiologist because there is a  
14 relationship between what happens in the inner  
15 ear -- we have an outer, middle and inner ear -- in  
16 relation to perception of wind turbine noise.

17 I don't know if you can -- I can't use my  
18 arrow here. Do you see the arrow?

19 BY MR. LUETKEHANS:

20 Q. Yes, we can, Dr. Punch.

21 **A. Thank you. The cochlea -- I don't want to**  
22 **get too far into the weeds here, but the cochlea is**  
23 **the hearing mechanism in the inner ear as opposed to**  
24 **the vestibular organs of the inner ear which give us**

1 a sensation of balance.

2 In the cochlea, we have outer hair cells  
3 and inner hair cells, and these cells, wind all the  
4 way around the 2- and 3-quarter turns of a  
5 snail-shaped cochlea.

6 On the right here, we have two studies  
7 showing the spectrum of wind turbine noise, that is  
8 the intensity versus the frequency, this line here  
9 and these wiggly lines here.

10 This is -- I am touching my laptop mouse  
11 control here, and it doesn't like me -- the outer  
12 hair cell sensitivity and the inner hair cell  
13 sensitivity. The outer hair cells are sensitive to  
14 infrasound between about 10 hertz down to almost  
15 around 1 hertz, so very sensitive. It can be very  
16 sensitive to infrasound. Whereas the inner hair  
17 cells are probably not that sensitive.

18 Salt, Alec Salt, I mentioned before in  
19 another side, had said that infrasound can reach the  
20 nonauditory centers of the brain which result in  
21 some negative sensations like dizziness, nausea,  
22 seasickness, motion sickness, fear and learning  
23 responses such as wakefulness and difficulties with  
24 visually-based problem solving. In other words, he

1 says, "What you can't hear can't affect you" is an  
2 invalid statement.

3 So the ear certainly plays a role in terms  
4 of how we perceive sound, even infrasound.

5 I think this is important because -- this  
6 slide -- because recently, in the last couple of  
7 years, I've heard more and more about motion  
8 sickness in people who are exposed to significant  
9 levels of wind turbine noise.

10 Motion sickness occurs when the sense of  
11 balance in the inner ear, that is a semicircle  
12 coming out, and vision, and muscle receptors receive  
13 conflicting signals or information, and these  
14 signals converge in the cerebellum of the brain,  
15 which is in the center of the graph. It's a  
16 round-shaped object in the back of the brain.

17 So, you get signals from the inner ear on  
18 the left, the muscle signals over here on the right,  
19 just sensations of the muscles sensing movement or  
20 touch from the eye, from the visual system.

21 What we see and what we hear and what we  
22 feel through the muscles all come together to give  
23 us a sense of position in space and movement,  
24 essentially, our posture and so on.

1           An example of motion sickness, it can  
2 occur when things are out of balance basically.  
3 I'll just give you the example straightforward here.  
4 Many of us have been on ferryboats. If you are on a  
5 ferryboat, and you are looking at your feet, the  
6 feet and the floor are moving at the same time, so  
7 it appears just based on vision that you are not  
8 moving. If you are not looking out at the water,  
9 you are looking at your feet here, okay? You can't  
10 see any movement, and you may feel a minimal amount  
11 of muscular stimulation in the legs or maybe a  
12 little, but the fluids in the vestibular system in  
13 the inner ear are being stimulated just like water  
14 rippling in a bowl as a result of the boat's slow,  
15 rocking movement resulting in motion sickness  
16 because the three senses I mentioned are in  
17 conflict, and that's what is happening with many  
18 people who are exposed to wind turbine noise I  
19 think. They are getting the vestibular sensation  
20 but they are not feeling anything through the other  
21 senses.

22           In terms of zoning regulations, the  
23 setback distance was compared to noise levels.  
24 Setbacks are usually short. They are intended to

1 maximize physical safety.

2 I noticed just recently that Apex is using  
3 the setback that's related to the hub height. The  
4 hub is the part that converges where the three  
5 blades converge in front of the tower. The hub  
6 height is 344 feet. The tip height, that is the tip  
7 of the blade at its maximum location from the  
8 ground, is 794 feet or 265 yards. I'll come back to  
9 this in a second.

10 I think Apex is using 1.3 times hub  
11 height, not blade height, as its basis for  
12 establishing a setback distance from a resident.

13 Two hundred sixty-five yards from the tip  
14 of the blade to the ground is two and a half  
15 football fields or about that, okay?

16 So, I think this setback distance is far  
17 too short. It's somewhat too short even for basic  
18 safety purposes. It's much too short if we want to  
19 protect against annoyance and health risks.

20 So, it turns out that setback distance is  
21 a fairly weak predictor of the noise level because  
22 there are so many variables that affect the noise  
23 coming from the turbines, and all these factors that  
24 I list in this slide are at work.

1           So, most of the reported symptoms that  
2 we've looked at or talked about occur at distances  
3 much greater than those commonly used as setback  
4 distances.

5           Setbacks intended to protect physical  
6 safety from mechanical or other traumatic failure of  
7 a wind turbine component are not adequate to protect  
8 general health and wellbeing.

9           It's ironic and unfortunate that it's  
10 difficult to model noise levels based on setback  
11 distance alone, but setback distances have to be  
12 sufficient to keep noise at acceptable levels at  
13 property lines, not residences, not at the house,  
14 but at property lines so that people can enjoy their  
15 property; although, waivers are an option, so that a  
16 person could waive that particular rule if they are  
17 willing, even nonparticipants, especially  
18 nonparticipants.

19           Infrasound and low-frequency noise levels  
20 are typically not masked by wind or other noises  
21 because wind noise is usually fairly minimal at  
22 ground level.

23           At night, the wind is blowing up where the  
24 blades are of the turbines. But the wind usually at

1 the ground, not always but usually at the ground  
2 level, wind is fairly soft. It's not loud at all.  
3 So, it wouldn't be able to mask the sound from the wind  
4 turbines properly, although I've heard many advocate  
5 turbines and say that it's not a problem because  
6 wind will mask it. It wouldn't mask it most of the  
7 time.

8           Infrasound cannot be controlled  
9 effectively by erecting barriers, insulating homes  
10 or wearing earplugs. So, distance is the only  
11 really practical means of achieving acceptable sound  
12 levels.

13           I have been in homes where people have put  
14 mattresses in their basements below ground, and it  
15 still didn't protect them from what was presumably  
16 infrasound and some other low-frequency noises from  
17 the turbines.

18           What are some good setback distances that  
19 are recommended? Well, to be brief here, .5 miles  
20 to 2.5 miles have been recommended most often.  
21 1.25 miles or longer is the one that the -- the one  
22 number that I've heard or read about most often as  
23 being safe in terms of reducing the risk of health  
24 effects.

1                   **Noise levels, in terms of literature, the**  
2                   **noise levels that are safe for health purposes --**

3                   MR. GERSHON: Mr. Hearing Officer, I have  
4                   to object.

5                   MR. KAINS: Hold on, Dr. Punch.

6                   What is your objection, Mr. Gershon?

7                   MR. GERSHON: I have to object. Not only  
8                   is this not an ordinance hearing on the text  
9                   amendment, but this gentleman is supposed to be  
10                  testifying on audiology. He has now talked about  
11                  incorrectly, which we will get to the questions, the  
12                  height of the turbines, the speed of the turbines.  
13                  He's not talking about what the setbacks should be  
14                  even though you already set setbacks.

15                  I would really appreciate if you limited  
16                  his presentation to what he has been qualified as an  
17                  expert as.

18                  MR. KAINS: Mr. Luetkehans?

19                  MR. LUETKEHANS: I am going to suggest  
20                  that, Dr. Punch, if you could, skip over to page 37  
21                  of your report so we can keep this moving because I  
22                  know you cannot be here next week. So, I would  
23                  like, just for that purpose alone, let's skip to  
24                  page 37.

1 MR. KAINS: Because the document is not  
2 numbered, what is the --

3 MR. LUETKEHANS: It is actually numbered  
4 right below the heading.

5 MR. KAINS: Oh, good grief. I've never  
6 seen the number in the middle of a page like that.

7 MR. LUETKEHANS: Honestly, I hadn't  
8 either, but I am used to seeing this report.

9 MR. KAINS: Page 37. Are we all there,  
10 members of the board?

11 BY MR. LUETKEHANS:

12 Q. So, Dr. Punch, if you could, go to  
13 page 37. I think you are already there. If you  
14 could, start up again.

15 **A. Sure. The World Health Organization says**  
16 **that levels below 30 dBA have no substantial**  
17 **biological effects or health effects.**

18 **Those between 30 and 40 dBA can affect**  
19 **sleep and can cause awakening and various kinds of**  
20 **sleep problems, particularly in young children and**  
21 **elderly adults and people with chronic health**  
22 **conditions.**

23 **Levels over 40 dBA, particularly with**  
24 **vulnerable groups, are much more severely affected.**

1           So, 40 dB, from this 2009 study I think it  
2 was, which was a community noise study relating  
3 primarily to transportation and common industrial  
4 noises, basically says that anything over 40 dBA is  
5 probably going to produce some adverse health  
6 problems.

7           Those of you who are not familiar with  
8 Dr. Paul Schomer, I wanted to bring in this slide.  
9 Dr. Schomer served as Director Emeritus of the  
10 Standards Division of the Acoustical Society of  
11 America, which is really the foremost acoustical  
12 organization in the country. He oversaw both the  
13 International and ANSI regulation standards, or  
14 American National Standards Institute, working  
15 groups that dealt with -- have dealt with  
16 environmental noise assessment for the last  
17 20 years.

18           He is an Illinois-based acoustician who  
19 assisted in developing the IPCB regulations.

20           He suggested that when dBA Leq is used to  
21 limit wind turbine noise, typically it's based on a  
22 goal of limiting high annoyance to 10 percent of the  
23 population, and high annoyance is considered an  
24 adverse health effect.

1           Schomer and a colleague of his stated that  
2 a practical and enforceable method of limiting noise  
3 level to restrict, in terms of restricting wind  
4 turbine noise, would be 36 to 38 dBA Leq measured  
5 over a 24-hour period, and the WHO in 2018  
6 recommended a similar level. It sounds like it's  
7 higher, but it's not. It's 45 dB Lden, where d-e-n  
8 stands for day, evening and night, which is  
9 comparable to 38 dBA.

10           So, I consider numbers from 36 to 40 dBA  
11 as essentially the ballpark within which wind  
12 turbine noise should be restricted at a residence,  
13 at the property line.

14           I won't read you the top paragraphs, but  
15 you are familiar with the IPCB regulations. In  
16 terms of the italicized information, the IPCB deals  
17 only with annoyance, not health effects, and it  
18 limits noise levels at, as you know, octave band  
19 levels -- excuse me -- octave band frequencies from  
20 31.5 hertz to 8,000 hertz. These levels are never  
21 to exceed the specified frequency.

22           It does not consider infrasound at all,  
23 which is a major component of wind turbine noise and  
24 major contributor to adverse health effects, based

1 on studies I've talked about.

2 Schomer has recently stated that the IPCB  
3 numeric limits are not protective against wind  
4 turbine noise and were never designed to be applied  
5 to wind turbine noise.

6 You've seen this before, the daytime and  
7 nighttime limits. Nighttime limits mean lower at  
8 different octave frequencies at residences produced  
9 from agricultural land, essentially. So, you are  
10 familiar with that.

11 So, what I've done here is, on the top  
12 half of the graph or the table, I have reproduced  
13 the numbers given in the Apex supplementary or the  
14 S-U-P basically, report. I have taken the highest  
15 levels that they report. I've converted there a  
16 formula -- by the way, it's a complicated formula,  
17 but it's very doable to convert octave band  
18 frequency levels that is at these octave band  
19 frequencies to one number, to a dBA number, because  
20 most of the literature out there on wind turbine  
21 noise does use dBA.

22 I think it's interesting. It's not  
23 probably disturbing to know, but it's interesting  
24 that, if you look across the top line here, these

1 are the nighttime limits the IPCB has established.

2 If at every frequency a maximum number  
3 allowed would be allowable or be present, you would  
4 have a level of 51.2 dBA. That's pretty high. That  
5 is very high.

6 So, what I've done in this table is add to  
7 the four, at the top four, more sites I found where  
8 the levels are fairly high. There are more than  
9 these levels reported by Apex that are high. Four  
10 of these levels are above 40. Two of these four  
11 right here are above, slightly above 45.

12 Q. So, Doctor, let me interrupt you for a  
13 second, Dr. Punch. So what you did here, just so  
14 it's clear, is you took the receptors that were in  
15 the special use application report and took the  
16 frequency levels and converted those to dBA; is that  
17 what you did on this chart?

18 A. That is what I did.

19 Q. Okay. Thank you. Please proceed.

20 A. Okay. Now, this goes back to some work I  
21 did just a couple years ago or the last couple years  
22 actually.

23 In one site -- I won't name the site or  
24 the state -- they reported -- the dBA levels were

1 reported for the plaintiffs in a lawsuit, for others  
2 who were not complainants, the total. One  
3 hundred percent of the plaintiffs were exposed to  
4 levels. These are modeled levels, modeled by the  
5 wind turbine company or the energy company. A  
6 hundred percent who are -- if these numbers were  
7 correct -- would be exposed to levels exceeding the  
8 higher of the three levels that I consider  
9 authoritative in terms of restricting levels to  
10 protect health.

11           Seventy-six percent of the people who were  
12 not plaintiffs would have been exposed to or would  
13 be exposed to 40 dB or over 40 dB level.

14           Seventy-eight percent of the total would be exposed.

15           At the another site where the data were  
16 broken down by nonparticipants and participants,  
17 42 percent of the nonparticipants, those who don't  
18 or didn't have leases, were modeled to have to be  
19 exposed to levels exceeding 40 dBA.

20           Eighty-nine percent of participating  
21 residents, which is not surprising, which would be  
22 people living closest to the turbines, presumably  
23 would be exposed to that level that would be beyond  
24 40 dB. Forty-eight percent of the total number

1 participants and nonparticipants would be exposed.

2 And so what I have done with the Goose  
3 Creek Wind data from the Apex report is I have taken  
4 -- I have analyzed the data in the same way, but  
5 I've used levels instead of the other kinds of  
6 breakdowns that I reported in the previous slide.

7 I've used 40, 38 and 36. Of course, as  
8 the number gets lower, the 36 gets more restrictive  
9 than the 40. For example, the numbers who are  
10 predicted to be exposed to those levels get higher,  
11 become higher/greater.

12 Q. Let me interrupt you again, Dr. Punch.

13 So, on this chart, on page 43,  
14 12.4 percent of the receptors have a dBA of over 40,  
15 if I am reading that chart correctly?

16 A. Well, I can't use the word "have."

17 Q. Are modeled. Excuse me. Are modeled to  
18 be at 40 dBA.

19 A. Predicted.

20 Q. Okay. Thank you.

21 A. Predicted to be exposed to those dBAs.

22 Q. Okay. Please proceed.

23 A. And 20 percent at 38 dB limit and

24 33.6 percent at a level of 36 dBA. Okay?

