

**In The Matter Of:**  
*McLEAN COUNTY ZONING BOARD OF APPEALS*

---

*February 22, 2018*

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1 McLEAN COUNTY ZONING BOARD OF APPEALS  
 2 MEETING  
 3  
 4 Wednesday, February 22, 2018  
 5 6:00 p.m.  
 6 at  
 7 McLean County Government Center  
 8 115 East Washington Street  
 9 Bloomington, Illinois  
 10 Case Number SU-18-02  
 11  
 12 BOARD MEMBERS PRESENT:  
 13 Brian Bangert  
 14 Chris Carlton - 1st Alternate  
 15 Rick Dean  
 16 James Finnigan - Chairman  
 17 Michael Kuritz  
 18 Mary Beth Taylor - 2nd Alternate  
 19 Julia Turner  
 20  
 21 ALSO PRESENT:  
 22 Philip Dick, Director of Building and Zoning  
 23 Samantha Walley, Assistant State's Attorney  
 24 Luke Hohulin, Assistant County Engineer  
 25  
 26 June Haeme: CSR #084-003038  
 27 Area Wide Reporting and Video Conferencing  
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 29 Champaign, IL 61820  
 30 800.747.6789

1 (Commencing at 6:00 p.m.)  
 2 **CHAIRMAN FINNIGAN:** We're going to call  
 3 the McLean County Zoning Board to order. Will the  
 4 secretary call the roll?  
 5 (Roll call was taken with Board Members  
 6 Brian Bangert, Michael Kuritz, Rick Dean, Julia  
 7 Turner, Jim Finnigan, Chris Carlton and Mary Beth  
 8 Taylor present.)  
 9 **CHAIRMAN FINNIGAN:** We have a quorum, so  
 10 we can conduct business. The staff has been  
 11 affirmed. I think the counsel -- our counsel is  
 12 going to tell us where we're at in the meeting and  
 13 maybe what we're going to talk about tonight.  
 14 **MS. WALLEY:** Good evening, ladies and  
 15 gentlemen. For those of you that have not been in  
 16 attendance before, my name is Samantha Walley. I'm  
 17 an Assistant State's Attorney with the civil  
 18 division of the McLean County State's Attorney's  
 19 office. As Chairman Finnigan stated, we are  
 20 currently in the public comment portion of the  
 21 hearing. What that means is that the applicant, EDP  
 22 Renewables, has rested its case in chief, and anyone  
 23 that has signed up and is willing to provide  
 24 testimony or information is more than welcome to do

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1 so. A layperson or a nonexpert is given ten  
 2 minutes, and anyone that's qualified as an expert  
 3 will be given 30 minutes. Everyone is subject to  
 4 cross-examination, the caveat being that there can  
 5 be no friendly cross-examination which means  
 6 cross-examination for the purpose of furthering  
 7 testimony. You can also -- you also cannot  
 8 cross-examine your own witness. It must be someone  
 9 that is an adverse witness to you.  
 10 Anybody have any questions? All right.  
 11 **CHAIRMAN FINNIGAN:** Okay, this is a  
 12 continuation of Case SU-18-02, so I think it's in  
 13 your court.  
 14 **MR. ARMSTRONG:** Thank you. Brian  
 15 Armstrong on behalf of several objectors. Is it on?  
 16 Can we both be on at the same time?  
 17 **CHAIRMAN FINNIGAN:** Yeah, you can both be  
 18 on.  
 19 **MS. WALLEY:** The maximum is three on at  
 20 any given point. If we get too far, it will light  
 21 up green.  
 22 **MR. ARMSTRONG:** Mr. Schomer, would you  
 23 please introduce yourself and spell your name for  
 24 the court reporter?

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1       **MR. SCHOMER:** My name is Paul Schomer,  
2 P-A-U-L, S-C-H-O-M-E-R.  
3       **MR. ARMSTRONG:** Mr. Schomer --  
4       **CHAIRMAN FINNIGAN:** I'm going to have to  
5 swear him in.  
6       **MR. ARMSTRONG:** Oh, I'm sorry.  
7       **CHAIRMAN FINNIGAN:** Do you want to be  
8 sworn in or affirmed?  
9       **MR. SCHOMER:** Sworn.  
10 (Mr. Paul Schomer was duly sworn.)  
11       **CHAIRMAN FINNIGAN:** Okay.  
12       **MR. DICK:** How about his address?  
13       **CHAIRMAN FINNIGAN:** Probably need your  
14 address.  
15       **MR. SCHOMER:** The address is 2117 Robert  
16 Drive, Champaign, Illinois, 61821.  
17       **QUESTIONS BY**  
18       **MR. ARMSTRONG:**  
19 Q. Mr. Schomer, are you currently employed?  
20 **A. I'm currently trying very hard to retire.**  
21 Q. Okay. What are you trying to retire from?  
22 What's your profession?  
23 **A. I'm having trouble understanding you.**  
24 **There's an echo in here.**

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1 Q. What is your profession?  
2 **A. I am an engineer specializing in acoustics**  
3 **and environmental noise.**  
4 Q. And how long have you done that as your  
5 profession?  
6 **A. Since about 1965.**  
7 Q. And can you briefly run down your  
8 educational background for us?  
9 **A. I have a bachelor's of electrical**  
10 **engineering from the U of I, a master's of**  
11 **electrical engineering specializing in acoustics**  
12 **from the University of California at Berkeley, and a**  
13 **Ph.D. from the University of Illinois, electrical**  
14 **engineering specializing in acoustics.**  
15 Q. And have you provided expert testimony in  
16 the past to either administrative bodies and/or  
17 courts on the issue of acoustics?  
18 **A. Yes.**  
19 Q. Have you published papers on the subject  
20 matter of acoustics?  
21 **A. I'm having trouble understanding you.**  
22 Q. Have you published papers on acoustics?  
23 **A. I have probably about 200 publications**  
24 **mainly in acoustics.**

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1 Q. All right. Showing you what we've marked  
2 as SLG Exhibit No. 4, is that a current c.v. for  
3 you?  
4 **A. Yes.**  
5 Q. Okay.  
6 **MS. ANTONIOLLI:** Have you put that into  
7 the record?  
8 **MR. ARMSTRONG:** No. 4? I don't think so.  
9 **MS. ANTONIOLLI:** Okay.  
10 **MR. ARMSTRONG:** You want it now?  
11 **MS. ANTONIOLLI:** If you have a copy.  
12 **MR. ARMSTRONG:** Yeah. If I didn't do it  
13 before, I'd ask that SLG Exhibit 4 be admitted.  
14 **CHAIRMAN FINNIGAN:** We can do that.  
15 **BY MR. ARMSTRONG:**  
16 Q. Dr. Schomer, were you involved in drafting  
17 the Pollution Control Board regulations for noise?  
18 **A. Yes, I was.**  
19 Q. When was that?  
20 **A. About 1968, probably about six or eight**  
21 **years after that. Took that long.**  
22 Q. At what point on property do the Pollution  
23 Control Board regulations require you to measure  
24 noise levels?

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1 **A. Measurements can be made anywhere interior**  
2 **to the property.**  
3 Q. When you say interior to the property,  
4 that's anywhere within -- if we imagine a  
5 rectangular parcel, anywhere within the rectangle?  
6 **A. Yes.**  
7 Q. And regulations specify that, for example,  
8 for Class A land, which is residential, the noise  
9 levels in the Pollution Control Board regulations  
10 cannot be exceeded anywhere on the land, correct?  
11 **A. That's correct. The regulation was**  
12 **written with the model of a speed limit, and the**  
13 **speed limit, you can go 300 miles across the state**  
14 **and speed one mile and you get a ticket, and that's**  
15 **the philosophy that the regulation is written.**  
16 **MR. ARMSTRONG:** And I may have overlooked  
17 this, but we are offering Dr. Schomer as an expert  
18 witness.  
19 **A. I'm sorry, in the philosophy --**  
20 **MS. WALLEY:** In what specific field?  
21 **MR. ARMSTRONG:** Acoustics and the  
22 measurement of sound.  
23 **CHAIRMAN FINNIGAN:** Do you have a problem  
24 with that?