1 Q. Yes, sir.

2 A. So, several conclusions:

3 Annoyance, as defined by the World Health  
4 Organization, is an adverse health effect.

5 Wind turbine noise has certainly  
6 uniqueness among other industrial noises and is  
7 known to lead to high annoyance and adverse health  
8 effects.

9 Many adverse effects have been associated  
10 with audible and inaudible wind turbine noise, and  
11 sleep disturbance is the most common complaint, at  
12 least as the research shows us.

13 There is convincing scientific evidence  
14 and voluminous anecdotal evidence that wind turbine  
15 noise causes negative sensations and adverse health  
16 effects in humans.

17 Among other bodily organs responsible for  
18 negative reactions to wind turbine noise, both the  
19 cochlear and vestibular portions of the inner ear  
20 play major roles.

21 The IPCB regulations were never designed  
22 to be applied to wind turbine noise, according to  
23 Dr. Schomer. They are insufficient to protect human  
24 health, and they ignore completely the critical

1 element of infrasound.

2 The many flaws in the Health Canada study  
3 preclude its use for a basis for concluding that  
4 wind turbine noise exposure poses no health risks.

5 If averaged levels are used to limit  
6 nighttime wind turbine noise, the most authoritative  
7 sources of noise guidelines recommend limiting the  
8 levels to 36-40 dB LAeq at property lines to protect  
9 human health.

10 An analysis of a study of modeled noise  
11 levels commissioned by Apex Clean Energy indicates  
12 that the significant percentages of receptors will  
13 be exposed to levels in excess of those considered  
14 by major authorities to safeguard health.

15 I'll end with this slide, which really is  
16 just a summary of conclusions drawn in our paper,  
17 2016 paper of Punch and James. I guess I'll quickly  
18 read it:

19 The available literature, which includes  
20 research reported by scientists and professionals in  
21 peer-reviewed journals -- I won't read all of them  
22 -- a lot of sources, a lot of sources -- is  
23 sufficient to establish a general causal link  
24 between commonly observed health effects and noise

1 emitted by industrial wind turbines.

2 A pro-health view is that there is enough  
3 anecdotal and scientific evidence to indicate that  
4 infrasound and low-frequency noise from industrial  
5 wind turbines causes annoyance, sleep disturbance,  
6 stress and a variety of other adverse health effects  
7 to warrant siting the turbines at distances  
8 sufficient to avoid such harmful effects, which,  
9 with without proper siting, occur in a substantial  
10 percentage of the population.

11 And I end with this slide which refers you  
12 to the website where you can find that Punch and  
13 James article.

14 Q. Okay. Dr. Punch, a couple follow-up  
15 questions: On I think it's page 16 -- you don't  
16 have to refer to it -- it said that, in essence, 10  
17 of the population, it's your opinion, is highly  
18 annoyed at 36 to 37 dBA?

19 A. This one?

20 Q. Yes.

21 A. What is the question?

22 Q. Is approximately 10 percent of the  
23 population highly annoyed at 36 to 37 dBA? Is that  
24 your opinion?

1           **A.    Yes.  That is what this slide shows.  Yes.**

2           Q.    Okay.  And, you know, I am sure by the end  
3 of these ten hearings or whatever, my voice is  
4 annoying pretty much to about everybody.  But highly  
5 annoyed is not that, correct?

6                   Highly annoyed is something much stronger  
7 than that?  Could you explain?

8           **A.    Highly annoyed is stronger than what?**

9           Q.    Than just normal everyday annoyance of  
10 listening to someone like me speak.

11           **A.    Yeah.  Usually the surveys use terms like**  
12 **annoyed and highly annoyed or not annoyed, that type**  
13 **of scale.**

14           Q.    Okay.

15           **A.    There's definitely extreme or high**  
16 **annoyances associated complaints.  Neighbors start**  
17 **complaining, doing something, acting on it.**

18           Q.    Okay.

19           **A.    Or they suffer problems, health problems.**

20           Q.    You talked about the height of these  
21 turbines, and I think you might have misspoke.  The  
22 actual height of the turbines is about 600 feet  
23 that's proposed here.

24                   If the height of the turbine is

1 approximately 600 feet, does that change any of your  
2 opinions that you've given in this presentation?

3 A. Well, I thought that, from the numbers I  
4 crunched, the turbine tip height was 709 feet; is  
5 that not correct?

6 Q. No. It's actually about 610.

7 A. Okay. About 610 feet, I think it is?

8 Q. Yeah. That does not change any of your  
9 opinions, does it?

10 A. No, not really. Some years ago, George  
11 Capperman, an acoustician, said that, as the  
12 capacity -- of course, height and capacity are kind  
13 of correlated, right? As things get -- higher  
14 turbines can produce greater capacity in terms  
15 energy output. He said, that as you increase  
16 capacity by 1 megawatt, it might -- he suggested  
17 that it would increase the noise by 4 to 5 dB. I  
18 don't think that is true. I don't think that would  
19 be true because you would have like 12 dB higher for  
20 a 6-megawatt turbine versus a 3-megawatt turbine.

21 Q. Okay.

22 A. I don't think that's true. I don't think  
23 it's that much --

24 Q. Okay.

1           **A.     -- an increase in level, but it's**  
2           **certainly higher, a slightly higher level. In terms**  
3           **of your question, it does not change my basic**  
4           **opinion. No.**

5           Q.     Okay. So, let's talk about Dr. Schomer  
6           for a second. You are familiar with Dr. Schomer,  
7           obviously?

8           **A.     Right.**

9           Q.     And are you familiar with the fact that  
10          Dr. Schomer originally represented wind energy  
11          companies when doing analysis for wind turbines?

12          **A.     I don't -- I think I recall something said**  
13          **in a hearing once that he had been testifying --**  
14          **he's testified on both side of the aisle, both sides**  
15          **of the argument.**

16          Q.     Okay.

17          **A.     More recently he is not against most of**  
18          **the things wind turbines or wind companies are**  
19          **saying about the turbines and the their safety.**

20          Q.     Is it fair to say that his opinion evolved  
21          over the years from what it may have started out to  
22          this --

23                   MR. GERSHON: I object to what his opinion  
24          is.

1 MR. KAINS: I am going to overrule it.

2 This is a public hearing. I want to hear what

3 Dr. Punch's answer is about the evolution of

4 Dr. Schomer's opinion.

5 BY MR. LUETKEHANS:

6 Q. Is it fair to say that Schomer's opinion

7 as evolved over the years to the point where he is

8 now saying this 36-38 dBA is the appropriate level?

9 **A. It is. And I would like to saying**  
10 **something personal about myself. I evolved in my**  
11 **own case. I am all for green energy. I really am**  
12 **as much as anybody in that audience at the hearing.**

13 **I really think that, unfortunately,**  
14 **placement of wind turbines too close to people is a**  
15 **problem, and that's been an evolving thing over the**  
16 **last ten years or so, in my mind.**

17 MR. LUETKEHANS: Okay. Nothing further.

18 Thank you.

19 MR. KAINS: Very good. Thank you,

20 Mr. Luetkehans.

21 All right. Dr. Punch, you are not done.

22 However, the board is going to take a  
23 ten-minute recess. It currently is 7:43 p.m. We  
24 will reconvene at 7:53.



1 talking about some of the studies and cortisol  
2 levels and then on from that into sleep disturbance.

3 My question is: In those studies, what is  
4 the methodology for -- what data did they come up  
5 with as far as to establish sleep disturbance or  
6 adverse health effects and those cortisol tests?

7 **A. That is a great question. To start with,**  
8 **the WHO defines annoyance as a health effect, and**  
9 **that is based on decades of research, primarily with**  
10 **transportation noise and industrial noises of other**  
11 **kinds, excluding wind turbines usually, typically.**

12 **The survey, in terms of the**  
13 **non-physiological things, like cortisol levels, they**  
14 **just basically use questionnaires to determine, you**  
15 **know, based on this scale of one to five or no**  
16 **annoyance versus extreme annoyance to what extent do**  
17 **you feel annoyed by these levels of noise that you**  
18 **are experiencing. So, that is the basic -- I guess**  
19 **a basic answer to your question.**

20 **Is there more to your question that I can**  
21 **help you with?**

22 **Q. I guess I was looking more for more**  
23 **specifics on like, if I pick out sleep disturbance,**  
24 **for example, were there any sleep studies done or**

1 anything that we have, you know, concrete data on,  
2 besides just surveys?

3       **A.     Yeah. A good example is the study by**  
4 **Nissenbaum in Maine -- I forgot what year -- just**  
5 **several years ago in which he did what is called a**  
6 **cross-sectional study of people who live close and**  
7 **live far from turbines, and he included sleep -- a**  
8 **sleep scale, a sleep questionnaire that is**  
9 **standardized that has been used before and is**  
10 **reliable and it's valid, and he also looked at**  
11 **mental health.**

12               **And he found that people who lived within**  
13 **closer distances were reporting greater amounts of**  
14 **sleep disturbance than people who lived further.**  
15 **But, again, that is kind of related or based on a**  
16 **survey type of questionnaire that I mentioned**  
17 **earlier. But there is that study.**

18               **There are other studies that have**  
19 **summarized some anecdotal stuff, anecdotal**  
20 **observations and answers to questionnaires that go**  
21 **back to Harry, or a woman whose last name was Harry,**  
22 **and another study about that same time period that**  
23 **reported that people were reporting to her they**  
24 **lived near turbines and were experiencing sleep**

1 disturbance, reduced quality of life and so on.

2           So, it starts with anecdotal reports, and  
3 then it gets a little more formalized when you put  
4 that -- when you make that report and that is you  
5 come up with a questionnaire that sort of quantifies  
6 on a rating scale or quantitative measure of the  
7 extent to which you suffer these particular  
8 conditions, and then you get into physiological  
9 measurements.

10           There aren't many sleep studies, if any,  
11 that I can point to that give us a good, solid,  
12 definitive answer on the sleep question.

13           There are some cortisol studies. I  
14 mentioned the Health Canada study but, again, that  
15 has been heavily criticized. I think there was a  
16 timing issue. They held on to the samples too long  
17 as I understand it. I can't say much more about  
18 that study or that criticism, but that is what I can  
19 tell you. Okay?

20           Q. All right. On page -- I so had the  
21 question initially -- you may have started to answer  
22 it on slide 37. So, the question is: Why are the  
23 under 18 and over 79 populations more susceptible?

24           And then, on your slide 37, you do mention

1 those age groups in the discussion about dBA. So,  
2 can you elaborate on that a little bit? Why are  
3 under 18 and over 79 more susceptible?

4 A. Well, I can relate more to the older  
5 people, but I think it's in terms of, first of all,  
6 we can say that the WHO, through decades of study,  
7 have said the most vulnerable people in terms of  
8 noise exposure and health effects are those over  
9 about 80 years old, even 65 and over, but primarily,  
10 like in the Health Canada study, they eliminated  
11 those over 79. Those are the people who are more  
12 likely, obviously, to be undergoing or have certain  
13 -- already have certain health conditions that can  
14 be exacerbated or made worse by exposure to noise.

15 Kids are harder to explain. I mean kids  
16 are growing up -- I am not a pediatrician. I am not  
17 a medical doctor. I can't tell you exactly a lot  
18 about that.

19 But we've always felt we, in general the  
20 medical world, and the rest of us have known that  
21 there are certain susceptibilities in children that  
22 are not true of older adults. For example, the  
23 reactions to vaccines or conditions that we have  
24 vaccines to get rid of certain conditions. I cannot

1 really go into great detail about why children are  
2 vulnerable.

3 One population of children that are more  
4 vulnerable are autistic kids. There are a few  
5 scattered reports of autistic children stuffing  
6 greater effects because they get more disturbance  
7 because of the inability to control their  
8 environment than other children.

9 But I can't give you a good solid answer  
10 on the rest of them, the normal, the rest of the  
11 pediatric population.

12 Q. Last question I have: A couple times in  
13 your presentation here visceral vibratory vestibular  
14 disturbance, or VVVD is mentioned. What is that?  
15 Can you explain that?

16 A. Right. That was one of the ten disorders  
17 that Pierpont pointed to as being a condition that  
18 resulted from exposure, of course, to wind turbine  
19 noise or wind turbines in general believed to be  
20 related to the noise exposure.

21 It basically, I think, boils down to  
22 things like motion sickness, dizziness, nausea. All  
23 those are kind of associated with a conflict between  
24 those three sensory elements I talked about, the

1 visual, auditory and muscle receptors.

2 But basically a feeling of queasiness,  
3 sort of a vibratory sensation, it wasn't well  
4 defined I don't think by Pierpont. It was a little  
5 hard for us, who did the questionnaire that I talked  
6 about, in the checklist, to decide which of those  
7 questions -- I mean answers to questions really was,  
8 in fact, identifying a condition of VVVD, but we put  
9 together -- we checked off on those three slides  
10 where I had a lot of checkmarks, three either  
11 families or the individual two or three slides where  
12 I checked off a bunch of marks, a number of  
13 checkmarks that indicated multiple conditions in  
14 these particular people, and VVVD was not on the  
15 questionnaire. We had things like dizziness, and I  
16 just mentioned the nausea, etc.

17 And they had several of those conditions.  
18 We just check it as VVVD. So, queasiness, migraines  
19 possibly, but mainly dizziness. Vertigo is  
20 possible; although, I think she listed that as --  
21 Pierpont listed that as a separate one. I don't  
22 think she defined it all that well, but it relates  
23 to the fact that infrasound particularly can vibrate  
24 the fluids in the vestibular portion of the inner

1 ear to cause or result in motion sickness, dizziness  
2 and those sorts of things.

3 MR. CHAMBERS: Okay. Thank you. That's  
4 all I have.

5 MR. KAINS: Thank you, Mr. Chambers.  
6 Chairman Wax?

7 EXAMINATION

8 BY MR. LOYD WAX:

9 Q. Yes. I would like to ask if you would  
10 explain how the effects of infrasound on health  
11 effects are actually measured.

12 A. Well, if you are suggesting that I said we  
13 can separate those conditions that are caused by  
14 infrasound from those caused by audible sound, I am  
15 not sure I can answer that definitively from the  
16 research.

17 We do know that things like dizziness,  
18 things I just talked about in answer to the other  
19 question, we do know that things like dizziness,  
20 nausea, vomiting, possibly vertigo, all relate to an  
21 inner ear condition in which the vestibular system  
22 is stimulated.

23 So, we are not set -- I am not saying that  
24 we know definitively which of these disorders or

1 health problems are caused by audible versus  
2 infrasound, but we do know pretty much -- we know  
3 not much about what I just said. We know not much  
4 about what kinds of problems result when the  
5 vestibular system of the inner ear is stimulated.

6 We know -- you can imagine, any audible  
7 sound that you hear at night can be disturbing.

8 And there is the whoosh-whoosh sound that  
9 is disturbing. The whoosh-whoosh is not necessarily  
10 the exact same thing as the infrasound because it's  
11 very audible, so it's probably above -- it's above  
12 infrasound levels of 20 hertz -- excuse me --  
13 frequency of 20 hertz.

14 But you can look at the literature and see  
15 what kinds of conditions people are reporting either  
16 anecdotally or quantitatively through research  
17 results data as to what is probably caused by  
18 audible versus inaudible part of infrasound. It's a  
19 judgment call, basically.

20 MR. WAX: Thank you.

21 MR. KAINS: Additional questions?

22 Mr. Harrington?

23 EXAMINATION

24 BY MR. HARRINGTON:

1           Q.     Dr. Punch, thank you. On page 1, you  
2     reference the Health Canada study, and maybe you  
3     said it and I missed it, but am I correct in saying  
4     that they excluded part of the population in that  
5     study?

6                     In quotes, you say here, "persons younger  
7     than 18 and older than 79 --" am I reading that  
8     correctly? "-- who abandoned their homes," I guess  
9     is the part that catches my ear. Is that accurate?

10           A.     **They included people between 18 and 79.  
11     They excluded people younger than 18 and older than  
12     79, plus they excluded people that had abandoned  
13     their homes. They didn't try to seek them out to  
14     ask them questions about their health.**

15           Q.     So do you know why they chose, in this  
16     particular study, to do that?

17           A.     **I wouldn't -- I don't want to suggest that  
18     I know why. No. I don't know why. I mean a lot of  
19     studies do just want to talk about adults because  
20     they comprise presumably most of the population.  
21     Eighteen to 79 includes a lot of people. I think  
22     their sample included maybe 1200 people or more. I  
23     forgot the number. Quite a few people were actually  
24     included in the surveys in the study, but they**

1     **didn't include children and older adults and people**  
2     **who had abandoned their homes.**

3           Q.     I understand.  So, on page 23, in regards  
4     to the conversation surrounding sensations, they  
5     listed headache, pressure in the ears, etc.  I  
6     guess, is there, by any chance, we know what  
7     distance from the turbines this particular piece of  
8     information is taken?

9           A.     **I can't tell you, so we don't know in that**  
10    **sense.**

11                    But in that Cooper report, which is very  
12    **extensive, I am almost certain he reports data on**  
13    **distance.  I know I can tell you that there were**  
14    **only six people in that study, but his point was**  
15    **everybody was arguing that infrasound doesn't cause**  
16    **any problems, and he showed at least in these six**  
17    **people who he called sensitive listeners or**  
18    **receptors, they did show that they experienced these**  
19    **sensations.  Again, they reported their sensations**  
20    **in diaries.  The time was recorded.  They couldn't**  
21    **see what was happening outside, and they didn't hear**  
22    **any sound.  And so it was concluded they were**  
23    **definitely receiving infrasound and not the other**  
24    **sounds that comes from turbines.**

1           But keep in mind that infrasound travels a  
2 long, long distance. I don't think I made that  
3 point clear enough. It travels for possibly miles,  
4 depending on, you know, things like the weather, the  
5 terrain, maybe even the temperature, but it depends  
6 on a lot of factors.

7           In the way of turbines, how many are  
8 located close together, for example, determines how  
9 much infrasound is produced and how far it can  
10 travel.

11           Q. I understand. Thank you for your answer.

12           Have you conducted or do you have  
13 knowledge of any noise study sounds regarding wind  
14 turbines that have looked at the population older in  
15 the life of the wind farm? So, by that I mean 15,  
16 20, 30 years old, in that regard?

17           Because I would guess the noise  
18 characteristics of this wind farm will change with  
19 its life.

20           A. Well, I mean, if people are bothered  
21 greatly by the wind turbine noise exposure or any  
22 other issue with wind turbines, they would probably  
23 move away, or some have solved their homes,  
24 unfortunately other people have bought the homes,

1 and we don't know what happened with those people.

2 But I don't imagine people who are  
3 experiencing problems are going to stay in their  
4 homes long enough to be around when a study is done  
5 20 years after the turbines are installed, if that  
6 makes any sense.

7 Q. Sure.

8 A. I don't know any study that has looked at  
9 that kind of long-term information. Turbines have  
10 been around in Denmark and other parts of Europe for  
11 many, many decades, for several decades at least,  
12 and the first ones I think in the US were in  
13 California but they were only about in the 80s  
14 maybe. I think the people from the wind company can  
15 tell us more than that. But we don't have a long,  
16 long history of wind turbines in this county, I  
17 don't think.

18 Canada is going through its own set of  
19 problems. If you want to get into that, we could.

20 Q. I understand. I guess last but not least,  
21 so you had referenced there towards the end of your  
22 presentation that you had had sort of a change of  
23 opinion. I was going to ask: What was the  
24 watershed moment from when you went from pro to

1 maybe you might say negative in regards to wind  
2 turbines in general or however you want to answer  
3 that?

4       A.     Well, until I read some literature --  
5     first of all, the things I was reading about wind  
6     turbines and complaints about them were very  
7     different from what I was reading in the first book  
8     I read about them by Paul Gipe. Paul Gipe's book  
9     differed markedly from the things of the family in  
10    Huron County, Michigan.

11               One of my first slides was about the  
12    family I visited who couldn't sleep at night and was  
13    sleeping in a hotel. They just could not stay.  
14    They had two daughters -- a wife, a husband and two  
15    daughters, and none of them could bear living or  
16    sleeping in the home when the wind turbines were  
17    operating, particularly moderately or at their  
18    maximum. So, they weren't leaving every night, but  
19    they are leaving. And I thought what could be in  
20    this, you know, atmosphere, what is happening that  
21    could cause people to actually leave their homes.  
22    They love their homes. They just spent tens of  
23    thousands of dollars remodeling their home. They  
24    wanted to stay there, but they were actually leaving

1 it about maybe two or three nights a week.

2           So, that kind of report, the things I was  
3 reading on the internet differed from everything I  
4 was reading from the wind industry, from energy  
5 companies. There wasn't a whole lot out there, but  
6 there were some things. And then the amount of  
7 literature wasn't extensive but it was, you know,  
8 fairly substantial.

9           There I guess was a period of months in  
10 which I realized there is a big discrepancy between  
11 what this set of people are saying is happening to  
12 them and what others are saying isn't happening to  
13 them, and I don't know when that was. It was  
14 sometime probably around 2010.

15           When I wrote the articles I had to think  
16 carefully about what I was saying. And when I  
17 started looking at what I was writing down, which  
18 was the interpretation of the literature I was  
19 reading, I came to believe it because there is quite  
20 a bit of substantial data backup for the things I  
21 believe now.

22           And I've been on trips to sites, to  
23 turbine sites, with an acoustician who has made  
24 measurements.

1           I stayed in a home one night, just one  
2 night, and tried to experience it myself, but,  
3 unfortunately, the wind turbines didn't turn much  
4 those two nights.

5           But I've talked to people who lived near  
6 there, and I've gotten a lot of these kinds of  
7 answers to things I presented tonight, these kinds  
8 of reports from them. These are honest people.  
9 They are telling the truth I think, and I just have  
10 to believe them. But when I put that together with  
11 what I've read and what I've learned through the  
12 research that has been done -- and I am not saying  
13 I've done this research myself. I am saying others  
14 have done it, but I am interpreting it as a  
15 researcher and I believe it's real.

16           MR. HARRINGTON: Thank you.

17           MR. KAINS: Any other questions from  
18 members of the board for Dr. Punch?

19           Very good.

20           Questions for Dr. Punch from units of  
21 local government, including local school districts?

22           Questions from interested parties  
23 represented by licensed attorneys?

24           Mr. Gershon?

1 MR. GERSHON: Thank you very much.

2 EXAMINATION

3 BY MR. GERSHON:

4 Q. I want to start with some initial  
5 questions on your background, and I recognize you  
6 mentioned a few of them, but I just want to verify.

7 Again, you are not a medical doctor,  
8 correct?

9 **A. Correct.**

10 Q. You are not an epidemiologist, correct?

11 **A. Correct.**

12 Q. Are you board certified in sleep medicine?

13 **A. Of course not. No.**

14 Q. Do you practice clinically?

15 **A. I am retired. I did practice many, many**  
16 **years of my professional career clinically, and I**  
17 **supervised students as well clinically. I am**  
18 **retired. I retired in 2011 from Michigan State**  
19 **University.**

20 Q. Have you ever treated a patient for  
21 symptoms that you believed to be caused by wind  
22 turbines?

23 **A. I would have to look back a ways. Before**  
24 **I was really interested, there were -- before wind**

1 turbines caught my interest as a topic of interest  
2 -- and I can't recall anybody that -- I wouldn't  
3 have known that they lived near turbines. I never  
4 heard anybody say I live near a turbine, or I  
5 couldn't have even connected any symptoms they might  
6 have reported to me at that time when I was working  
7 clinically.

8           You mentioned board certification. I am  
9 certified by the American Speech-Language-Hearing  
10 Association through continuing education units that  
11 I continue to accumulate, and all it takes to be a  
12 certified or a licensed audiologist these days is  
13 that certification plus an annual fee payment. I  
14 didn't want to pay the payment every year after my  
15 retirement because I had stopped doing clinical  
16 work.

17           Q. Well, that wasn't the question I asked. I  
18 am interested -- you were saying now that you are  
19 not certified as an audiologist. I thought you said  
20 previously you were?

21           A. I am certified as an audiologist. The  
22 only certification for audiology is through the  
23 American Speech-Language-Hearing Association. I am  
24 certified as an audiologist through continuing

1 **education units that I accumulate.**

2 Q. My question was whether -- you gave a  
3 great deal of testimony here on sleep issues. Are  
4 you board certified in sleep medicine?

5 **A. No. No.**

6 Q. Have you reviewed the application  
7 submitted for the Goose Creek Wind Project?

8 **A. I reviewed it. I can't say that I've read**  
9 **every word of it. I looked at the table of contents**  
10 **and read those areas that related primarily to**  
11 **noise. I've looked at setback distances and the**  
12 **types of turbines that were being used. To that**  
13 **extent, I've reviewed them.**

14 Q. So have you reviewed the supporting  
15 documents and studies provided with that  
16 application?

17 **A. May I ask you a question? Are those the**  
18 **appendices you are referring to?**

19 Q. Yes, the appendices.

20 **A. I've just glanced through them. I really**  
21 **have not reviewed them substantially. No.**

22 **I, frankly, had gotten this fairly late,**  
23 **and I didn't have a lot of time to do a lot of**  
24 **reading. I read as much as I thought I needed to**

1 **know.**

2 Q. I appreciate that. Given that you have  
3 not reviewed that, what was your basis for the  
4 numerous specific references you made to the  
5 specifics of the project?

6 **A. I missed part of your question. What were**  
7 **the --**

8 Q. What is your basis for the numerous  
9 specific references that you made to the specific  
10 design and application of the project?

11 **A. Can you tell me what I said that triggered**  
12 **that question? Because I am not relating your**  
13 **question to what I actually said.**

14 Q. I'm happy to walk through the specifics.  
15 You indicated that the wind turbine speed is 20  
16 RPMs. What was the basis for that statement?

17 **A. I didn't say that about Goose Creek, sir.**  
18 **I said that I was giving an example to indicate how**  
19 **often the whoosh-whoosh sound occurs with wind**  
20 **turbines and the production of the infrasonic waves**  
21 **that come from that.**

22 Q. So then, since the actual speed for this  
23 wind farm is between 4.3 and 12.1 RPMs, should we  
24 disregard your comments on the speed of the wind

1 turbines?

2 **A. Well, I think speed depends on the wind**  
3 **speed -- right? -- or the rotation speed depends on**  
4 **the wind speed. So, it's very variable. It varies**  
5 **quite a bit.**

6 Q. Are you aware of the operation of wind  
7 turbines and the fact that they have mandatory  
8 systems to slow them down beyond their designated  
9 speed?

10 **A. I am familiar with feathering. Yes.**

11 Q. So that when Vestas identifies that the  
12 speed of their wind turbine is 4.3 to 12.1 RPMs, do  
13 we presume that no matter how high the speed of the  
14 wind is, or do you presume that no matter how high  
15 the speed of the wind is it's going to keep  
16 spinning?

17 **A. I am not making those presumptions at all.**  
18 **No.**

19 MR. KAINS: Dr. Punch, could you please  
20 state your answer again to the last question?

21 BY MR. GERSHON:

22 Q. Yes. We didn't hear it.

23 **A. Yes. I said that I am not familiar enough**  
24 **with that concept to state or to give a good answer**

1 to that question. I really don't deal with that. I  
2 am not an acoustician. I made the statement that I  
3 thought wind turbine rotation was highly dependent  
4 upon wind speed. I think Mr. Gershon is saying that  
5 is not exactly true. I am not exactly what is being  
6 said here.

7 Q. We've had testimony already in this  
8 hearing about how wind turbines are designed and the  
9 fact that they don't just spin at any speed, and  
10 we've identified that the RPMs identified by Vestas  
11 for this turbine are between 4.3 and 12.1 RPMs.

12 Given that testimony, is there any reason  
13 to give credibility to your testimony about wind  
14 turbine speeds at 20 RPMs and their impact?

15 A. Well, those numbers were illustrative or  
16 examples, 20 -- and was it 18, I think, RPMs? Those  
17 were just examples to show what basically -- I think  
18 those relate to 3-megawatt, 2.5- to 3-megawatt  
19 turbines.

20 MR. GERSHON: I'd ask him to answer the  
21 question.

22 THE WITNESS: I am just saying that the  
23 only thing I was really saying there in that  
24 slide -- and I don't have the slides anymore to pull

1 up in front of me -- was that rotation speed is  
2 related directly to the cycles per second or hertz  
3 of the rotation of the blades themselves, and that  
4 rotation speed relates to the times, the periods  
5 over which or the rate at which those whoosh sounds  
6 and infrasound occur, infrasound and pulses occur.

7 MR. KAINS: Mr. Gershon, do you have an  
8 objection?

9 MR. GERSHON: I do have an objection.  
10 I've asked for the answer to the question of whether  
11 or not your indication of the impact of a wind  
12 turbine spinning at 20 RPMs -- you've indicated that  
13 that would apply to this project, otherwise I assume  
14 you wouldn't be testifying on it.

15 MR. LUETKEHANS: You can't make that  
16 assumption.

17 MR. GERSHON: I agree.

18 MR. LUETKEHANS: So it's a mathematical  
19 calculation he does on page 13. He doesn't take it  
20 any further. He is not making any further  
21 assumptions. That's all that is on page 13.

22 MR. KAINS: All right. Very good. This  
23 is an example. My understanding is this is an  
24 example that Dr. Punch has given completely

1 unrelated to the Vestas turbine that is being  
2 proposed by the applicant. It's just simply an  
3 example that he used.

4 So, Mr. Gershon, you may ask another  
5 question.

6 MR. GERSHON: I appreciate the  
7 confirmation that it's unrelated to our project.

8 MR. LUETKEHANS: Please question.

9 BY MR. GERSHON:

10 Q. I would like to go back to some of your  
11 other comments on the project. You talked about the  
12 height of the project and the setbacks of the  
13 project.