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1 **MS. ANTONIOLLI:** I do not.  
 2 **CHAIRMAN FINNIGAN:** That will be fine.  
 3 **BY MR. ARMSTRONG:**  
 4 Q. I'm sorry to interrupt you, Dr. Schomer,  
 5 you can continue. You were talking about where to  
 6 measure on the land.  
 7 **A. Yeah, this is the difference between some**  
 8 **kinds of measurements and others. This is a thou**  
 9 **shall not exceed ever limit. It's not an average of**  
 10 **any kind whatsoever in the Illinois rules. And**  
 11 **those rules are in effect, and the papers produced**  
 12 **say they're going to meet the Illinois rules, and**  
 13 **they're not. And the county board can adopt it, but**  
 14 **they don't have the legal basis to do it. The**  
 15 **Illinois rules have been found by the -- I believe**  
 16 **it was the Supreme Court fairly early on that nobody**  
 17 **can promulgate rules lower than the board rules, but**  
 18 **they can make it more stringent. And so if the**  
 19 **county goes ahead and approves this, they can do**  
 20 **that, but that doesn't prevent people from going to**  
 21 **the Pollution Control Board and finding that it's in**  
 22 **violation.**  
 23 Q. Now, have you -- you've worked on  
 24 noise-related issues with respect to wind turbines

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1 before, correct?  
 2 **A. I'm having trouble hearing.**  
 3 Q. You have worked on noise issues with  
 4 respect to wind turbines in the past, correct?  
 5 **A. Yes, I have.**  
 6 Q. Okay. And do you have an opinion on what  
 7 metric the board should be using to evaluate, to  
 8 judge whether or not the wind project is safe for  
 9 the public?  
 10 **A. The measures are confusing to people I**  
 11 **know. The state regulations are these octave band**  
 12 **limits that were created 60 years ago. If I were**  
 13 **creating them today, I wouldn't use them. And I'm**  
 14 **not sure that if these wind farms were to go to**  
 15 **24-hour LEQ, which is what is used in almost every**  
 16 **other jurisdiction around the world -- that would be**  
 17 **my recommendation if they were to come and ask me,**  
 18 **either side would come and ask me, I would say that**  
 19 **the 24-hour LEQ is good. The Pollution Control**  
 20 **Board was very, very happy probably to not to have**  
 21 **to worry about wind farms. And I really think the**  
 22 **decision is do you want to go with the Illinois**  
 23 **rules or with what most of the world is doing? And**  
 24 **that's semi legal issues and not just noise.**

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1 Q. Dr. Schomer, do you have any criticisms of  
 2 the sound study that was performed by the applicant  
 3 for this project?  
 4 **A. Well, the criticism is that they're not --**  
 5 **it's very difficult to come up with the level that**  
 6 **you're never going to exceed. It was probably fuzzy**  
 7 **thinking at the time the regulation was written.**  
 8 **You can't -- sound propagation is always**  
 9 **statistical, it's like the seven year flood, the**  
 10 **hundred year flood. If you measure long enough,**  
 11 **it's going to be louder. And that's the point I was**  
 12 **trying to make earlier.**  
 13 **The standard deviation is that sigma**  
 14 **stuff, that crazy stuff. To really translate about**  
 15 **roughly what it means, if you predict the average**  
 16 **and you design to the average, you're going to be**  
 17 **exceeding these limits almost every day. Half the**  
 18 **time you're over and half the time you're under if**  
 19 **you try to hit exactly the average. And by the way,**  
 20 **if I recall the Illinois rules, they round to the**  
 21 **nearest decibel not to 40.9. Oh, I guess 40.9 would**  
 22 **be okay for 41.**  
 23 **The standard deviation, as I said, if**  
 24 **that's just the average you're predicting, you are**

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1 **going to be over a lot of the time. The prediction**  
 2 **was for the limits.**  
 3 Q. Is the -- did the applicant in this case  
 4 use the average?  
 5 **A. I wasn't done.**  
 6 Q. So what -- what criticism do you have of  
 7 the applicant's methods in this case?  
 8 **A. Well, I'm trying to explain what happens**  
 9 **if you just design to the average.**  
 10 Q. And is that what they did here, design to  
 11 the average?  
 12 **A. That's my understanding.**  
 13 Q. Okay. Go ahead and explain why you've  
 14 made that statement.  
 15 **A. Well, for any kind of data, there's a**  
 16 **standard deviation. It's like sigma. Sigma is one**  
 17 **standard deviation. What it means in terms of**  
 18 **practicality here is, as I said, if you have the**  
 19 **average, you're going to be trespassing with your**  
 20 **sound almost daily, if you have one standard, if you**  
 21 **design to one standard deviation above where you**  
 22 **want to be. So the standard deviation is 3 dB, you**  
 23 **want to be at 40, you have to design for 43.**  
 24 **That'll get you down to about once a week.**

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1 Q. So in that case, under that circumstance  
 2 you just described, so you would say that it's  
 3 likely that once a week there would be a violation  
 4 of the limit?  
 5 A. **That's what the -- if the statistics are**  
 6 **all behaving. They don't always behave, but that's**  
 7 **the general way things work. If it's two standard**  
 8 **deviations, it would be maybe once a month, and**  
 9 **three standard deviations would be once a year, and**  
 10 **then if you wanted once a century, I haven't**  
 11 **calculated that, but we could. It's this kind of**  
 12 **thing. The Illinois rules, if you're trying to do**  
 13 **it based on an average, it's very difficult and you**  
 14 **end up -- the proper thing you have to design for is**  
 15 **about three standard deviations above where you want**  
 16 **to be to, quote, never go over the limit.**  
 17 Q. Can noise from wind turbines cause a  
 18 concern for human health and safety?  
 19 A. **Say it again.**  
 20 Q. Can noise from wind turbines cause a  
 21 concern for human health and safety?  
 22 A. **Well, there's certainly a concern as far**  
 23 **as the broad sense of health and safety. The World**  
 24 **Health Organization which deals with total**

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1 **well-being and not just illness --**  
 2 Q. Do you -- I'm sorry, go ahead.  
 3 A. **The wind turbines seem -- the data seem to**  
 4 **be telling us that the biggest problem is what we**  
 5 **call high annoyance, which is used for military**  
 6 **bases. Traffic noise, train noise, airport noise,**  
 7 **and wind turbines all are measured in terms of the**  
 8 **annoyance they're causing. And this is not a little**  
 9 **annoyance, but when we have people that say I'm**  
 10 **highly annoyed, that usually means it's kind of like**  
 11 **the number one bad thing in the neighborhood.**  
 12 Q. Do you have a maximum noise measurement  
 13 that you suggest is proper to avoid this level of  
 14 annoyance?  
 15 A. **I have a recommendation based upon four**  
 16 **independent sources of data, but I have to say this**  
 17 **is -- I'm talking about now the 24-hour LEQ as it's**  
 18 **called. We won't go into the details, but that's**  
 19 **what's used around the world and that's the simple**  
 20 **A-weighted measurement, and there we recommend 40**  
 21 **dB.**  
 22 Q. As --  
 23 A. **And that's a very top end number.**  
 24 Q. 40 dB being the maximum, correct?