14 **A. Yes.**

15 Q. The setbacks of this project have been  
16 identified previously as 1.3 times the tip height or  
17 1600 feet from homes; are you aware of that?

18 **A. Well, I'll take your word for it, of**  
19 **course; but I read in your SUP, in your report, that**  
20 **it was 1.3 times the hub height not the tip blade**  
21 **height. So, is that correct?**

22 Q. You are wrong. If I tell you that you are  
23 incorrect, Phil will tell me I am testifying.

24 MR. LUETKEHANS: No. I will stipulate

1 that it's 1600 feet.

2 BY MR. GERSHON:

3 Q. 1.3 times the tip height or 1600 feet.

4 I guess I should ask this: Have you  
5 reviewed the Piatt County Zoning Ordinance?

6 **A. I don't believe I have.**

7 Q. Have you reviewed the Piatt County Wind  
8 Ordinance?

9 **A. Which ordinance, please?**

10 Q. Their wind ordinance for wind farms.

11 **A. I think I read that early on. It was**  
12 **several weeks ago now. If I reviewed it, I can't**  
13 **remember it, frankly.**

14 Q. Are you aware that this zoning board and  
15 the county board spent months and many long hearings  
16 just recently reviewing and setting new standards  
17 for wind farms?

18 **A. I am not familiar with that. No.**

19 Q. You mentioned previously, in identifying  
20 what you believed at the time were the setbacks,  
21 that those setbacks don't take into account all of  
22 the other impacts.

23 Are you aware that, in fact, the WECS  
24 ordinance takes into account not just the setbacks

1 but shadow flicker requirements, sound requirements  
2 and numerous other requirements in setting where a  
3 turbines can be located?

4 **A. Yes. To extend, I mean the sound**  
5 **requirements specifically are related to the IPCB**  
6 **regulations or recommendations. I don't believe**  
7 **they are related to the larger literature that says**  
8 **-- that is out there that says basically Leq has**  
9 **been the most used standard by which to judge the**  
10 **potential health risks.**

11 Q. I am sorry, again, but that is not  
12 responsive to the question.

13 You specifically stated that the setbacks  
14 established for wind turbines do not take into  
15 account the other health risks.

16 And I asked you: Are you aware that the  
17 standards established by this county take into  
18 account shadow flicker, sound, and other health  
19 risks in establishing those setbacks?

20 **A. Yes. I am aware that all those things are**  
21 **mentioned. Yes. I get that means they take the**  
22 **wind into account. I am just arguing they haven't**  
23 **been adequately taken into account in terms of the**  
24 **sound limits.**

1           Q.     I recognize that you disagree with their  
2 standards.  Would it be your understanding then that  
3 if a house were at 1600 feet away from the property  
4 and didn't meet shadow flicker requirements or  
5 didn't meet noise requirements, that it could still  
6 be placed at 1600 foot away from the property -- I  
7 apologize -- 1600 foot setback is for the house, not  
8 for the property?

9           **A.     If I'm understanding the question -- I am**  
10 **not sure what you are asking.  Sixteen hundred feet**  
11 **-- if a house were 1600 feet from a turbine, what is**  
12 **the question?**

13          Q.     So the county established a 1600-foot  
14 setback for nonparticipating owners.  You  
15 indicated --

16          **A.     Yes.  I am aware.**

17          Q.     -- that the setback does not take into  
18 account health issues.  So my question is:  Do you  
19 assume that a house could be placed at 1600 feet  
20 away from a home even if it didn't meet -- I  
21 apologize -- that a turbine could bet set at  
22 1600 feet away from a home even if it didn't meet  
23 noise standards or shadow flicker standards?

24          **A.     That's the way it's written.  I mean that**

1 **is the way it's planned I think. Yes.**

2 Q. To clarify for the record, and we can the  
3 ZBA's attorney to clarify it if you prefer, that is  
4 not the way it's written.

5 **A. Okay.**

6 MR. LUETKEHANS: Is there a question?

7 I mean we all understand how it's written.  
8 I am not sure I understood the question either, the  
9 first one.

10 MR. KAINS: Gentlemen? Gentlemen, the  
11 standards approved by this zoning board are the  
12 standards that everybody has in front of them.

13 Whether Dr. Punch has an opinion on the  
14 standards is not going to make a difference in this  
15 board's decision-making process because the  
16 standards that were approved are the standards that  
17 they are going by. Whatever Dr. Punch's opinion on  
18 it is may be important but it's not going to change  
19 what the standards are.

20 So, Mr. Gershon, if you could, please ask  
21 another question.

22 MR. GERSHON: I certainly will. I would  
23 like to go to a few of the issues you've raised  
24 concerning Paul Schomer.

1           My first question, which I am unaware of,  
2           is -- we received Objectors' Exhibits 9 and 12.

3           MR. LUETKEHANS: Which has not been put  
4           into evidence.

5           MR. GERSHON: We'll hold back our  
6           objection to submitting those.

7           BY MR. GERSHON:

8           Q.     You discussed Paul Schomer extensively in  
9           your report, and I want to make sure that you and I  
10          know the same Dr. Paul Schomer.

11          Are you aware that Dr. Paul Schomer did  
12          work with the Illinois Pollution Control Board?

13          **A.     With what, please?**

14          Q.     The Illinois Pollution Control Board.

15          **A.     I think he did. Yes. That is my**  
16          **understanding.**

17          Q.     Has Paul Schomer appeared in any of the  
18          cases which you relied on in these documents to  
19          testify?

20          **A.     McLean County, Illinois. I am almost**  
21          **certain he's appeared in a number of cases, but I**  
22          **can't name them for you. I think he gives the same**  
23          **opinion in all his cases, essentially, and I've read**  
24          **a lot of his work in the literature.**

1 Q. And you have a great deal of respect for  
2 his opinion?

3 A. I do. I know he is not currently active.  
4 I don't believe he is. He's retired, but I am  
5 relying on work he did decades ago up to a few years  
6 ago at least. In one hearing I shared sort of the  
7 stage with him in McLean County, at least, and I  
8 have met him.

9 Q. You've made clear throughout your  
10 presentation your issues with the Health Canada  
11 study. Would you be surprised to know --

12 A. Yes.

13 Q. -- that Dr. Paul Schomer has expressed his  
14 opinion on the same study?

15 A. I wouldn't be surprised. No. I don't  
16 recall what it is, but I guess you are going to tell  
17 me.

18 Q. I'd like to read from the McLean County  
19 Board of Appeals February 22, 2018, hearing, and I  
20 would ask for whether you were aware of his opinion.

21 He indicates: Health Canada did a very  
22 big survey in two of their providences, Prince  
23 Edward and Ontario, or maybe I forgot the names.  
24 They had 38 dB or 37.5, and one of those to about

1 10 percent were highly annoyed. This study has been  
2 lauded by the industry and by me as one as probably  
3 the best study we have worldwide in terms of wind  
4 turbine noise.

5 And are you aware that Paul Schomer is a  
6 supporter of this study?

7 **A. No. I am not aware. I am now.**

8 Q. Paul Schomer further stated: The main  
9 people that have not liked it -- it being the Health  
10 Canada study -- have been some of the communities  
11 because the data didn't come out quite the way they  
12 thought it should, but even so it shows that the  
13 biggest problem with wind farms is the annoyance.

14 Are you aware of Paul Schomer's testimony  
15 with respect to that?

16 **A. No. I am aware of the statement that the**  
17 **biggest problem is annoyance. It's out there and**  
18 **said by many people, but I am not aware Paul Schomer**  
19 **said that.**

20 **I disagree with him, by the way. But**  
21 **based on everything else I know that I've read and**  
22 **heard, that is not a great study. It's not**  
23 **scientific, and if it's not scientifically done,**  
24 **even though it's published in a very highly rated,**

1 peer-reviewed journal, I have a few articles in that  
2 journal myself and I respect it. I have been a  
3 reviewer for that journal. But I think they were  
4 wrong in just accepting all of the things that were  
5 said in those articles. That is my opinion. That's  
6 all.

7 Q. If you disagree with Dr. Schomer, then why  
8 do you site to him in your report?

9 A. I respect other things he says because he  
10 is summarizing not only his opinions and his own  
11 work he's summarizing the opinions of many, many  
12 people, including the World Health Organization.  
13 There's a lot of other people behind the things that  
14 he advocates, things that I've talked about with  
15 respect to dBA levels, for example.

16 Q. In addition, if you disagree with the  
17 Health Canada study, why do you cite it in your own  
18 PowerPoint and in your reports?

19 A. Primarily because Dr. Ellenbogen used it  
20 as the one example of green scientific reports,  
21 peer-reviewed reports, and that is pretty  
22 compelling, but I disagree because of the  
23 shortcomings I think it contained.

24 Q. So, you disagree with both Dr. Ellenbogen

1 and Dr. Schomer with respect to the study, the  
2 Health Canada study?

3 **A. I disagree with those gentlemen on those**  
4 **points. Strictly on those points.**

5 Q. And if you disagree with the Health Canada  
6 study, again on page 17 of your report, you say  
7 that: The Health Canada study found IWT noise  
8 highly annoying in a substantial number of people.

9 Why do you cite the study in your report  
10 if you disagree with it and you think it was not  
11 properly done?

12 **A. I was saying that I admit, despite the**  
13 **shortcomings that I later discussed, that they found**  
14 **annoyance to be highly annoying. I think**  
15 **Dr. Ellenbogen certainly agreed with that as well,**  
16 **but I don't agree with the other things**  
17 **Dr. Ellenbogen said. Dr. Ellenbogen did not present**  
18 **any evidence that wind turbines do not cause --**

19 Q. Well, again, I would like to ask the  
20 question to be answered.

21 MR. LUETKEHANS: I think he did. He is  
22 finishing his answer.

23 MR. KAINS: Let's let Dr. Punch finish his  
24 answer with respect to his opinion regarding

1 Dr. Ellenbogen's testimony.

2 Go right ahead, Dr. Punch.

3 THE WITNESS: I think Dr. Ellenbogen is --  
4 I am basing it on a fairly short slide presentation  
5 he gave. If he gave other evidence, I am not  
6 familiar with, I apologize. I did not see it.

7 But I saw a report, I mean a slideshow or  
8 slide presentation with the title similar to the one  
9 I've used in several presentations, including  
10 tonight's, in which basically he said -- I forgot  
11 what I said now. I forgot what I just said earlier.  
12 Sorry. Maybe it will come to me. If you could go  
13 ahead with your question, maybe I could come back to  
14 it.

15 BY MR. GERSHON:

16 Q. Well, I hadn't been asking about your  
17 opinion on Dr. Ellenbogen. Let's go there.

18 A. Yeah.

19 Q. To clarify, did you hear Dr. Ellenbogen's  
20 testimony?

21 A. I didn't hear it. I saw a slideshow of  
22 it.

23 May I get back to my answer that I just  
24 recalled what it was?

1 MR. KAINS: Yes, you may.

2 THE WITNESS: I was saying or trying to  
3 say that Dr. Ellenbogen, in that brief slide  
4 presentation that I saw visually, did not present  
5 any evidence to the contrary when it comes to  
6 showing that there's -- in other words, he showed no  
7 evidence that if -- there is no evidence of this  
8 relationship between wind turbine noise and adverse  
9 health effects.

10 He said summarily this: Definitively this  
11 is the one study we can rely on.

12 And that is somewhat agreeing with  
13 Dr. Schomer, but he didn't present any studies that  
14 supported his opinion that there is no relationship  
15 between wind turbine noise and adverse health  
16 effects.

17 So what I'm trying to understand and I've  
18 tried to present a lot of evidence in the time I  
19 have available to show there is plenty of evidence,  
20 anecdotal as well as research evidence, to show  
21 there is a relationship between adverse health  
22 effects, particularly those above 36, 38 or 4 dBA  
23 and wind turbine noise.

24 BY MR. GERSHON:

1           Q.     But to clarify again, you're basing this  
2     on his PowerPoint, not based on his published  
3     studies, not based on what he stated in this  
4     hearing, just the fact that he did not include that  
5     in his PowerPoint, correct?

6           A.     **That's all I've had time to read or see in**  
7     **the time I was introduced into this case. So, yes,**  
8     **it is based just on that PowerPoint. I did read**  
9     **some testimony by him from the transcript, but that**  
10    **is it, of this case that is.**

11          Q.     We are going to come back to the evidence  
12    that exists on that issue, but since you raised  
13    Dr. Ellenbogen, are you qualified to make an  
14    analysis of individual patients?

15          A.     **Not in terms of the relationship between**  
16    **wind turbine noise exposure and adverse health**  
17    **effects. No.**

18          Q.     As an audiologist, are you qualified to  
19    testify on medical causation?

20          A.     **No. Not really. No. I gave you the**  
21    **answer, my answer, in the slide that distinguished**  
22    **between specific and general causation, and I am**  
23    **looking at general causation and not specific,**  
24    **related to specific individuals.**

1           Q.     So, then to clarify, while a physician  
2     sees a patient, determines what is causing the  
3     symptoms and has a personal review of the patient,  
4     you are not qualified and do not do that, correct?

5           **A.     Correct.**

6           Q.     And would you agree that Dr. Ellenbogen  
7     is?

8           **A.     I would say no, in the sense that, for**  
9     **example, I've heard Ellenbogen, in a continuing ed**  
10    **series that I listen to, say that when one is asleep**  
11    **the brain is always active and able to hear changes**  
12    **in sound or sudden sound or to respond to sound.**  
13    **It's an alerting response that humans are capable of**  
14    **even when they are sleeping, but his answers don't**  
15    **seem to comport with that belief. That was several**  
16    **years ago, so I don't know if he still believes that**  
17    **or not.**

18                   **I think Dr. Ellenbogen has chosen to**  
19    **cherry pick the data. That was one of the**  
20    **criticisms by Dr. Hartman, that the data reports**  
21    **dishonesty in the Massachusetts report.**

22           Q.     So, I am a little surprised to hear that.  
23                   I apologize. Go ahead.

24           **A.     I'll stop. That is it, unless you want**

1     **more.**

2           Q.     I am a little confused. Are you saying  
3     that because you disagree with a medical doctor that  
4     he's not qualified to investigate patients and to  
5     see them?

6           A.     Well, I am not an epidemiologist, neither  
7     is he as I understand it. He is a sleep specialist.  
8     I don't think he has seen a lot of patients, a lot  
9     of people who have been exposed to wind turbine  
10    noise. If that is not true, I apologize again.

11                    But a doctor, even a medical doctor who is  
12    qualified to do that, including perhaps  
13    Dr. Ellenbogen, can only ask the patient what is the  
14    problem. You know, I have a headache, I have  
15    migraines, I have whatever, and I live near wind  
16    turbines. The only conclusion, the only treatment  
17    typically is move away. That has been done here in  
18    Michigan by medical physicians who have seen  
19    patients. I think it's been done in Ontario as  
20    well.

21                    So, I don't know that medical doctors have  
22    a lot that they can offer, frankly. I honestly  
23    can't. I mean I respect Dr. Ellenbogen's opinion in  
24    that case that it might happen, but the patient who

1     **lives near turbines and may have had acute or**  
2     **chronic conditions previous, that is prior to**  
3     **exposure, but I don't think he can discount the**  
4     **possibility that the exposure to the noise has made**  
5     **that condition worse. I don't think he said that.**

6             **He's disregarding indirect relationships,**  
7     **is what I am saying, and that was one of the**  
8     **criticisms made I think by another person, by**  
9     **Dr. Hartman.**

10            Q.     Again, I want to make sure for the record,  
11     since almost none of that is what I asked the  
12     question on. You indicated that Dr. -- I asked if  
13     Dr. Ellenbogen can diagnose patients when you  
14     cannot. Do you believe he can or cannot do that?  
15     Yes or no?

16            A.     **I believe he can diagnose patients. Yes.**

17            Q.     Thank you.

18            A.     **My answer was qualified to apply to the**  
19     **case of doctors, medical doctors in general, and**  
20     **what they are limited in doing in terms of**  
21     **diagnosing a problem with wind turbine exposure.**

22            Q.     When you talked throughout your  
23     presentation on the effects on people, you are  
24     really talking about the effects on individual

1 people, correct?

2 A. Of course. People and people in the  
3 population who comprise a larger group of people.

4 Q. Can you opine on the effects of people  
5 without being able to opine on the effects on an  
6 individual?

7 A. I can't opine without saying that many,  
8 many people report similar conditions as a result of  
9 exposure to wind turbines.

10 I guess, if you want, I'll say yes. I  
11 mean that's -- obviously, these are all -- these  
12 start with individuals, but when it accumulates into  
13 a number of people and in many places and in many  
14 sites and in many countries, not just the US, it's  
15 all over the world -- Denmark has the most wind  
16 turbines I think -- they had their complaints.

17 Not everybody has these complaints. It's  
18 a small -- it's a percentage. If you ask me what is  
19 a percentage I think are affected, maybe 15, maybe  
20 as high as 25 percent. Not everybody.

21 So, people differ in their vulnerability  
22 or their susceptibility to having these problems.

23 Yes. So, it starts with the individual.

24 No question about it. But the doctors, the

1     **physicians are not the only ones who can make a**  
2     **decision or make a reasonable statement about**  
3     **causation in the population.**

4           Q.     You've previously testified that you are  
5     qualified to do research but not qualified to do  
6     clinical work; is that correct?

7           A.     **I guess, if you want to interpret it that**  
8     **way, I am not licensed to practice audiology because**  
9     **I am retired. I am certified, if I had chosen when**  
10    **I retired not to relinquish my license -- but I am**  
11    **not paying the fee -- then I would be licensed today**  
12    **to practice. I would not be practicing because I am**  
13    **retired. I don't know if that answers your**  
14    **question, but that is how I see it.**

15          Q.     I think I am good.

16          A.     **I am sorry to be argumentative, but I find**  
17    **some of your questions very argumentative.**

18          Q.     I am not going to disagree with you.

19                 We've talked about Paul Schomer, and I  
20    want to go back to that. Do you remember that I was  
21    asking about him when we/you began analysis of Jeff  
22    Ellenbogen?

23                 I would like to go back to my first  
24    question. Are you aware that Paul Schomer has been

1 involved with the Illinois Pollution Control Board?

2 MR. LUETKEHANS: I think he already  
3 answered that.

4 MR. KAINS: That has been asked and  
5 answered. Moved on.

6 BY MR. GERSHON:

7 Q. Did Paul Schomer participate when the  
8 Illinois Pollution Control Board amended their noise  
9 regulations the summer between 2003 and 2006?

10 **A. I thought Paul Schomer was involved with**  
11 **developing the IPCB regulations, if that's what your**  
12 **question is.**

13 Q. Are you aware that he filed a public  
14 comment as part of that ruling?

15 **A. I am not aware of it. It wouldn't**  
16 **surprise me.**

17 Q. In the state of Illinois, what public  
18 group, what public body is established to establish  
19 noise regulations?

20 Is that the Illinois Pollution Control  
21 Board?

22 **A. I thought it was the Illinois Pollution**  
23 **Control Board.**

24 Q. Correct. Have you ever approached the

1 Illinois Pollution Control Board yourself?

2 **A. No, not approached them. I mean I've not**  
3 **communicated with them.**

4 Q. Are you aware -- the Illinois Pollution  
5 Control Board, to your knowledge, has not adopted  
6 the standards that you have suggested in your report  
7 today; is that correct?

8 **A. That is my understanding. They have not.**

9 Q. And have you sought out their approval of  
10 the standards that you are proposing?

11 **A. No. I have not.**

12 Q. And are you aware that Paul Schomer has  
13 never sought out the Illinois Pollution Control  
14 Board standards?

15 **A. No. That doesn't surprise me, but I am**  
16 **not aware of it. But as I said, Dr. Schomer I think**  
17 **is retired and probably is not going to be actively**  
18 **doing those kinds of things, but that is my guess.**

19 Q. Would you be surprised to know that in  
20 2018, when Paul Schomer testified in hearings, he  
21 was specifically asked whether he had sought out  
22 changes in the Illinois Pollution Control Board  
23 standards and he responded, no, I haven't asked that  
24 at any time?

1 MR. LUETKEHANS: Could we have a date of a  
2 transcript as well as a copy so that we could --

3 THE WITNESS: I was not aware of it.

4 MR. KAINS: Hold on, Doctor.

5 Mr. Gershon, do you have that information  
6 for foundational purposes?

7 MR. GERSHON: It will take me a moment to  
8 get it.

9 MR. KAINS: Absolutely. Please take your  
10 time.

11 MR. GERSHON: In the McLean County Zoning  
12 Board of Appeals, on February 22, 2018, Paul Schomer  
13 was asked --

14 MR. LUETKEHANS: I think you already --  
15 that's not my question, and I think you've asked it.

16 I guess my other question -- and I was  
17 going to ask later: Is that the same place that you  
18 were quoting from before when you asked the  
19 question, just so I have that record?

20 MR. GERSHON: Yes, it was.

21 MR. LUETKEHANS: Same transcript. Thank  
22 you.

23 MR. KAINS: Now proceed.

24 MR. LUETKEHANS: I am the only one that

1 was involved in both of these.

2 MR. KAINS: Mr. Gershon, you may proceed  
3 with the statement from Mr. Schomer at that hearing  
4 that is contained in the transcript.

5 BY MR. GERSHON:

6 Q. First statement, he was questioned: Do  
7 you recall filing a public comment in the  
8 rulemaking?

9 No.

10 His response was: Doesn't mean I didn't  
11 do it, but I don't recall it.

12 The questioner said: I happen to have one  
13 in my folder. So, you didn't need it in your public  
14 comment -- sorry -- so you didn't in your public  
15 comment, though, ask for those regulations, those  
16 numerical noise standards to be changed at that  
17 time, did you?

18 MR. LUETKEHANS: Okay. I guess I am  
19 trying to figure out what is going on. The witness  
20 already said he wasn't aware of those. I don't know  
21 why we're asking, why or what we are doing here.

22 MR. KAINS: Okay. I am going to sustain  
23 the objection.

24 Is this leading to a question?

1           MR. GERSHON:  Again, it's leading to a  
2 question.

3           MR. LUETKEHANS:  Which he can't answer he  
4 just said.

5           MR. GERSHON:  No.  He actually can answer  
6 the question.

7           The question is:  We've established that  
8 Mr. Punch is not aware that this board established  
9 standards.  We are trying to establish -- I am  
10 asking the question of whether he's aware that the  
11 person he quotes throughout his presentation also  
12 didn't ask the Illinois Pollution Control Board.

13           MR. LUETKEHANS:  Asked and answered.

14           MR. KAINS:  It has been asked and  
15 answered.  He is not aware.  This witness has  
16 already testified that he is not aware of Schomer in  
17 any way approaching, petitioning or replying to,  
18 with respect to any rule making with respect to the  
19 standards for noise levels, from the Illinois  
20 Pollution Control Board.  He is not aware of this.

21 BY MR. GERSHON:

22           Q.  Then I will ask you the question a  
23 different way.  I respect your belief that the  
24 Illinois Pollution Control Board standards are not

1 correct.

2 Why have you not approached the Illinois  
3 Pollution Control Board to change those standards?

4 A. Well, I only testified a couple of other  
5 times or so in Illinois, and I've testified in other  
6 places that takes my time, and as a retired person I  
7 don't have a lot of time to devote to a lot of these  
8 activities, not that I do a lot of these  
9 consultings, consulting events.

10 But it, frankly, never occurred to me to  
11 do that. I think it was a good idea. If I were  
12 actively involved as a clinician or as a researcher  
13 at Michigan State University and not retired, I  
14 might well do that, but I am retired and one who is  
15 retired just does not want to continue to work in  
16 all the areas he's worked in before.

17 So, I don't have an answer to that  
18 question. I didn't do it and probably would have  
19 done it if I weren't retired. That is all I can  
20 say.

21 MR. GERSHON: I would like to submit on  
22 the record as our Exhibit 38 the McLean County  
23 Zoning Board of Appeals, February 22, 2018,  
24 transcript.

1 THE WITNESS: Is that a question for me?

2 MR. KAINS: No, sir.

3 Exhibit 38, Zoning Board of Appeals, from  
4 McLean County, has been received by this board.

5 Mr. Gershon, do you have any other  
6 questions?

7 MR. GERSHON: I certainly do.

8 BY MR. GERSHON:

9 Q. Were you retained by the plaintiff in the  
10 case of Williams versus Invenergy, LLC, in the  
11 Federal Court in the District of Oregon in 2016?

12 **A. Yes.**

13 Q. Did you provide an expert opinion that the  
14 plaintiff in that case was suffering from negative  
15 health impacts as a result of sound generated by a  
16 nearby wind farm?

17 **A. Yes.**

18 Q. Did the court in that case find that  
19 because you were not a medical doctor or an  
20 epidemiologist you could not opine on the cause of  
21 the plaintiff's medical symptoms based on your  
22 credentials alone?

23 **A. That happened, yes. I could explain what**  
24 **happened. I am not sure I am going to get to, but I**

1     **know the background there, and I didn't like what**  
2     **happened, and I could explain it if you let me.**

3           Q.     I don't believe Scott has stopped you from  
4     testifying to anything.  So if you --

5           MR. KAINS:  Dr. Punch, if you have an  
6     explanation as to why the court in Oregon ruled as  
7     it did with respect to your opinion, if you could  
8     give a summary of that in a minute or two, we would  
9     appreciate it.

10          THE WITNESS:  I can do that quickly.

11          The plaintiff was running out of money,  
12     and the lawyer told me this.  The lawyer said to me  
13     and to Rick James, who also testified in that case,  
14     I threw you guys under the bus, okay, as experts  
15     because he's out of money and we need to do what we  
16     can to close this case and do the best we can for  
17     the client.

18          So, that was the end of it, and that's why  
19     he sold us out, in his words.

20          MR. KAINS:  Thank you, Dr. Punch.

21          Mr. Gershon, do you have another question?

22          MR. GERSHON:  I do.  I would like to  
23     submit this for the record as our Exhibit 39, the  
24     case of Williams versus Invenergy, LLC.

1 MR. KAINS: Is that the appellate court  
2 opinion?

3 MR. GERSHON: Yes.

4 MR. LUETKEHANS: No. It's district court.

5 MR. GERSHON: Yes, district. Sorry.

6 MR. KAINS: Okay. Very good.

7 BY MR. GERSHON:

8 Q. Did the court in that case indicate that  
9 you needed to rely on foundational literature not  
10 your credentials?

11 **A. Foundational literature in what, please?**

12 Q. Foundational literature, not your medical  
13 credentials.

14 **A. If I understand the question, I think so.**  
15 **Yes.**

16 Q. Your opinion relied only three different  
17 references, the 2009 book Wind Turbine Syndrome by  
18 Nina Pierpont and two other studies.

19 Did the court rule that your opinion on  
20 causation should be excluded from trial because you  
21 failed to rely on scientifically reliable supportive  
22 documents?

23 **A. I think that is written down in and you**  
24 **are reading it correctly, but I guess my answer has**

1       **to be yes that is what they said.**

2           Q.     Were you barred in that procedure from  
3     testifying on the relationship between wind turbine  
4     infrasound and human adverse health effects or the  
5     prevailing hypotheses regarding the physiological  
6     mechanisms underlying that alleged causal  
7     relationship?

8           **A.     I don't recall that specifically. I don't**  
9     **recall it. I don't remember.**

10          Q.     I am going to save Mr. Luetkehans the  
11     trouble. Please confirm that, while they did  
12     exclude your testimony, you were not excluded from  
13     making all of your statements.

14          **A.     Okay. That's it.**

15          Q.     Did the court find three of those studies  
16     you presented unreliable?

17          **A.     That's not my recollection. Go ahead and**  
18     **read it, if you like, but it's not my recollection,**  
19     **if it's there.**

20          Q.     Did the court allow your testimony because  
21     you cited the 2008 World Health Organization study?

22          **A.     Is the question did it disallow or did it**  
23     **allow?**

24          Q.     Did it allow your testimony?

1           A.     You know, I can't remember the answer. I  
2 don't know. I don't recall the answer. I honestly  
3 don't recall what the court decided. I was so  
4 disgusted with what happened that I guess I just  
5 gave up, and I knew that we were thrown under the  
6 bus. I knew that the case would be closed easily if  
7 these things were said in writing as an easy way to  
8 get rid of the matter.

9                     I don't know what happened to the case in  
10 terms of the plaintiff. It was a very unsatisfying  
11 outcome for those of us who do this kind of work. I  
12 read it once, but I have forgotten it since, so I  
13 don't know the answer to those questions.

14           Q.     Your presentation says: Based in large  
15 part on your 2016 article, wind turbine noise and  
16 human health, a four-decade history of evidence of  
17 wind turbine and proposed risks.

18                     Is that correct?

19           A.     It's based largely on that, not totally,  
20 not totally. It also has been updated since then  
21 somewhat.

22           Q.     Who was your coauthor on that article?

23           A.     Richard James, an acoustician.

24           Q.     Was Mr. James also a former board member

1 of the Anti-Wind Group Society of Wind Vigilance?

2 **A. I believe he might have been. He might**  
3 **have been.**

4 Q. A clarification: Throughout that report  
5 and today, you've referred to ILFN throughout to  
6 mean -- is this correct that you refer to that to  
7 mean infrasound and low-frequency noise? Is that  
8 correct?

9 **A. Correct.**

10 Q. Are these two things different?

11 **A. Yes. Most acousticians define them a**  
12 **little differently, infrasound being below 20 hertz**  
13 **and low-frequency noise being between 20 and 200 or**  
14 **250 hertz. People define them differently but in**  
15 **that general range.**

16 Q. Are you familiar with the -- I am going to  
17 mispronounce this -- Maijala study from Finland,  
18 M-a-i-j-a-l-a, regarding annoyance perception and  
19 physiological effect of wind turbine infrasound?