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1 A. **That would be -- that would be an average**  
 2 **number. That would be not using the Illinois**  
 3 **regulation.**  
 4 Q. All right, but something over that would  
 5 cause a high level of annoyance?  
 6 A. **40 dB is in several attitudinal surveys**  
 7 **around the world and notably some in Canada. I**  
 8 **don't know, Health Canada did a very big survey in**  
 9 **two of the provinces, Prince Edward and Ontario**  
 10 **maybe, I forget names, and they had at 38 dB or 37**  
 11 **and a half, one of those two, about 10 percent**  
 12 **highly annoyed. And this study has been lauded by**  
 13 **the industry and by me as one -- as probably the**  
 14 **best study we have worldwide in terms of wind**  
 15 **turbine noise. And the main people that have not**  
 16 **liked it has been some of the communities because**  
 17 **the data didn't come out quite the way they thought**  
 18 **it should, but even so, it shows that the biggest**  
 19 **problem with wind farms is the annoyance, and the**  
 20 **annoyance is at levels that you have people annoyed**  
 21 **with traffic noise or airport noise and it's that**  
 22 **kind of thing.**  
 23 Q. And the closer the noise level gets to 40,  
 24 the more people are highly annoyed, and as the

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1 number gets above 40, even more people are highly  
 2 annoyed, is that what you're saying?  
 3 A. **Yeah, the annoyance goes up with the sound**  
 4 **level, and 40 is already about 2 or 3 dB higher than**  
 5 **I really think it should be. These four independent**  
 6 **sources, they all come up with the same range, about**  
 7 **35 to 38, 39, 40. First of all, we looked at the**  
 8 **average of what other countries and sectors were**  
 9 **doing, and that average was around 36 from around**  
 10 **the world, so 40 is clearly 4 dB above the world**  
 11 **average.**  
 12 **Second, we looked at what the national and**  
 13 **international standards on environmental noise**  
 14 **predict, and that's 36 to 39, and then we looked at**  
 15 **equating the percent highly annoyed with traffic**  
 16 **noise at 50 to 55 dB, and to stay the same percent**  
 17 **highly annoyed, a wind farm would have to be at 38,**  
 18 **39 dB. And the fourth was a variation on that using**  
 19 **a new measure, computer -- community tolerance**  
 20 **level, CTL, and that gives you a numerical value in**  
 21 **decibels for the difference between two communities.**  
 22 **And using, again, the worldwide road traffic**  
 23 **compared to the worldwide wind farm data that we**  
 24 **had, you have about a 16 dB offset, which again**

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1 **brings you down to the mid 30s to high 30s.**  
 2 **And so these are four sources that have**  
 3 **nothing to do with wind farms -- well, average on**  
 4 **wind farm levels does, but the other three don't.**  
 5 **And with four separate ways of vetting that and they**  
 6 **all come out with 37, 38, 39, you begin to suspect**  
 7 **something might be correct.**  
 8 Q. Are you familiar with a study that was  
 9 done at Cape Bridgewater in Australia about the  
 10 effects of sound?  
 11 **A. Oh, this is in Cooper?**  
 12 Q. Correct.  
 13 **A. Cooper is a unique study. It's not**  
 14 **acoustically unique, but it's the only study I know**  
 15 **where a wind farm has cooperated and given**  
 16 **operational data, and I think it was in a court**  
 17 **proceeding. We can't make progress when there's no**  
 18 **research being done, and even if you do research,**  
 19 **you can't know what the wind turbines were doing**  
 20 **when you were making your measurements. And Cooper**  
 21 **had the data that showed what was going on. And**  
 22 **there was six people and they were able to -- there**  
 23 **are people that are sensitive to wind turbine noise**  
 24 **and they were able to sense it without seeing or**

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1 **hearing it. In fact, one of the people in the study**  
 2 **was deaf, and she was the best at sensing the**  
 3 **turbines turning on and off. But this kind of**  
 4 **reaction I have to say occurs, but about 90 to 99**  
 5 **percent of the people don't sense this. It's a**  
 6 **small percentage, but there are people that are very**  
 7 **bothered by the sound.**  
 8 Q. So even though it may be a small number of  
 9 people, those people who are bothered are very  
 10 bothered, highly annoyed by it?  
 11 **A. Well, there's a lot of people highly**  
 12 **annoyed.**  
 13 Q. Okay.  
 14 **A. Surprisingly Canada came out with numbers**  
 15 **statistically high.**  
 16 Q. Did you write a paper after that study  
 17 that came out that made some comments about the  
 18 study?  
 19 **A. Well, I wrote a couple of memos or letters**  
 20 **or whatever because people opposed to the study**  
 21 **weren't happy, and I wanted to get out in front and**  
 22 **stave off the attacks and I think I did.**  
 23 Q. Showing you what's marked as SLG Exhibit  
 24 No. 8, that is a document dated February 10, 2015.

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1 That's one of the documents you wrote, correct?  
 2 **A. Yes.**  
 3 Q. And in that document, you make two  
 4 statements I want to highlight. The first one is  
 5 the following. The important point here is that  
 6 something is coming from the wind turbines to affect  
 7 these people and that something increases or  
 8 decreases as the power output of the turbine  
 9 increases or decreases. Denying infrasound as the  
 10 agent accomplishes nothing. It really does not  
 11 matter what the pathway is, whether it is infrasound  
 12 or some new form of rays or electromagnetic field  
 13 coming off the turbine blades. If the turbines are  
 14 the cause, then the wind farm is responsible and  
 15 needs to fix it.  
 16 And then a second statement in that letter  
 17 or paper that you wrote is the following. Wind  
 18 farms will be in the position where they must say  
 19 "We may affect some people." And regulators charged  
 20 with protecting the health and welfare of the  
 21 citizenry will not be able to say they know of no  
 22 adverse effects. Rather, if they choose to support  
 23 the wind farm, they will do so knowing that they may  
 24 not be protecting the health and welfare of all the

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1 citizenry.  
 2 My question to you is do you still agree  
 3 with those statements today?  
 4 **A. I want to explain a little bit the**  
 5 **background.**  
 6 Q. Okay, I'll let you explain in a second,  
 7 but before, I just want to make sure you do still  
 8 agree with those statements today, correct?  
 9 **A. I agree with the statements.**  
 10 Q. Okay, go ahead.  
 11 **A. The wind farm companies when they would go**  
 12 **into communities, at least at that point in time,**  
 13 **were saying there's no possible way for infrasound**  
 14 **or people to sense the wind farm other than through**  
 15 **acoustic means, through the audio, hearing it, and**  
 16 **this said that they were wrong. Then they said no**  
 17 **one in the world can do this, it doesn't exist, and**  
 18 **this study shows that it does exist, and I think**  
 19 **some other places where people are sensing the --**  
 20 **the wind turbines, but they're not hearing it. And**  
 21 **this is -- this is important because if you say no**  
 22 **one can do it anywhere, it just takes one example,**  
 23 **and this study has six examples. And so that's why**  
 24 **that was written that way. And the rest of this was**

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1 just to protect Cooper and not let him be eaten by  
 2 the wolves.  
 3 MR. ARMSTRONG: I would like to have SLG  
 4 Exhibit 8 admitted please.  
 5 CHAIRMAN FINNIGAN: Any objection?  
 6 MS. ANTONIOLLI: I don't have a copy. I  
 7 don't have any objection.  
 8 CHAIRMAN FINNIGAN: We can have that  
 9 admitted. Give you a number here in a minute.  
 10 MR. ARMSTRONG: That's all I have for this  
 11 witness.  
 12 CHAIRMAN FINNIGAN: Questions from the  
 13 board?  
 14 MS. TURNER: Could you talk about the six  
 15 people who this Cooper studied a little bit more  
 16 that you talked about that can detect the wind  
 17 turbines and things going on with that? Here you  
 18 state that the six subjects, three couples from  
 19 different homes, are the participants in this study.  
 20 They don't represent the average resident in the  
 21 vicinity of a wind farm. Rather, they are  
 22 self-selected as being particularly sensitive. Did  
 23 they study others in the area? Was there anything  
 24 in common with these six people as far as locations

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1 to turbines or was there any way of predicting who  
 2 would be able to be sensitive to these phenomenons?  
 3 MR. SCHOMER: There wasn't -- the three  
 4 homes were separated, they weren't near one another,  
 5 and, you know, if I had a -- a big question in my  
 6 mind on it is why were couples only selected? When  
 7 we studied this effect in Shirley, Wisconsin, I  
 8 think I remember distinctly we interviewed a husband  
 9 and wife and young child. We didn't interview the  
 10 young child but -- and the husband was not bothered  
 11 one bit, heard nothing, felt nothing, but the wife  
 12 and child were bothered. And this was a person that  
 13 had moved out of their house and he was paying on  
 14 two mortgages and just wanted to be able to move  
 15 back in and couldn't.  
 16 It was meeting him that made me believe  
 17 that something was happening, and I think we're  
 18 getting closer to understanding what's happening.  
 19 When the -- what Cooper found was that the effect,  
 20 whatever it is, goes with the electrical power being  
 21 generated by the turbine more than the acoustical  
 22 sound. And we know that the pulsing from the blade  
 23 past the rotor was a big problem in the '70s. They  
 24 looked at the rotor being downwind of the pole and