20 **A. That's spelled M-a-i-j-a as the author's**  
21 **name?**

22 Q. Full name is Panu, P-a-n-u, P. Maijala,  
23 M-a-i-j-a-l-a. There are numerous other authors as  
24 well.

1           **A.     I am not familiar with the name.**

2           Q.     Okay.  Would you agree with the conclusion  
3 of that study -- I should say the study was issued  
4 by the Journal of the Acoustical Society of America.  
5 I'll submit a copy of this as our Exhibit 40.

6                     Would you agree with the findings?

7           MR. LUETKEHANS:  Could I get a copy of it,  
8 please?

9           MR. KAINS:  Sure, and the board would like  
10 one, too.

11           MR. GERSHON:  Yeah.  Sorry.  Far too many  
12 documents on my desk.

13           MR. KAINS:  Sure.

14 BY MR. GERSHON:

15           Q.     Do you agree with the findings of that  
16 article that, in the conditions used in the current  
17 study, infrasound did not contribute to the  
18 detection, annoyance or physiological reactions to  
19 wind turbine sound?

20           **A.     I cannot say whether I agree with it or**  
21 **not without knowing -- first of all, can you give me**  
22 **the title of that article?  I might be familiar with**  
23 **it.  I am not familiar with the name.**

24           Q.     Again, the title of the article was

1 Annoyance, Perception and Physiological Effects of  
2 Wind Turbine Infrasonnd. It was issued by -- I am  
3 going to guess a number here -- 15 or 16 acoustical  
4 engineers in the Journal of the Acoustical Society  
5 of America. Dates of the study is April of 2021.

6 **A. Okay. I don't recall the article, if I**  
7 **saw it. I try to keep up with those kinds of**  
8 **articles, but you asked me if I agree with the**  
9 **statement. Would you repeat the statement again?**

10 Q. In the conditions used in the current  
11 study, infrasound did not contribute to the  
12 detection, annoyance or physiological reactions to  
13 wind turbine sound?

14 **A. The problem with the question to me is**  
15 **that I don't know the conditions of the study, and**  
16 **the outcomes of the study are very dependent upon on**  
17 **the conditions of the study. A lot of studies in**  
18 **the past, some studies in the past have used**  
19 **insufficient in terms of time, insufficient in terms**  
20 **of level, insufficient in terms of a number of**  
21 **factors that didn't -- these factors did not**  
22 **adequately simulate real-life infrasound from a wind**  
23 **turbine, so I don't know if the conditions this**  
24 **person used would have resulted in my agreeing or**

1       **disagreeing with the statement that you just read,**  
2       **so I can't give an opinion, I don't think, on that.**

3           Q.     Do you agree that peer review is an  
4       important part of scientific research?

5           A.     **It's an important part. Yes.**

6           Q.     Was it important to you to get your  
7       article peer reviewed?

8           A.     **Was it important for me to get my article**  
9       **peer reviewed; is that the question?**

10          Q.     Yes.

11          A.     **I am sorry. I am having trouble with the**  
12       **sound on my end here.**

13                   **It was important. Yes.**

14                   **In fact, are you talking about the 2016**  
15       **article?**

16          Q.     Correct.

17          A.     **It was, but the problem was it was too**  
18       **long, and that was the main criticism. It was too**  
19       **darn long, and we submitted it to Noise & Health,**  
20       **and we were told it's too long.**

21                   **The other argument or the other criticism**  
22       **was that the basic foundation for the article was**  
23       **that infrasound can hurt people even though it's not**  
24       **perceptible.**

1           **And we couldn't get another reviewer. The**  
2 **one reviewer in the second review gave us the same**  
3 **answer, and we just stopped trying to get it**  
4 **published in Noise & Hearing, so we had it published**  
5 **online. It's 56 pages. No. It's reference is**  
6 **about 70 pages long I think.**

7           Q.     Do you agree that Noise & Health is a  
8 reputable journal with a rigorous review process?

9           **A.     Generally, yes. Generally.**

10          Q.     And I think you've just testified, but I  
11 want to make sure I've got this right, that your  
12 article received multiple reviews by a single  
13 reviewer; is that correct?

14          **A.     It received two reviews by one reviewer.**

15          Q.     You then submitted your are article to  
16 HearingHealthMatters.org, a website publication; is  
17 that correct?

18          **A.     It's a website, yes. That's true.**

19          Q.     And Hearing Health Matters, did they have  
20 one anonymous and three other reviewers consider  
21 your article?

22          **A.     There were I don't know how many**  
23 **reviewers, but it was reviewed by Pierce, by**  
24 **probably mostly audiologists. I don't know who**

1 **reviewed it exactly. It was de minimis I think.**

2 Q. Would you be surprised to know that the  
3 three of yours were Dr. Daniel Shepherd, Dr. Michael  
4 Nissenbaum and Keith Johnson?

5 A. Yeah. We said that. I don't know if we  
6 said it at the end of the article. We said it  
7 somewhere else on that same website I think. We did  
8 say that. You are right. That is the article that  
9 was reviewed by three people. I know one was a  
10 physician, one was an acoustician, and the other one  
11 was an attorney.

12 Q. Let's walk through the three reviewers  
13 that you had for your article. Once it was moved to  
14 this journal are Dr. Shepherd and Dr. Nissembaum,  
15 both on the board of the Society of Wind Vigilance  
16 and Anti-Wind Organization?

17 A. I have no idea.

18 Q. Who chose the reviewers for your article?

19 A. I think the editor. The person that did  
20 the editing asked us to name somebody, and that's  
21 pretty common these days.

22 Q. So you chose the --

23 A. I think we did. I think we did, is the  
24 answer.

1 Q. And "we" would be you and Mr. James, your  
2 coauthor?

3 **A. Correct.**

4 Q. And, again, to be clear --

5 **A. I don't know -- I don't know any of these**  
6 **people personally. I've talked to Nissenbaum on the**  
7 **phone once. I think Rick James knew of them, but I**  
8 **don't know how well he knew them, particularly the**  
9 **lawyer, personally.**

10 Q. As you've already acknowledged, Mr. James  
11 was on the board of the Society of Wind Vigilance.  
12 Would you be surprised to know that the other two  
13 reviewers, Dr. Shepherd and Dr. Nissenbaum, were  
14 also on the board of the Society of Wind Vigilance?

15 **A. I would be a little surprised. Yes.**

16 Q. Would you also be surprised to know that  
17 the attorney, Keith Johnson, represents objectors in  
18 wind turbine cases?

19 **A. I am not familiar with his history or**  
20 **recent history. No. I am not familiar with it, old**  
21 **or recent history.**

22 Q. We've already talked about the Journal of  
23 Noise & Health, which did not publish your article.

24 Are you familiar with an article that they

1 published by Swen, Stefan, Martin -- I am sorry --  
2 I'm trying to get all the names out of this -- by  
3 Swen and Muller and multiple others, are you  
4 familiar with their article titled Can Infrasound  
5 From Wind Turbines Affect Myocardial Contractility?

6 **A. I'm not really familiar with it. I might**  
7 **have -- I probably saw it, and I may have seen it,**  
8 **but I don't recall its contents. No. I am not**  
9 **familiar with it.**

10 Q. Would you agree with the conclusion of  
11 that article which states -- and I apologize. Let  
12 me submit this as our Exhibit 41.

13 Would you agree with the following  
14 conclusion of that article, which was peer reviewed  
15 by the same Noise & Health entity that you had dealt  
16 with previously, that stated: It is absolutely  
17 inconceivable that an in vitro heart would suffer  
18 any weakening from infrasound up to 100 decibels  
19 even at prolonged exposure. Such a sensibility  
20 would be noticed long before an everyday clinical  
21 practice. Industrial or agricultural workers  
22 operating heavy machinery, truck drivers and ravers  
23 and electronic dance and music festivals would all  
24 suffer from acute cardiomyopathies. Likewise,

1 swimmers would suffer hypoxia and drown after a  
2 short time.

3 Would you agree with that conclusion?

4 **A. I don't, because infrasound is unique and**  
5 **it's not just constant infrasound. Like, the Nigra**  
6 **falls is infrasound, for example. It contains**  
7 **infrasound. It's constant, basically constant.**

8 **We are talking about wind turbine noise**  
9 **infrasound, which is the rate of infrasound which is**  
10 **pulsations that are short impulses above the level**  
11 **of the constant noise. So, I do not agree with the**  
12 **statement.**

13 Q. Okay. Page 9 of your presentation  
14 identifies multiple characteristics of wind turbine  
15 noise, which you have said are unique to wind  
16 turbines.

17 Would a car or truck going 50 miles per  
18 hour have amplitude-modulated impact?

19 **A. It might have some modulation. Yes.**

20 Q. If a car passed by going 50 miles per  
21 hour, would it have amplitude-modulated impact?

22 **A. It probably would have minimal modulation,**  
23 **but I am not -- I haven't seen a spectrum of a large**  
24 **truck. I don't think it would be as large a**

1     **pulsation above the constant level, with the average**  
2     **level let's say, as you have with wind turbine**  
3     **noise.**

4           Q.     But, again, I want to make sure I  
5     understand. Your testimony is that this was unique  
6     to wind turbines. Are you now saying it's not  
7     unique to wind turbines?

8           A.     No. I am not saying. I am saying, well,  
9     **the uniqueness in terms of amplitude modulation is**  
10    **the amount of modulation. Maybe I should have said**  
11    **it that way. It's not other things are amplitude --**  
12    **my voice is amplitude modulated, so is yours, but**  
13    **it's not the same kind of thing with the short,**  
14    **short pulses in time as you have from wind turbine**  
15    **noise.**

16          Q.     What are you comparing -- of the multiple  
17    other things that have amplitude-modulated impacts,  
18    what are you using as your comparison on a  
19    quantitative basis to wind turbines?

20          A.     **With respect to amplitude modulation?**

21          Q.     Yes.

22          A.     **More typical noises, even rail traffic,**  
23    **railroad traffic, or highway traffic, environmental**  
24    **noises, I mean your tractors on farmland, all these**

1 things are somewhat amplitude modulated. Nothing  
2 stays constant except pure tones, okay? But I don't  
3 know of any other sound that is amplitude modulated  
4 to the extent that wind turbine noise is. This is  
5 just one of many things that make it typically  
6 unique.

7 Q. Can cars or trucks going by at 50 miles  
8 per hour also have impulsive sound?

9 A. To a lesser extent, probably. Generally  
10 highway traffic is pretty steady, but when it passes  
11 you, it's going to be amplitude modulated and you  
12 are going to hear it louder, but it's over a longer  
13 period of time rather than a specific pulse at one  
14 specific millisecond or so in time.

15 Q. So, then are you indicating that, if you  
16 lived near one of the multiple highways in this  
17 county, that you would regularly have impulsive  
18 sounds from that highway?

19 A. Sure, and people have complained about  
20 that.

21 Q. Do vehicle engine tones have tonal sound?

22 A. Tonal sound?

23 Q. Yes.

24 A. What is the question again, please?

1 Q. Your third standard is tonal, which you've  
2 identified, again, as wind due to wind turbines. Do  
3 vehicle engines have tonal sounds?

4 **A. They might. They might. I am looking at**  
5 **the conglomeration of unique statistics that are not**  
6 **typical of other transportation and industrial**  
7 **noise. Sure, other noises have some of these**  
8 **specific characteristics, but none have all these**  
9 **characteristics that I know of.**

10 Q. The next standard was that the perception  
11 of wind turbines varies with distance, terrain and  
12 wind direction.

13 **A. Right.**

14 Q. Can that also change with respect to a car  
15 going by you at 50 miles per hour?

16 **A. I am not making the connection with the**  
17 **first and last parts.**

18 Q. Can a car going by at 50 miles per hour  
19 meet the standard you identified of having  
20 perception that varies with distance, terrain and  
21 wind direction?

22 **A. I don't know that those factors are as**  
23 **controlling as they are with wind turbines. I do**  
24 **not know.**

1           Q.     Again, not my question. Can it have  
2     can -- can the perception vary with distance,  
3     terrain and wind direction?

4           MR. LUETKEHANS: He answered he doesn't  
5     know.

6           THE WITNESS: I said I don't know.

7     BY MR. GERSHON:

8           Q.     Okay. Does the spectrum of sound change  
9     due to atmospheric absorption for a moving vehicle?

10          **A.     I think it does. Yes.**

11          Q.     Can you predict when cars are going to  
12     pass by you?

13          **A.     By the sound?**

14          Q.     No. Can you generally predict when cars  
15     are going to pass by you?

16          **A.     By looking in my review mirror, I can  
17     predict, maybe. I am not sure what you are getting  
18     at with your question.**

19          Q.     Your next standard is that wind turbines  
20     are unpredictable. Is the noise from an automobile  
21     at 50 miles per hour passing by you on the highway  
22     also unpredictable?

23          **A.     Well, what other drivers do is not  
24     predictable. What I said earlier is true I think.**

1     **It's not one thing that's taken of these factors;**  
2     **they probably all apply to some other kind of noise,**  
3     **but there are very few noises that have this many**  
4     **unique or this many characteristics.**

5           Q.     Is the noise uncontrollable by the person,  
6     by the receptor, by the person who is hearing it on  
7     the highway?

8                   Or to put it a different way, can that  
9     person control whether or not cars drive down the  
10    highway?

11           **A.     The noise of other vehicles?**

12           Q.     Correct.

13           **A.     Well, of course, I can't control the**  
14    **speed. I mean, if traffic is tied up, and the car**  
15    **is behind me, I can't -- I can control it by staying**  
16    **in front of them, and they can't get around me. But**  
17    **I mean, generally, I don't -- I am not in control of**  
18    **other people's speed limits or speeds.**

19           Q.     I would agree.

20           **A.     On the highway.**

21           Q.     Do automobiles traveling on a highway make  
22    noise at night traveling on highways?

23           **A.     Again, I am having problems with the**  
24    **sound. I am not -- I am sorry about this, but I am**

1     **just not interpreting all your words together as a**  
2     **sentence because some of it it's disappearing on me**  
3     **with my sound here.**

4           Q.     I can repeat the question if you would  
5     like.

6           **A.     Please ask it one more time.**

7           Q.     Does automobile noise on a highway occur  
8     against low background noise levels in rural areas  
9     at night?

10          **A.     Yes.   It certainly it can he heard over**  
11     **the background noise if you live close enough to the**  
12     **highway.**

13          Q.     Does impulsive and low-frequency noise  
14     easily cross property boundaries and penetrate  
15     barriers when it's generated by transportation such  
16     as a vehicle traveling at 50 miles per hour?

17          **A.     To some extent, but not nearly as much as**  
18     **sound from wind turbines.**

19          Q.     Again, not my question.

20                 MR. LUETKEHANS:  You know what?  He  
21     answered the question and he gave his full response.

22                 MR. KAINS:  Let's ask another question.

23     BY MR. GERSHON:

24          Q.     So, on your page 9, I just listed every

1 standard you identified as being uniquely attributed  
2 to wind turbines, and in every single case you  
3 identified that that same sound characteristics  
4 could be found on a car driving by on a highway; is  
5 that correct?