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1 that got people really sick. We know that low  
 2 frequency sound can make people sick, nausea, other  
 3 effects, kind of almost like seasickness, and that's  
 4 well-documented. So what was done with the wind  
 5 turbines is they moved the rotor from downwind to  
 6 upwind so that it wouldn't get the -- be going  
 7 through the wake of the pole in the wind, and that's  
 8 made them much quieter and much better.  
 9 But there's two things going on. One is  
 10 you always -- if so much noise gets a lot of people  
 11 sick, a lot less of the same thing will get a few  
 12 people sick, which is distribution statistics. And  
 13 what I believe is going on is whenever you have --  
 14 when the turbine is putting out power, the more  
 15 power it puts out, the more the blades bend  
 16 backwards towards this pole. They bend in  
 17 proportion to the power being generated. And if you  
 18 think of a pole in water, there's a little bit of an  
 19 upwind wake where the water piles up against the  
 20 pole. There's a big wake going downwind, down  
 21 river, but there's a little bit of a wake going up  
 22 river. The water is piling up against the pole.  
 23 Well, if these wind turbines are putting  
 24 out enough power, they bend so that they get

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1 maybe -- I don't know a real number, but from what  
 2 I've observed, it looks like it's on the order of a  
 3 meter or so from the pole. And it be -- they can  
 4 then be cut into the upwind, up river wake, and all  
 5 of a sudden, you have some wake noise which has been  
 6 shown to bother people already, and that would go  
 7 with the power being generated by that turbine and  
 8 that's what I think is the culprit. And it would be  
 9 easy to test, but we need to know what power is  
 10 being generated at the nearest turbine, but I've not  
 11 seen anybody willing to state it.  
 12 MS. TURNER: I assume other peers reviewed  
 13 this Cooper study also. People often ask was it  
 14 peer reviewed, and obviously you reviewed it you  
 15 said to stave off the wolves. How is it -- how was  
 16 it reviewed by other peers, do you know?  
 17 MR. SCHOMER: What I was trying to -- what  
 18 I wrote here is that it would be discredited by not  
 19 doing things that were not in the scope of work and  
 20 not doing things that the wind farm company had said  
 21 they couldn't do, things like that, that if it  
 22 didn't have a control, it's not a study, that it  
 23 should have a control, and things like that.  
 24 CHAIRMAN FINNIGAN: Mr. Schomer, you said

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1 that you think the state rules are not stringent  
 2 enough is basically what you said. Is there -- and  
 3 it's been a long time. Have you tried to have those  
 4 changed? Have you made a case to the state to see  
 5 if you can make it more stringent?  
 6 **A. We're getting feedback. I can't -- I**  
 7 **couldn't understand all of your --**  
 8 **CHAIRMAN FINNIGAN:** Have you made a case  
 9 with the State of Illinois to see if you can get the  
 10 ruled changed down there, meaning what you're saying  
 11 is that you think the rule is not strict enough.  
 12 Have you made a case with them to try to make that  
 13 change?  
 14 **MR. ARMSTRONG:** You can correct me if I'm  
 15 wrong, but I think his question was have you tried  
 16 to get the noise levels changed? Have you gone to  
 17 Springfield to try and advocate for changing the  
 18 current noise levels that have been in place since  
 19 1968. Is that a fair characterization?  
 20 **CHAIRMAN FINNIGAN:** Yes.  
 21 **MR. SCHOMER:** I have not, this is -- I  
 22 have not.  
 23 **CHAIRMAN FINNIGAN:** I guess I wonder I  
 24 mean why you haven't tried to do that, because if

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1 you start there, it would be easier for us to --  
 2 we're trying to maintain the level that we've been  
 3 given, and it seems like you're trying to come to  
 4 the table wagging the dog. If we had the right  
 5 rule, if it's not right, we can do something about  
 6 it, but we're not -- it seems like we haven't  
 7 started in the right spot.  
 8 **MR. SCHOMER:** Well, they're not that  
 9 different if you enforce the Illinois rules to the  
 10 -- I said that you needed like three sigmas to keep  
 11 things down to once a year. If you add three sigma  
 12 to the design of the average, and sigma is 3 dB,  
 13 you're adding 9 dB of -- to what would be the  
 14 average measurement, the design. And once you add 9  
 15 dB, the numbers that you're getting in Illinois and  
 16 what I'm saying for an average using LEQ are very  
 17 close together. The Illinois rule is about -- well,  
 18 it's couched as 51 dBA. It isn't. It's really --  
 19 if you go to what's the probable spectrum of sources  
 20 and things like that, you may be at 48, and you  
 21 add -- take 9 off of that, you're down at 39.  
 22 They're not far apart, the rules. The problem is  
 23 the enforcement. The way people are thinking is  
 24 that they can just have an average and that's what

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1 the Illinois rules say. That's where the mistake  
 2 is.  
 3 **CHAIRMAN FINNIGAN:** I guess I'm not sure  
 4 that I understand a hundred percent, but it was the  
 5 expert for the applicant told us that they check  
 6 their level, and somebody correct me if I'm wrong,  
 7 but at full load 24 hours a day.  
 8 **MR. SCHOMER:** I'm sorry, I'm not hearing  
 9 you well.  
 10 **CHAIRMAN FINNIGAN:** You want to convey  
 11 that?  
 12 **MR. ARMSTRONG:** Again, correct me if I  
 13 mischaracterize the question. I think he believes  
 14 that the applicant has said that they measured 24  
 15 hours a day.  
 16 **CHAIRMAN FINNIGAN:** At full load.  
 17 **MR. ARMSTRONG:** At full load.  
 18 **MR. SCHOMER:** They measure?  
 19 **MS. TURNER:** They predict.  
 20 **MR. SCHOMER:** Huh?  
 21 **MS. TURNER:** Their predictive model uses  
 22 full load 24 hours a day.  
 23 **MR. SCHOMER:** Yeah, they predict the  
 24 average, but it's the average they're predicting.

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1 And what I'm saying is they didn't meet the average.  
 2 They could absolutely have the average be 40 or 41  
 3 or 47. They could predict the average and meet it.  
 4 It doesn't mean they wouldn't be going over half the  
 5 time or a quarter of the time or whatever because if  
 6 you say I'm going to meet an average of 62, whatever  
 7 the average is, half the time you're over and half  
 8 the time you're under if you're meeting just the  
 9 average. So I fully believe that statement is  
 10 correct.  
 11 **MR. KURITZ:** To what level did you make  
 12 the calculations that their noise expert did his  
 13 calculations and reviewed those to find out that  
 14 they're -- that they're not good measurements or is  
 15 this just based on what you've seen done through the  
 16 years on these farms by the wind farm companies?  
 17 **MR. SCHOMER:** Well, wind farm, California  
 18 Ridge, the one I was involved with, and there we  
 19 were very concerned because we were looking at did  
 20 they ever go over the limit? And they came close,  
 21 but they didn't go over the limit. There was lots  
 22 of trouble, wasn't that many days of good data,  
 23 maybe about three or four weeks out of what was  
 24 turned into a long project, but they never went over

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1 the limit in the time we were there.  
 2 Sound is a very funny thing. I was  
 3 involved with some mines in southern Illinois with  
 4 the noise from the exhaust and inlet for the  
 5 ventilation of the mine, and I had probably been at  
 6 this mine in this area 20 times and never gone over  
 7 the limit. And then we went there three times in a  
 8 row and went over the limit. It's just a matter of  
 9 what the sound is doing, what the atmosphere is  
 10 doing, it affects the sound, and it's like the 30  
 11 year flood, we've been getting a lot of those, and  
 12 you just don't know, whatever it is, you get  
 13 clobbered three times in a row after never  
 14 happening. So what I'm trying to say is thou shall  
 15 never exceed is a silly way to write a regulation,  
 16 but I guess I was silly.  
 17 **MR. KURITZ:** Okay, what I'm saying, what  
 18 I'm asking is, if you're saying that you disagree  
 19 with their study, what do you disagree with? I mean  
 20 how much did you study it? Did you go into their  
 21 mathematics and their calculations and determine  
 22 that 25 percent of them don't meet the regulation or  
 23 exactly what? If their study is not -- we're trying  
 24 to find something that we can count on to make our