6       **A. In the way that you asked your questions,**  
7 **yes. I told you three times or two times that the**  
8 **sounds, its characteristics are more significant a**  
9 **factor in wind turbines than most other sounds.**  
10 **It's true that any one sound, any one factor can be**  
11 **present if you -- you used automobiles a lot in your**  
12 **answers. Automobiles are more constant, unless they**  
13 **are speeding by you, than infrasound.**

14               **So, I don't agree with the premise of your**  
15 **question. You are free to ask, and I am sure you**  
16 **have a reason to ask them, and I understand there is**  
17 **reasons, but I still think, taken in totality, wind**  
18 **turbine noise is unique among other industrial and**  
19 **transportation noises.**

20               **For example, industrial noises are**  
21 **controlled. You don't build factories next to**  
22 **suburbs. You don't build factories in the middle of**  
23 **a city and expose residences to those noises.**

24               **You certainly can use the automobile**

1 **because it's a mobile device and it can go anywhere.**

2 **That's all I can say about that I think.**

3 Q. I appreciate that if I had asked the  
4 questions about factories your answers would have  
5 been different.

6 But since I asked the questions about  
7 vehicles traveling on highways, do you disagree that  
8 vehicles traveling on a highway would satisfy each  
9 of the characteristics that you identified in your  
10 page 9?

11 MR. LUETKEHANS: Objection. Asked and  
12 answered.

13 MR. KAINS: He is asking it a different  
14 way, so I am going to overrule.

15 Ask the question again.

16 Dr. Punch, listen to the question.

17 BY MR. GERSHON:

18 Q. Do you agree that automobiles traveling on  
19 a highway at 50 miles per hour meet all of the  
20 characteristics you identified on page 9 of your  
21 presentation?

22 **A. Yes, but not to the same degree.**

23 Q. Understood. Would you agree that trains,  
24 for the same reason, meet each of the

1 characteristics you've identified on page 9?

2 **A. Yes, but we don't live near trains going**  
3 **by all the time. They go by on a transient basis**  
4 **and it's temporary. Wind turbines can run for hours**  
5 **at a time at night. So, that is the difference.**  
6 **There are differences here.**

7 Q. And those differences you've identified  
8 don't exist for cars?

9 **A. Don't exist for cars?**

10 Q. I am not going to ask. Phil will say it's  
11 been asked and answered, so I'll move on.

12 Do you agree with our noise consultant  
13 from RSG who testified that Illinois Pollution  
14 Control Board levels are significantly lower -- at  
15 night are significantly lower than the permitted  
16 standards during the day?

17 **A. Yes.**

18 Q. Are you aware that our project was  
19 designed to meet the Illinois Pollution Control  
20 Board nighttime standards during the day and at  
21 night, notwithstanding that those standards only  
22 apply at nighttime?

23 **A. Yes, I am.**

24 Q. I would like to turn to your slides --

1           **A.     I looked through the data.**

2           Q.     I apologize.

3           **A.     I looked through the data carefully, and**  
4 **you are right that they do meet that standard. I**  
5 **just don't think the standard is a very good one**  
6 **that is applied to wind turbines.**

7           Q.     I do understand, and that's why I asked  
8 the questions about whether you sought to change the  
9 standards. I do understand you don't agree with the  
10 standards.

11                   I would like to turn to your pages 42 and  
12 43, and these are the charts where you identified,  
13 in your noise analysis, that the projects do not  
14 meet multiple standards you identify here.

15                   Are these standards the Illinois Pollution  
16 Control Board standards?

17           **A.     I am going to have to pull up the slide,**  
18 **which I've not had to do so far in the questioning.**  
19 **42 and 43?**

20           Q.     Correct.

21           **A.     I think I can still pull them up.**

22                   MR. LUETKEHANS: If it helps, we will  
23 stipulate that these are not based on the IPCB  
24 standards.

1 THE WITNESS: Can you say them? I don't  
2 know whether we see them or not.

3 MR. KAINS: Dr. Punch, hold on.

4 Mr. Luetkehans, you are stipulating to --

5 MR. LUETKEHANS: The fact that these two  
6 models, pages 42 and 43, are not based on the IPCB  
7 standards or whatever it was suggested to be.

8 MR. KAINS: Very good. Thank you.

9 MR. LUETKEHANS: Thank you. We appreciate  
10 that.

11 BY MR. GERSHON:

12 Q. You may still want to look at the exhibit  
13 for the next question. If you need to, let us know.

14 Are the standards you've identified on  
15 slides 42 and 43 long-term averages or short-term  
16 averages?

17 **A. Long-term averages. I don't recall**  
18 **whether they were 24-hour or 8-hour averages. They**  
19 **were longer-term averages. I think that is**  
20 **definable as long-term. I don't know if they were**  
21 **longer than 24 hours or not. They, obviously, don't**  
22 **apply to Illinois.**

23 Q. Isn't the 40-decibal you identified here  
24 as L9 an annual standard?

1           A.     In terms of the way the 40 dB was applied  
2     in those charts, I am pretty sure they are not  
3     annual because that's an almost impossible standard  
4     to meet. A more -- you know, I think it was  
5     24 hours or 8 hours because those are the kinds of  
6     standards that the kinds of time periods that are  
7     typically used in specifying what the dBA levels  
8     are.

9           Q.     Are the 40 dBA standards identified as LEQ  
10    based on the WHO's standard?

11          A.     Yes, and I am aware that the standard that  
12    the World Health Organization talks about annual,  
13    but everybody, every acoustician that I've talked  
14    to, everything I've read says that it's an  
15    impossible standard. Nobody can measure sound  
16    365 days a year 24 hours a day.

17               MR. KAINS: At this point we are going to  
18    take a quick five-minute break. Holly's fingers are  
19    going to fall off.

20               So, approximately how much do you have  
21    left with respect to questions for Dr. Punch?

22               MR. GERSHON: I probably have three pages  
23    of questions left. I think that depends on -- I  
24    can't tell you, depending on the answers, how long

1 it will take.

2 MR. KAINS: Absolutely. Very good. We  
3 are going to take a quick break. It's 9:32. We'll  
4 come back at 9:37. We are in recess.

5 (BREAK TAKEN.)

6 MR. KAINS: Folks, we are back on the  
7 record.

8 And, Mr. Gershon, you may continue your  
9 questioning of Dr. Punch.

10 MR. GERSHON: Thank you. I would like to  
11 ask Holly to read the last question and answer.

12 (REQUESTED TEXT WAS READ BACK.)

13 BY MR. GERSHON:

14 Q. I want to make sure I understand. In  
15 multiple places in your presentation, including on  
16 slides 42 and 43, you suggest that this project  
17 should be obligated to comply with the World Health  
18 Organization guidelines, correct?

19 **A. Yes.**

20 Q. And you've just testified on the record  
21 that it's impossible to meet the World Health  
22 Organization's guidelines, correct?

23 **A. In the way that -- yes, in the way you**  
24 **specified it.**

1           Q.     I asked you some questions before about  
2 whether or not 42 and 43 were long-term averages.  
3 You indicated that they were.

4                     Are the Illinois Pollution Control Board  
5 standards based on long-term averages?

6           **A.     My understanding is no; they are based on**  
7 **octave band readings.**

8           Q.     Would you be surprised to know that, in  
9 fact, the administrative code provides that the  
10 Illinois Pollution Control Board requirements can be  
11 studied on an hourly basis?

12           **A.     I didn't know that. I don't recall that,**  
13 **if it's true.**

14           Q.     Are short-term models and long-term models  
15 comparable?

16           **A.     They may be, depending on how good the**  
17 **random measurements might be, the sampling might be.**

18           Q.     If they are, then why do you emphasize  
19 intermittent sound in your presentation?

20           **A.     As a unique characteristic?**

21                     **I talked about intermittent sound so I**  
22 **could talk about unique characteristics.**

23           Q.     Correct.

24           **A.     But intermittent sounds can be averaged.**

1     **That is the whole concept of Leq. It's the sound**  
2     **power level that is equal to the average of all the**  
3     **other sounds that occur over a period of time.**

4           Q.     So will the short-term maximums be more  
5     impacted by intermittent sounds than the long-term  
6     maximums?

7           **A.     They could be if intermittent sounds are**  
8     **present. Yes.**

9           Q.     I am sorry. Am I correct that you said,  
10    if intermittent sounds are present?

11                   I want to make sure.

12           **A.     Intermittent sounds can be taken into**  
13    **account in averaging over any given period of time.**

14           Q.     But to be clear, your prior testimony is  
15    that intermittent sounds are present in wind  
16    turbines, correct?

17           **A.     Yes.**

18           Q.     I want to turn to the Health Canada study.  
19    The Health Canada study was done of 1200 people  
20    living near existing and functioning wind turbines;  
21    is that correct?

22           **A.     Correct.**

23           Q.     And they reviewed noise levels up to 46  
24    dBA; is that correct?

1           **A.     Yes.**

2           Q.     And did they review that as an average  
3 over a year's time?

4           **A.     No.   No.   I don't think so.   The study**  
5 **took a long time, but I don't think they averaged**  
6 **over that period of time.   I am not sure, to be**  
7 **honest.   I don't recall or don't know.**

8           Q.     Given the hour, we'll present the Health  
9 Canada study at another time.

10                   The conclusion of the -- was the  
11 conclusion of the Health Canada study that it did  
12 not show a relationship between wind turbine noise  
13 and health effects, including sleep, stress and  
14 cardiovascular disease, among others?

15           **A.     Yes.   That was a conclusion.**

16           Q.     Okay.   In your presentation, on slide 19  
17 -- I apologize -- slide 20, you discuss 40 dBA and  
18 its link to serious physiological and psychological  
19 health effects; is that correct?

20           **A.     Yes.**

21           Q.     Did the World Health Organization in 2009  
22 confirm that, however, even in the worst cases, the  
23 effects seem modest on an Lnight, outside of 40 dB,  
24 is equivalent to the lowest observed adverse effect

1 level for nighttime noise?

2 And if you need the reference-

3 **A. What are you reading from?**

4 Q. What is that?

5 **A. I assume you are reading that. Yes.**

6 MR. GERSHON: In the interest of the hour,  
7 that will close my questions.

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

9 Any questions from other licensed  
10 attorneys?

11 Questions from other interested parties?

12 Individuals in the public in support of or  
13 neutral on the application for special use permit?

14 Mr. Johnson?

15 Mr. Johnson, go ahead with your questions.

16 Dr. Punch, this is Mr. Johnson, a member  
17 of the audience. He has some questions for you,  
18 sir.

19 EXAMINATION

20 BY MR. CHRISTIAN JOHNSON:

21 Q. I would like to get a couple of points of  
22 clarification from you, sir, because there is a lot  
23 of terminology that I think has been thrown around  
24 and could be a little confusing to members of the

1 audience.

2 Am I correct in -- I know a little bit of  
3 music theory. I am not trained in audio at all, but  
4 I am under the impression that audio or sound is  
5 logarithmic, so that would mean that -- could you  
6 kind of go and maybe explain a little bit on, you  
7 know, how sound scales, what the difference between  
8 different decibel levels is?

9 **A. You mean the amount of the numbers from**  
10 **like 0 to 120 or something like that?**

11 Q. Yeah.

12 **A. The decibel levels themselves?**

13 Q. Uh-huh.

14 **A. Well, speech, in terms of sound pressure**  
15 **levels, speech occurs at about 70 dB SPL or so. A**  
16 **jackhammer going on the upper end of the scale is**  
17 **around 130 or 40 at the ear level, typically, that**  
18 **they operate. A jet line I think is around 110**  
19 **maybe 120 dB SPL. I may be getting these numbers a**  
20 **little wrong but in that ballpark.**

21 **What other sounds would you have in mind?**

22 Q. Yeah. So I guess -- sorry to cut you off  
23 there. I guess my question in there or sort of what  
24 I am trying to get at is there would be a pretty

1 significant noticeable difference in just 10  
2 decibels of sound, correct?

3 **A. Yeah, but --**

4 Q. Because 30 decibels of sound --

5 MR. KAINS: Mr. Johnson, let him answer  
6 the question.

7 MR. JOHNSON: I apologize.

8 MR. KAINS: Dr. Punch, go ahead and answer  
9 that question.

10 THE WITNESS: Repeat it. I am sorry. I  
11 was taking a note on here on what you are saying and  
12 I forgot what you were saying.

13 BY MR. JOHNSON:

14 Q. That a 10-decibel sound difference would  
15 be fairly noticeable to the average layperson.

16 **A. Yes. Yes. I recall now. The ear can**  
17 **actually discern differences between levels of about**  
18 **3 or so dB. The 10 decibels you are talking about**  
19 **may come from your knowledge that, as any sound**  
20 **increases by 10 decibels it becomes twice as loud**  
21 **because loudness, in what is measured in phons,**  
22 **p-h-o-n-s, is different than the actual decibel**  
23 **level. So, the level is the physically quantifiable**  
24 **measurement, whereas the loudness level is how we**

1 **perceive it as being loud or soft. So, ten decibels**  
2 **difference is twice as loud as 10 decibels lower**  
3 **sound.**

4 Q. And so I know from music theory there is,  
5 obviously, a difference between loudness and;  
6 frequency being, you know, I guess you could say the  
7 notes that are being played by the vibrations.

8 So, with infrasound -- with infrasound, if  
9 you were, let's say, playing the piano and you went  
10 to the bassiest keys, the lowest keys, and kept  
11 going off the piano and kept getting lower and lower  
12 and lower, eventually, if you get a giant piano,  
13 eventually the string would vibrate that you  
14 couldn't hear, correct?

15 It would be vibrating but maybe an  
16 elephant could hear it, but you couldn't?

17 **A. Yeah. You are exactly right. Pitch -- we**  
18 **talk about pitch. Frequency is related to pitch.**  
19 **Pitch is a subjective counterpart of the frequency.**

20 Q. Okay.

21 **A. Frequency and loudness is a subjective**  
22 **counterpart of the physical intensity.**

23 Q. So, from kind of what I am piecing  
24 together from this, it sounds to me that you can

1 have a wind turbine making a very low sound, very  
2 deep sound, infrasound. But, you know, it could be  
3 loud or it could be a quiet sound, you know. It is  
4 infrasound, but it could be either a loud infrasound  
5 you can't hear or a quiet infrasound you can't hear,  
6 but there is just the amount of vibration sound; is  
7 that correct?

8 **A. Well, it's said that some unusual people,**  
9 **a few people in the population, can actually hear**  
10 **infrasound as sound, but generally infrasound cannot**  
11 **be heard as sound; but it can be felt and it can be**  
12 **perceived as present, okay?**

13 Q. But could --

14 **A. It's like a vibration.**

15 Q. You would say, though, that it would be  
16 more likely that infrasound that had a high decibel  
17 count would be easier to feel by those people than a  
18 quiet one, right?

19 **A. Yes. Exactly.**

20 Q. So, I was looking up just some comparable  
21 decibel rates online just to see what is out there,  
22 and I was seeing the quietest air conditioner on the  
23 market being sold right now is about it looked like  
24 just under 40 decibels.