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1 decision. You're saying that you don't believe that  
 2 their study is valid. If you're saying that, what  
 3 are you basing that on? Did you take their study  
 4 and tear it apart to come up with this conclusion?  
 5 **MR. SCHOMER:** Well, what I'm trying to say  
 6 is two things, I think. One is that if we're going  
 7 to use the Illinois rules, which we can, it has to  
 8 be recognized that that's a worst case in a year  
 9 regulation and not an average, the Illinois rules.  
 10 And their writing indicates that they're thinking of  
 11 it as an average. They have no margin built in for  
 12 worst case. They don't have the decibel range to  
 13 accommodate a worst case. The worst case is going  
 14 to go over the limit. That's what's the matter with  
 15 that.  
 16 You can use the Illinois rules, but they  
 17 have to be -- the design for the Illinois rules for  
 18 them to meet it over the long-term needs to build in  
 19 a margin of safety. They have not built in a margin  
 20 of safety. It's just the nature of the rule.  
 21 **MS. TURNER:** So you're saying if they were  
 22 to account for worst case, they would use the  
 23 standard deviation in their model, they would use  
 24 the worst case standard deviation in addition --

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1 **MR. SCHOMER:** Yeah, they would add in  
 2 something like three sigma in the design.  
 3 Alternatively, which is what I would recommend, is  
 4 get away from the 60-year-old measurements and  
 5 measure like the rest of the world, with the metric  
 6 of the rest of the world and a reasonable number.  
 7 **MR. KURITZ:** Again, as Chairman Finnigan  
 8 says, that's wonderful, but it doesn't seem as  
 9 though any of those of you who are experts in this  
 10 are out there lobbying for this. Why not?  
 11 **MR. SCHOMER:** Well, some of us have to  
 12 earn money, too, instead of this.  
 13 **MS. TURNER:** In their model, they felt  
 14 that they were conservative in that they were, as  
 15 the chairman said, going at full speed, full  
 16 production with a .5 ground, in other words, that  
 17 half the ground was concrete. They used very  
 18 conservative measures as they ran their model. Is  
 19 there any way we can know -- in other words, they  
 20 didn't use an average situation. They tried to go  
 21 to a conservative worst case scenario type. So  
 22 wouldn't that take up part of the three sig that  
 23 you're talking about because to me if you need to  
 24 add -- if you need to incorporate three sig, then

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1 you're using an average situation, if you need to  
 2 incorporate all three sig, and not worst case  
 3 scenario.  
 4 **MR. SCHOMER:** Now you know some of the  
 5 secrets of noise, and a secret shared is really not  
 6 a secret. When you do the attitudinal surveys, it's  
 7 your yardstick for saying what is too much and not.  
 8 Everybody predicts sound more or less that way. And  
 9 so the attitudinal surveys were done with  
 10 projections all -- allowed in all directions at once  
 11 and with, of course, various other factors. And so  
 12 you'd have a pair, you have the human response and  
 13 the way you measure the sound. And the attitudinal  
 14 surveys, in fact, just anymore any contouring  
 15 exercise, is normally done where it overestimates,  
 16 but the people who judged the sound predicted it  
 17 over, so it balances out because that's the only  
 18 practical way of doing it. You wouldn't be able to  
 19 know every wind turbine, which way it's turning at  
 20 this time, that time, every time, and you couldn't  
 21 handle the data that way. So it's handled as a more  
 22 of a worst case noise, but the annoyance goes with  
 23 the worst case noise.  
 24 **MS. TURNER:** As you were measuring the

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1 annoyance factor with each one of these, you were  
 2 comparing traffic noise to wind noise and saying  
 3 that there's less of a tolerance essentially for  
 4 wind noise, is that a correct summary of what you  
 5 said?  
 6 **MR. SCHOMER:** I'm having so much trouble  
 7 in this room that --  
 8 **MS. TURNER:** Okay, yeah, there's more  
 9 feedback tonight, so I apologize. It's not just  
 10 you. There's something funny going on in this room  
 11 with the sound.  
 12 **MR. SCHOMER:** I think it's the sound  
 13 system.  
 14 **MS. TURNER:** I'll slow it down a little  
 15 bit because it is reverberating. You stated that  
 16 for traffic noise there was a higher decibel level  
 17 before people hit highly annoyed than there was with  
 18 windmill noise, correct?  
 19 **MR. SCHOMER:** Correct.  
 20 **MS. TURNER:** Do you think -- are you able  
 21 to isolate that it's actually the noise that is  
 22 annoying people with windmills or do they take in  
 23 other considerations, you know, like they don't like  
 24 looking at them or do you take in other annoying

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1 factors with windmills when you're measuring  
 2 annoyance?  
 3 **MR. SCHOMER:** In the Canadian study, they  
 4 found two or three factors that went together and  
 5 you can't separate them, sound being one of them.  
 6 [Cell phone.]  
 7 **MR. SCHOMER:** Not mine.  
 8 **MS. TURNER:** We're going to see how many  
 9 different sounds we can get here tonight.  
 10 **MR. SCHOMER:** And there are factors that  
 11 go with it. My personal feeling is that if the wind  
 12 turbines are bothering people and noise is part of  
 13 it and other things are part of it, you should  
 14 probably fix what's bothering the people and not say  
 15 because there's three things we won't do anything,  
 16 which is not logical to me.  
 17 **MR. DEAN:** One of those things was sound.  
 18 What are the other two issues? Could you tell us  
 19 what those are in the Canadian study? You mentioned  
 20 there was three issues in the Canadian study.  
 21 **MR. SCHOMER:** Oh, I'm trying to remember.  
 22 **MR. DEAN:** Thank you.  
 23 **MR. SCHOMER:** I could say flashing lights  
 24 and that might be right, I could say the size of the

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1 thing, that might be right, but I'm not sure. I'd  
 2 have to look.  
 3 **MR. DEAN:** Okay. No, I understand, thank  
 4 you.  
 5 **MS. TURNER:** Are you aware of any wind  
 6 farms or wind projects that have been designed using  
 7 the three sigma allowance that you're talking about?  
 8 **MR. SCHOMER:** There's been lots of wind  
 9 farms around the world designed to 40 and lower.  
 10 **MS. TURNER:** 40 and lower using the 24  
 11 hours number that you were talking about --  
 12 **MR. SCHOMER:** Yeah.  
 13 **MS. TURNER:** -- not what we have here,  
 14 correct?  
 15 **MR. SCHOMER:** What's been designed to the  
 16 Illinois numbers are only in Illinois.  
 17 **MS. TURNER:** And are you saying, are the  
 18 Illinois numbers always in favor of -- how do they  
 19 compare to your 24-hour? I mean is it -- is noise  
 20 going to be less stringent? I mean 24, you said  
 21 most of the world goes with the 24-hour whatever  
 22 number you're talking about.  
 23 **MR. SCHOMER:** Yeah.  
 24 **MS. TURNER:** LEQ. On average, how does

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1 that compare to Illinois, to what we have here?  
 2 **MR. SCHOMER:** Well, as I was saying, if  
 3 you allow -- if you take this average and say what  
 4 will it never exceed, you have to add about some  
 5 number of decibels, three sigma, and once you add  
 6 the three sigma, you're designing for about the same  
 7 thing. You take the three sigma and you try to  
 8 convert the octave bands to probable A levels and  
 9 you wave your wand by your hat and that's about how  
 10 you do it.  
 11 **MS. TURNER:** It's that wand waving that  
 12 gives me ulcers.  
 13 **MR. BANGERT:** Dr. Schomer, when I was  
 14 younger, and I'll tell you just a quick story, I'll  
 15 make it quick, my mother had to figure out what was  
 16 causing her annoyance when it came to me not  
 17 listening, so she had my hearing tested. My hearing  
 18 was fine, I just happened to be an adolescent, but  
 19 she -- there's -- testing for hearing is used to  
 20 measure hearing loss or the level of hearing.  
 21 Hearing tests are used that way. X rays you use to  
 22 look for fractures in bones.  
 23 In your discussion you brought up more  
 24 than once the 10 percent, if that's the correct

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1 number that I heard, of the individuals that are  
 2 annoyed, whether it's mildly annoyed or severely  
 3 annoyed, by these sounds or lack of. You said even  
 4 a deaf women could sense them. Is there a test that  
 5 exists or any peer reviewed information by any other  
 6 organization that exists that we could seek to  
 7 establish a baseline for a limit of annoyance or  
 8 some litmus test that, you know, we could cite or  
 9 seek.

10 **MR. SCHOMER:** There's no test that I know  
 11 of that would say how annoyed a person would be.  
 12 There are -- there are some things that tend to go  
 13 with it, but certain people are noise sensitive, and  
 14 I think there is even some tests for that. It's not  
 15 an area I've ever gotten into directly, but there is  
 16 about 30 percent of the population that is more  
 17 sensitive to noise than the rest and they tend to be  
 18 people that are highly annoyed then. But I don't  
 19 recall any detail of the test, of what the test  
 20 would be. It's a semantic test of some kind.

21 **MR. BANGERT:** Thank you.

22 **MR. KURITZ:** In your acoustic experience,  
 23 does that also include coming up with methods of  
 24 soundproofing?

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1 **MR. SCHOMER:** Yes.

2 **MR. KURITZ:** Okay. I've heard people say  
 3 that this -- that these sounds can't be soundproofed  
 4 out, but yet for years we've always heard about  
 5 soundproof booths, so one or the other has to be  
 6 incorrect I assume.

7 **MR. SCHOMER:** Well, I answered yes to the  
 8 question have I worked on soundproofing of things.  
 9 Yes. The question is soundproofing of buildings  
 10 might be the right way to go, but I don't think so.  
 11 It seems to me that if we knew better what the  
 12 sources were of sound, what the sound was at the  
 13 turbine that was bothering people, you could design  
 14 the turbine better and eliminate the problem. For  
 15 example, if I'm right about the blades bending back  
 16 to be close to the stator, maybe you stiffen the  
 17 blades so they don't bend as far. I mean I can't --  
 18 I don't know that that's correct or not, but it --  
 19 that's the way I would approach it if I had the  
 20 control to approach it.

21 **MR. KURITZ:** And I can agree with you on  
 22 that, but if you're sitting here in our position and  
 23 you have wind turbines that meet current designs and  
 24 you're looking -- and you've got a resident with a

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1 problem, are there ways to mitigate that I guess?  
 2 **MR. SCHOMER:** The answer is it would be  
 3 very difficult to do it on a house.  
 4 **MR. KURITZ:** Be very difficult, but can it  
 5 be done?  
 6 **MR. SCHOMER:** Can you build -- I think the  
 7 question you're asking is can you build a structure  
 8 people could live in that would shield from the  
 9 sound? The answer to that would be yes. But would  
 10 you want to pay for those and would you want to live  
 11 in them? Probably be good for tornadoes and other  
 12 things, too, so they would have some other material  
 13 benefits, but in general you wouldn't want -- you  
 14 wouldn't want to do it that way.

15 **MS. TAYLOR:** Mr. Schomer, you seem to be  
 16 implying that no more wind farms should be approved  
 17 in Illinois until Illinois changes its regulations  
 18 to meet all these issues that have been brought up.

19 **MR. SCHOMER:** No.

20 **MS. TAYLOR:** That doesn't seem to be a  
 21 very feasible approach to me. I'm just -- what are  
 22 you -- what are you suggesting this board should do  
 23 with this information?  
 24 **MR. SCHOMER:** I'm suggesting one or two

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1 avenues. Either you stick with the Illinois rules,  
 2 but you take the whole rule and not half of it,  
 3 because first of all there's no authority to take  
 4 half of the board's rules. It has to be measured in  
 5 accordance with the board's rules. That's not  
 6 anything that I'm saying. That's what the Pollution  
 7 Control Board writes. It has to be measured this  
 8 way. So any problem -- all I'm saying is you can't  
 9 take half a rule. And that's not just me  
 10 personally. I'm saying that's what the whole system  
 11 says. And so I'm saying take the whole Illinois  
 12 rule or take the 24-hour LEQ. One is a thou shall  
 13 not exceed; the other is the average should be. And  
 14 those are the only two kinds of rules that exist,  
 15 and I'm saying you can do one or the other, but you  
 16 can't do half of one.

17 **MS. TAYLOR:** Okay, thank you.

18 **MR. KURITZ:** And you're saying that the 40  
 19 decibels on the 24 LEQ is more stringent than the  
 20 Illinois Pollution Control standards as they sit  
 21 right now, because you said that we could only make  
 22 them more stringent, we couldn't make an alternative  
 23 to that.

24 **MR. SCHOMER:** I think that they're about

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1 equal as I've said. If you take the Illinois rule  
 2 that says thou shall not exceed, and the way you get  
 3 to the thou shall not exceed is adding three  
 4 standard deviations to the desired level, they come  
 5 out about the same.  
 6 **MR. KURITZ:** Does that show up in these  
 7 calculation sheets that we have? Would it show up  
 8 there or would it be -- could it be built into their  
 9 model and we just don't know that?  
 10 **MR. SCHOMER:** No, it's something that has  
 11 to be specifically done. You have to say that I'm  
 12 going to have a three sigma margin of safety so that  
 13 we never exceed it, and that was the idea, that  
 14 three sigma would be like once in a year, two sigma  
 15 is once in a month, one sigma is once in a week.  
 16 **MS. TURNER:** To your knowledge, with all  
 17 the wind farms that we have in Illinois and using --  
 18 that have used this standard, have there been a lot  
 19 of complaints? I know that you have said you aren't  
 20 necessarily asking Illinois Pollution Control Board  
 21 to change anything because you have to make money,  
 22 but is there a movement afoot, is there a reason --  
 23 we have a lot of existing ones. Has it become a  
 24 movement to do such a thing?

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1 **MR. SCHOMER:** Yeah, let me talk a little  
 2 bit about complaints because people expect  
 3 complaints and annoyance to go together, and I did  
 4 too until we did the study. I worked for 30 years  
 5 mainly heading the Corps of Engineers noise program,  
 6 and we were interested in things that go bang in the  
 7 night. Armor, artillery, demolition, helicopters  
 8 were the kinds of things I worked on. We collected  
 9 all the noise complaints Army-wide for a year and  
 10 were very surprised at the results.  
 11 You have two kinds of complainers: one  
 12 that just complains every time they hear it because  
 13 fighting the noise maker has turned into an  
 14 avocation, and the second is people complain about  
 15 the unusual, the out of the ordinary, but things  
 16 that are everyday they don't complain about. In  
 17 fact, the one way to reduce complaints is increase  
 18 the noise so that the unusual becomes usual, and  
 19 they go in exactly the opposite direction. You  
 20 increase the noise, you increase the annoyance, you  
 21 decrease the complaints. I didn't expect that  
 22 result, but that -- and it makes sense.  
 23 People -- in fact, there's in earlier  
 24 studies in the '60s and even back to the '50s, about

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1 30 percent of the people felt it was not patriotic  
 2 to complain. The Air Force had slogans: the sound  
 3 you hear is the sound of freedom. And so there's  
 4 all kinds of things that go into this, but the  
 5 simple answer is the Canadian study showed the same  
 6 thing. There was very low complaint rates, very  
 7 high annoyance. And it's the same thing. People  
 8 that are living there, the wind turbines are there,  
 9 they don't really seriously think that their  
 10 complaint is going to move a wind turbine, so only  
 11 the people that want to hit their head against the  
 12 wall complain.  
 13 **MS. TURNER:** Would you say that's the case  
 14 with things beyond wind turbines? I mean you stated  
 15 with other noise that that's the case.  
 16 **MR. SCHOMER:** Yeah, the other --  
 17 **MS. TURNER:** I mean that would be the case  
 18 with smells or with anything else, is that -- would  
 19 you think that would be true, that in general that's  
 20 the way we feel about annoyance?  
 21 **MR. SCHOMER:** Well, I think smell might be  
 22 a more local thing. There's stuff that comes from  
 23 chickens that really will wake you up.  
 24 **CHAIRMAN FINNIGAN:** Any other questions?