1           So, it seems to me that if a wind turbine  
2 is coming in at 40 or less decibels, not only would  
3 you not be able to hear it, like physically, you may  
4 maybe would be able to feel it, but 40 decibel seems  
5 to be a pretty quiet sound.

6           **A.     Right, and the wind industry has**  
7 **advertised itself essentially as being no louder**  
8 **than the refrigerator. But, you know, again, it**  
9 **goes back to the uniqueness of the wind turbine**  
10 **sound. It's the level of the sound and the low**  
11 **frequencies that are higher than the average level**  
12 **of the sound, overall level of the sound. By no**  
13 **means --**

14          **Q.**     Sorry. My house is right on the street  
15 corner, and when the windows are open at night, I'll  
16 hear the cars going by. If I have my doors or  
17 windows shut or if I am not standing on the front  
18 lawn, it's a lot quieter in my house.

19                 It seems to me, if you are going outside  
20 and you are measuring decibel rates of sound that is  
21 inaudible to most people and it sounds to be  
22 relatively quiet, if you could go inside of  
23 someone's house, there would be a decrease in the  
24 sound from inside from someone sleeping. We are not

1 expecting someone to be in a hammock on their front  
2 lawn listening to these wind turbines at night I  
3 would assume.

4           So doesn't it seem that inside of  
5 someone's home where they are sleeping, not only is  
6 there no audible sound, but the feelable frequency,  
7 which is relatively quiet, would be even further  
8 muffled by the walls and windows in the house?

9           **A.    Again, there is a distinction between**  
10 **infrasound, constant infrasound, and impulsive**  
11 **amplitude-modulated sound. It's the peaks or the**  
12 **spikes and the intensity that occur at an infrasonic**  
13 **rate that people pick up as disturbing, as**  
14 **vibrations, essentially.**

15           I understand your logic. It makes sense  
16 to say, well, if speech is no more than say 65, 70  
17 dB -- well, actually, speech is about that loud.

18           The sound you talked about -- I forget  
19 what sound you used as 40 dB, but 40 dB may be  
20 happening outside your window, and you are right, if  
21 you close the windows, it would sound less than  
22 that.

23           Infrasound is impervious to barriers. In  
24 other words, it won't be reduced that much with

1     **barriers. It's hard to reduce infrasound through**  
2     **barriers, and that's why people that can't sleep**  
3     **good go to their basements sometimes around**  
4     **infrasound.**

5             **So all of these -- I realize this is**  
6     **confusing. It confused me for a long time. I still**  
7     **don't know all the answers, by any means. But you**  
8     **just can't compare regulators and other common air**  
9     **conditioners and such to the levels of infrasound**  
10    **from wind turbines because of the amplitude**  
11    **pulsations -- amplitude-modulated pulsations that**  
12    **occur with infrasound. You have to actually**  
13    **experience it to really believe it I think.**

14            Q.     So, one other concern that comes up to me  
15    is it seems that these projects, obviously, they  
16    stir up a lot of controversy when they come into a  
17    place and the process between the beginning, middle  
18    and end of this project from the first time, I  
19    guess, a company decides maybe they want to build  
20    something around here until the day the very last  
21    wind turbine is running is going to be several  
22    years. You know, is it a possibility that some of  
23    these medical complaints would be based off of, you  
24    know -- let's say an individual developed sleep

1 apnea and it had nothing to do with a wind turbine,  
2 but because they have been hearing a lot of  
3 negativity around -- really, I mean I've been to  
4 several different of these, and I've heard about  
5 shadow flicker and I've heard about infrasound.  
6 I've heard about a lot of things. But isn't it  
7 possible that what people are doing is they are  
8 associating an existing medical condition with a  
9 change in their environment but those aren't  
10 necessarily connected?

11 **A. It's certainly possible. It's also**  
12 **possible that wind turbine noise added to a chronic**  
13 **health problem will make it worse, and to me that's**  
14 **also negative. Okay? It's a negative health**  
15 **effect.**

16 **So, you are right. Basically it could be,**  
17 **but it would take a medical doctor, admittedly, to**  
18 **discern that. I think it would take some very**  
19 **detailed questioning to actually arrive at a good**  
20 **answer in terms of a diagnosis.**

21 **MR. JOHNSON:** I think that's all the  
22 questions that I have.

23 **MR. KAINS:** Very good. Thank you,  
24 Mr. Johnson.

1           Any questions from the public folks in  
2 support of the application or neutral on the  
3 application?

4           Yes. I've got your name right here.  
5 Jim Warren, you may approach.

6           The microphone.

7           Just listen closely, Dr. Punch.  
8 Mr. Warren speaks fairly softly.

9           THE WITNESS: Yes. I will. I'll try to  
10 speak a little better.

11           Basically what I've got here, we really  
12 should be concerned with wind health; is that  
13 correct?

14           That is what I understand.

15           MR. KAINS: You need to ask questions of  
16 the doctor.

17           MR. WARREN: Oh, yeah. I am sorry.

18           Anyway, on wind health on our -- bear with  
19 me.

20           MR. KAINS: Sure.

21           MR. WARREN: I have a question of we're  
22 really -- the wind problem is really -- I think  
23 there are worse problems than we have for our wind  
24 problem at this level.

1           I was going to say -- I want to mention  
2 this, too: We have other rains that make these  
3 winds possible.

4           MR. KAINS: Mr. Warren, I am sorry to  
5 interrupt you, but do you have a question for  
6 Dr. Punch?

7           MR. WARREN: Yeah. I was going to say if  
8 we have more important things than this, it seems to  
9 me a little over level that we don't need to be  
10 discussing it as much and spending more time on a  
11 higher level. I think the doctor has answered his  
12 questions good and he's answered what he needs to  
13 answered.

14           But it's -- I still wanted to say on that  
15 more rains -- our scope seems to be way wider. It's  
16 not that wide. You got more rains. You got people  
17 in Gibson City that can't answer your questions for  
18 here.

19           And I wanted -- this is to the doctor,  
20 too. A combine, we are all running combines, but  
21 they are not looking at the combines making them  
22 more detrimental than what we are discussing here.

23           And then the other thing I was going to  
24 say is combines are very minimal and, of course, a

1 combine and a semi-truck makes a lot more noise than  
2 what we are discussing here on for the doctor.

3 And that's all I had to say.

4 MR. KAINS: Okay. Very good. Thank you,  
5 Mr. Warren. We appreciate your participation.

6 Any other questions from folks in support  
7 of or neutral on the application?

8 Very good. Questions from Piatt County  
9 staff and consultants?

10 Redirect, Mr. Luetkehans?

11 FURTHER EXAMINATION

12 BY MR. LUETKEHANS:

13 Q. Could you explain to the board why the WHO  
14 guidelines are important or still relevant even  
15 though they may not be realistic?

16 **A. Well, the guidelines were based -- the WHO**  
17 **guidelines were based on decades of research by**  
18 **medical doctors and others, including I think**  
19 **epidemiologists and other health-related**  
20 **professionals over decades, and so we have to, I**  
21 **think, respect their expertise as coming to some**  
22 **decision on what levels of noise exposure are really**  
23 **present at little or no risk of health effects.**

24 The problem with -- one problem that I

1     **don't think I've mentioned is -- it is in one of my**  
2     **slides that the World Health Organization guidelines**  
3     **of 40 decibels are based on transportation and**  
4     **industrial noises that are more I guess constant**  
5     **noises, if you will, than the type of noise that**  
6     **comes from wind turbines; again, we get back to the**  
7     **quote "unique characteristics of wind turbines."**

8           Q.     Let me cut you off. I think we all want  
9     to try to get out of here for you tonight. I know  
10    you are an hour ahead of us.

11                   My question -- my next question about  
12    those characteristics is ILFN, as we talked about,  
13    is not the same with cars and trains as it is with  
14    wind turbines, correct?

15           **A.     Correct.**

16           Q.     Okay. And your slide on page 9 is related  
17    to the uniqueness and conglomeration of all of those  
18    together, correct?

19           **A.     Correct.**

20           Q.     And if I stand by the side of a road, I  
21    can leave that side of the road and not hear that  
22    noise, correct?

23           **A.     Right.    Correct.**

24           Q.     If I live in my house, it's a completely

1 different thing for me to have to leave my house to  
2 avoid that noise, correct? Is that one of your  
3 points?

4 **A. Yes, that noise from wind turbines. We**  
5 **are talking about chronic exposure overnight over a**  
6 **period of nights, weeks, months. So, we are not**  
7 **talking about these kinds of transient noises here**  
8 **that were mentioned.**

9 Q. You did review Dr. Ellenbogen's transcript  
10 from the hearing, correct?

11 **A. I did.**

12 Q. Just so that we are clear --

13 **A. I did.**

14 Q. I just want to finish with one point from  
15 Dr. Schomer's testimony. It's in the McLean County  
16 hearing, and you pointed out as well it's in this  
17 transcript, Petitioner's Exhibit 38, that  
18 Dr. Schomer testified that, from the Health Canada  
19 study, he determined that 38 dBA -- at 38 dBA,  
20 10 percent of the population would be "highly  
21 annoyed." Do you recall that? I think that is in  
22 your slide as well.

23 **A. Yeah. It's in my slide for sure. I don't**  
24 **doubt -- I don't recall it, frankly, but I don't**

1       **doubt it's in there.**

2           Q.     Okay.  It's in there because you read it  
3     somewhere, correct?  And most likely you read it  
4     from one of the McLean transcripts where you  
5     testified and he testified, correct?

6           **A.     Correct.**

7           MR. LUETKEHANS:  Nothing further.

8           MR. KAINS:  Mr. Gershon, anything to  
9     clarify?

10   FURTHER EXAMINATION

11       BY MR. GERSHON:

12           Q.     Yea.  Clarify, notwithstanding that you've  
13     indicated you like the World Health Organization  
14     standards for reference, do you still believe that  
15     they are impossible?

16           **A.     You are referring to the WHO standards?**

17           Q.     Yes.

18           **A.     Impossible in terms of -- yes, the annual**  
19     **measurement part of it is impossible or very**  
20     **unlikely to happen, not practical.**

21           Q.     Okay.  Do the conditions you've been  
22     talking about here and just responded to related to  
23     the standard, the standards you have in your page,  
24     etc., do those conditions exist in the other

1 counties and townships in this state that have wind  
2 turbines?

3 **A. I am sorry. What conditions are you**  
4 **referring to?**

5 Q. The unique conditions you identified,  
6 would those be unique to this county or would they  
7 exist in all of the other locations?

8 **A. No. Sorry. Yes. They would presumably**  
9 **exist in a number of areas that there are wind**  
10 **turbines.**

11 Q. And have those conditions been identified  
12 as actually creating problems on economic impact  
13 studies, unions, property values, etc., in all those  
14 other counties?

15 MR. LUETKEHANS: Objection. Beyond the  
16 scope. I don't know where --

17 MR. GERSHON: He's identified that these  
18 are unique conditions that have adverse impact.

19 MR. KAINS: I am going to overrule the  
20 objection. If the witness knows the answer, he can  
21 answer.

22 THE WITNESS: I don't know the answer.  
23 Sorry.

24 MR. GERSHON: No further questions.

1 MR. KAINS: Very good.

2 And the final stab at questions come from  
3 the members of the zoning board. Anybody on the  
4 board with questions for Dr. Punch?

5 Very good. Dr. Punch, we want to thank  
6 you.

7 It is after 11:00 in the east where  
8 Dr. Punch resides.

9 So, thank you for staying up with us, and  
10 you are excused as a witness in this cause. Thank  
11 you.

12 THE WITNESS: Thank you. Good evening.

13 MR. KAINS: Folks, now a roadmap for where  
14 we are going.

15 Mr. Luetkehans, do you have any other  
16 expert witnesses that you propose to call on Monday?

17 MR. LUETKEHANS: No.

18 MR. KAINS: Very good.

19 All right. On Monday, we will have  
20 members of the public. Mr. Luetkehans will call his  
21 clients, and then there will be other members from  
22 the public who are opposed to the application for  
23 special use permit. Those folks will testify on  
24 Monday. We will begin at 6:00. And then, if we

1 have to carry it over to Tuesday also, those folks  
2 who are neutral on the application will then testify  
3 after folks who are opposed.

4 Then, after folks who are neutral on the  
5 issue, after they testify, whether it be Monday or  
6 Tuesday, then the Piatt County Zoning Board of  
7 Appeals has retained an engineer who will testify on  
8 Tuesday of next week.

9 And then, if there are any witnesses that  
10 need to be recalled that we reserved the rights to  
11 recall for counsel, we will hear from them we are  
12 here on Tuesday. And if there are any witnesses who  
13 the board wishes to be recalled, we will have them  
14 on Tuesday or Wednesday. I'll let counsel know if  
15 there is any such witnesses.

16 And, also, the next question is, rebuttal  
17 evidence, we've heard a lot. Are there any, right  
18 now, as we sit here, obviously, you can change your  
19 minds. Are there any witnesses you are  
20 anticipating, Mr. Gershon, calling in rebuttal?

21 MR. GERSHON: I do not believe so. I want  
22 to go back through all this.

23 MR. KAINS: Absolutely, and you have that  
24 right.

1           So, that is a roadmap of where we are  
2 going. Monday we'll hear from folks opposed. And  
3 if we get through all of those folks, folks who are  
4 neutral. Then Tuesday we'll hear from the engineer  
5 retained by the County Zoning Board of Appeals.

6           And it is our sincere hope that we can  
7 have closing statements from counsel on Wednesday  
8 night of next week, and then we will schedule a  
9 discussion and decision night for the board that  
10 will occur in January.

11           Anything further, Mr. Luetkehans?

12           MR. LUETKEHANS: No, sir.

13           MR. KAINS: Mr. Gershon?

14           MR. GERSHON: Only that can we make sure  
15 that by on Monday, if not tomorrow, both sides  
16 identify anyone, as well as ZBA, that will be  
17 recalled? Given that people have to fly in, we want  
18 to make sure we tell them that.

19           MR. KAINS: Yes. Let's try to have that.  
20 If there is anybody who is going to be recalled,  
21 e-mail me and everybody, you know, all the attorneys  
22 involved, so we know so we can make those  
23 arrangements.

24           MR. LUETKEHANS: I can make a statement

1 right now that we will not be calling the one  
2 witness that we had the opportunity to recall.

3 If that helps, Mr. Gershon, I have no  
4 intention of calling -- I think it was Mr. Rogers.

5 MR. KAINS: Very good. Thank you,  
6 Mr. Luetkehans.

7 Mr. Keyt will be meeting with the board  
8 for just a few seconds after the conclusion of this  
9 to determine if there is anybody the board wishes to  
10 recall.

11 So, e-mail me tomorrow, guys. We will get  
12 this on the road.

13 We are in recess until Monday night, 6:00,  
14 in this very building, at this address, and we will  
15 be meeting in the first floor meeting room.

16 We are in recess. Thank you.

17 (END OF PROCEEDINGS.)

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CERTIFICATE OF REPORTER

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

  
Holly Wingstrom, CSR #84-003888  
Official Court Reporter

Dated: 12/23/2022

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