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1 Questions from staff?  
 2 **MR. DICK:** No.  
 3 **CHAIRMAN FINNIGAN:** Does the applicant  
 4 have questions?  
 5 **MS. ANTONIOLLI:** I do.  
 6 **QUESTIONS BY:**  
 7 **MS. ANTONIOLLI:**  
 8 Q. Dr. Schomer, I'm Amy Antonioli, Schiff  
 9 Hardin, attorney for EDP Renewables.  
 10 **A. Hello.**  
 11 Q. Hi. I want to start with asking you a  
 12 couple of questions about the DNV report, the sound  
 13 report, and you had a chance to review that,  
 14 correct?  
 15 **A. I've reviewed it, but I won't be ready to**  
 16 **quote it for you.**  
 17 Q. Well, we've been talking a little bit  
 18 about it tonight, we talked about some of the  
 19 assumptions that went into the DNV report, and so  
 20 you would be aware that EDPR selected this model of  
 21 turbine with a 99 meter hub, but the DNV report  
 22 modelled a hub height of 82 meters, so a lower hub  
 23 height.  
 24 **A. The height you model at turns out not to**

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1 **make any difference in the 9613.**  
 2 Q. And can you explain why that would be the  
 3 case?  
 4 **A. Huh?**  
 5 Q. Can you explain why that would be the  
 6 case?  
 7 **A. Because the model 9613 was not designed to**  
 8 **handle high altitude sources, so it just treats**  
 9 **anything from about seven feet up the same.**  
 10 Q. And are you familiar with the Vestas 3.6  
 11 model turbine?  
 12 **A. I don't understand what your question is.**  
 13 Q. I just wondered if you're familiar with  
 14 the model, the Vestas model 3.6 turbine that's been  
 15 selected for the EDPR Bright Stalk site?  
 16 **A. I'm not familiar with any of the turbines**  
 17 **directly.**  
 18 Q. No, you're not familiar with the  
 19 specifications for that model?  
 20 **A. Other than what's published for noise in**  
 21 **the report, I wouldn't know a thing about it.**  
 22 Q. Okay. And are you familiar with in the  
 23 report DNV assumed a ground factor that assumes half  
 24 the site is concrete or ice?

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1 **A. I was aware of that. I wouldn't recommend**  
 2 **doing that. I would put 1 in if I was running it.**  
 3 Q. Would you say that would be a conservative  
 4 approach?  
 5 **A. I think that as I said -- well, I have --**  
 6 **do we have that as an exhibit?**  
 7 **MR. ARMSTRONG:** I don't, but if she wants  
 8 to show it to you, she can.  
 9 **A. All right. If I were doing the contours,**  
 10 **if I were doing this here, I would predict exactly**  
 11 **as I can, remembering that you can't do directional**  
 12 **things because you never have the data. If you did,**  
 13 **it would drown a big computer. But the difference**  
 14 **between zero and 1 in the running of the 9613,**  
 15 **that's the difference between soft and hard ground,**  
 16 **and I think you're talking about half. It's 3 dB is**  
 17 **the difference between zero and 1, so hard ground is**  
 18 **3 dB louder than soft ground, and the intermediate**  
 19 **is 1 and a half dB.**  
 20 Q. Okay, so considering that temperatures  
 21 change year-round and considering the area that  
 22 we're in in McLean County, would you say that that  
 23 assumption is conservative?  
 24 **A. It's a little bit conservative is what I**

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1 **was getting to.**  
 2 Q. Okay. And the report also assumes a wind  
 3 speed of 20 miles per second.  
 4 **A. 20 what?**  
 5 Q. 20 meters per second.  
 6 **A. Okay.**  
 7 Q. Would you agree that's a conservative  
 8 approach?  
 9 **A. I have not complained about the prediction**  
 10 **in terms of how 9613 is run, but my issue is is that**  
 11 **if you have a thou shall not exceed, you don't get**  
 12 **thou shall not exceed if you predict the average.**  
 13 Q. But factoring in all these conservative  
 14 approaches, would you agree that the model still ran  
 15 and showed a very unrealistically conservative case?  
 16 **A. I would agree only that it's a little bit**  
 17 **conservative because you're dealing with 1 and a**  
 18 **half dB where three sigma is 9 dB and they don't**  
 19 **balance each other out.**  
 20 Q. So a little bit of a conservative approach  
 21 is what you said. Would that provide a margin of  
 22 safety?  
 23 **A. Not enough to really impact.**  
 24 Q. Okay. And have you done your own

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1 modelling study for the Bright Stalk project?  
 2 **A. No.**  
 3 Q. Okay. Are you -- you are aware that over,  
 4 just over a year ago, the McLean County board  
 5 adopted IPCB standards by reference into its  
 6 ordinance, correct?  
 7 **A. I read that, yes.**  
 8 Q. Okay. And you suggested that the maximum  
 9 dBA for a wind farm should be about 40, correct?  
 10 **A. Well, let's get the units right. We're**  
 11 **talking about octave band or A-weighted level?**  
 12 Q. I said dBA.  
 13 **A. Yeah.**  
 14 Q. Is that right? Is that what you're  
 15 suggesting?  
 16 **A. 40 dBA 24-hour LEQ.**  
 17 Q. Okay, thanks for clarifying that for me.  
 18 But that's not the standard that the Pollution  
 19 Control Board adopted, correct?  
 20 **A. The Pollution Control Board adopted the**  
 21 **octave band thou shall not exceed, no trespassing of**  
 22 **the noise on my property rule.**  
 23 Q. Okay. And you testified that that was  
 24 adopted about 60 years ago, right?

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1 **A. Yeah.**  
 2 Q. Okay. So when the board amended the noise  
 3 regulations in the time frame of 2003 to 2006, did  
 4 you participate in that rule making?  
 5 **A. I can't recall. I don't think so, but I'm**  
 6 **not sure.**  
 7 Q. Do you recall filing a public comment in  
 8 that rule making?  
 9 **A. No.**  
 10 Q. No.  
 11 **A. Doesn't mean I didn't do it, but I don't**  
 12 **recall it.**  
 13 Q. I happen to have one in my folder, but --  
 14 so you didn't in your public comment, though, ask  
 15 for those regulations, those numerical noise  
 16 standards to be changed at that time, did you?  
 17 **A. No, I haven't asked that at any time.**  
 18 Q. Okay, just checking. And your suggested  
 19 dBA standard of 40, do you know if any wind farm in  
 20 Illinois meets that standard?  
 21 **A. I have no idea.**  
 22 Q. Okay. So can we turn to A Review of This  
 23 Study and Where It's Leading? That's the article  
 24 that was admitted into the record as SLG Exhibit 8.

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1 **A. Say that again.**  
 2 Q. Can we look at the article that we -- that  
 3 you brought with you tonight?  
 4 **A. Oh.**  
 5 Q. So down in this paragraph near the end,  
 6 that paragraph says: This study is not in any way a  
 7 sample of the general population nor is it in any  
 8 way a sample of the general population in the  
 9 vicinity of the wind farms. Correct?  
 10 **A. You've got to help me out. I don't know**  
 11 **where you're reading.**  
 12 Q. I'm going to take you there right now.  
 13 Right here [indicating].  
 14 **A. This study is not in any way a sample of**  
 15 **the general population nor is it in any way -- nor**  
 16 **is it -- I'm having trouble reading here. Nor is it**  
 17 **in any way a sample. There's something written**  
 18 **wrong or something.**  
 19 Q. That's okay, we can move on. So this  
 20 study, and I don't have the study in front of me but  
 21 I have your article about this study, was -- at any  
 22 time during this study, was data collected by  
 23 turning off the wind turbines and then collecting  
 24 data at that time and then turning the wind turbines

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1 back on and collecting data?  
 2 **A. I don't recall.**  
 3 Q. So you wouldn't know whether that approach  
 4 was taken to quantify the contribution of sound from  
 5 the wind turbines?  
 6 **A. I don't recall that.**  
 7 Q. Okay. In this Cape Bridgewater Wind Farm,  
 8 do you know if the model was similar to a Vestas 3.6  
 9 turbine?  
 10 **A. Say that again.**  
 11 Q. Just asking if this Cape Bridgewater Wind  
 12 Farm study was done with a model similar to the  
 13 Vestas 3.6 turbine, and I ask that because that's  
 14 the turbine that's selected for Bright Stalk.  
 15 **A. I would suspect that they're not that**  
 16 **similar because that was a much earlier time. It**  
 17 **would be a smaller turbine.**  
 18 Q. Okay. And would you agree that perhaps  
 19 the topography in Australia where this study was  
 20 done could be different than the topography in  
 21 McLean County where we are now?  
 22 **A. I suppose that the topography in southern**  
 23 **Illinois might be different than it is in McLean**  
 24 **County.**

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1 Q. True, I would agree with that. And do you  
 2 know -- and do you think that might affect how sound  
 3 travels?  
 4 **A. Certainly might.**  
 5 Q. Okay. And you mentioned -- you testified  
 6 earlier that according to the Illinois Pollution  
 7 Control Board regulations that noise can be measured  
 8 at any point on the receiving property.  
 9 **A. Correct.**  
 10 Q. And do you agree also that a single  
 11 property can be classified differently depending on  
 12 where you are and the use of the property?  
 13 **A. I don't think I understand.**  
 14 Q. Well, let me give you an example. So if  
 15 we have a 94 acre parcel and it's zoned  
 16 agriculturally and used agriculturally but there's  
 17 also a residence on that property, part of that  
 18 property could be classified as Class C land and  
 19 part of the property could be classified as Class A  
 20 land.  
 21 **A. Yes.**  
 22 Q. Okay.  
 23 **MS. ANTONIOLLI:** I think that's all I  
 24 have.

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1       **CHAIRMAN FINNIGAN:** Are there any other  
2 questions of this witness?  
3       **MR. HANEY:** I wasn't sure if --  
4       **CHAIRMAN FINNIGAN:** You will not be able  
5 to ask questions because this is your witness.  
6       **MR. ARMSTRONG:** I don't have any more  
7 questions, but I do have another exhibit I would  
8 like to submit. It's a memorandum of law that's not  
9 prepared by Dr. Schomer obviously, it's prepared by  
10 us, but it addresses the law regarding measurement  
11 practices and locations. I'll give a copy to  
12 counsel.  
13       **MR. TAYLOR:** Too late?  
14       **CHAIRMAN FINNIGAN:** We don't know if  
15 you're on the list, so --  
16       **MR. TAYLOR:** No, I'm not.  
17       **CHAIRMAN FINNIGAN:** Okay, you can come,  
18 you can ask questions.  
19       **MR. TAYLOR:** Travis Taylor, 28686 North  
20 3050 East Road, Chenoa, Illinois.  
21       **QUESTIONS BY**  
22       **MR. TAYLOR:**  
23       Q. Do you think in any way the Illinois  
24 regulations as they stand actually benefit the wind

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1 companies as opposed to the residents, as opposed to  
2 using the other standard that you referenced  
3 tonight?  
4       **A. I think that what I understand is that the**  
5 **Illinois rules as written by the board are not being**  
6 **followed completely, and that if they were followed**  
7 **completely, they -- you would perceive it to be**  
8 **fairer. I'm saying the problem is in how people**  
9 **have interpreted or misinterpreted the rules and not**  
10 **with the rules themselves.**  
11       Q. Do you think that by doing the sound  
12 studies at the house as opposed to the property  
13 lines or off-the-house measurements, then, it is  
14 wrong of the board to do it based off the house as  
15 opposed to the property line?  
16       **A. The rules say you can measure anywhere on**  
17 **the property as long as you're 25 feet from the**  
18 **source. That's all they permit. There doesn't have**  
19 **to be a house on the property.**  
20       Q. Are you aware of any studies or have  
21 participated in any studies on animals' effects in  
22 particular or just on humans that you referenced to  
23 that annoyance level?  
24       **A. On animals?**

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1       Q. Yeah.  
2       **A. Nothing that I know of.**  
3       Q. I had a question early on, but after  
4 hearing more about your past history, I'm not sure  
5 it's going to be as relevant. I'm going to shoot  
6 for it just to see. If you lived in a house that  
7 was near the legal limit on the noise in your yard,  
8 would it disrupt you personally?  
9       **A. Would it bother me personally? Probably.**  
10 **I live in Champaign in a quiet area relatively**  
11 **speaking, but it's probably 50 dBA, which is most --**  
12 **most cities are not as quiet as if you live in a**  
13 **rural community. And part of what's in the national**  
14 **and international standards is that quiet rural**  
15 **communities have a 10 dB offset because of the**  
16 **expectations for peace and quiet. That's actually**  
17 **been studied and reported on. And expectations**  
18 **affect people's attitudes towards noise, and**  
19 **communities would be just as upset if you were**  
20 **moving a busy interstate into through the downtown**  
21 **of -- Chenoa was one of the towns I heard, and if**  
22 **you put an O'Hare Airport next to Chenoa, they'd be**  
23 **unhappy, or even a lot less than O'Hare Airport.**  
24       **MR. TAYLOR:** I think I'm happy. That was

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1 my questions, thank you.  
2       **CHAIRMAN FINNIGAN:** Any other questions?  
3 All right, I think we're in the clear. We're going  
4 to take a ten minute break. Thank you.  
5       (Recess at 7:33 p.m. to 7:46 p.m.)  
6       **CHAIRMAN FINNIGAN:** We're going to come  
7 back to order.  
8       **MS. ANTONIOLLI:** So before we resume, I  
9 move to submit two revised reports into the record.  
10 These are revisions to Appendix 9, the sound impact  
11 assessment, and Appendix 14, which is the shadow  
12 flicker report. And if you'll notice, the only  
13 corrections made were to the location of receptor  
14 50, and to Appendix B of the shadow flicker report,  
15 that corrected a typo that we discussed previously  
16 in testimony.  
17       **CHAIRMAN FINNIGAN:** We'll have those  
18 entered.  
19       **MS. ANTONIOLLI:** Thank you.  
20       **MR. ARMSTRONG:** The objectors next witness  
21 is Dr. Jerry Punch. Dr. Punch, would you please  
22 repeat your name and spell it for the court  
23 reporter?  
24       **MR. PUNCH:** Jerry Punch, J-E-R-R-Y,

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1 P-U-N-C-H. My home address 4469 Satinwood Drive,  
 2 Satinwood is one word spelled S-A-T-I-N-W-O-O-D,  
 3 Okemos, O-K-E-M-O-S, Michigan, 48864.  
 4 **CHAIRMAN FINNIGAN:** Would you like to be  
 5 sworn in?  
 6 **MR. PUNCH:** Yes.  
 7 (Mr. Jerry Punch was duly sworn.)  
 8 **QUESTIONS BY**  
 9 **MR. ARMSTRONG:**  
 10 Q. Dr. Punch, would you please tell us your  
 11 current occupation?  
 12 **A. I'm an audiologist by training and**  
 13 **education. I am retired formally from Michigan**  
 14 **State University as of 2011. I have been a**  
 15 **clinical -- want me to go into my background?**  
 16 Q. Yeah, tell the board a little bit about  
 17 your professional background.  
 18 **A. It's varied. I've been a clinical**  
 19 **audiologist, a supervising audiologist training**  
 20 **students. I've been an administrator, a teacher, a**  
 21 **researcher, so I've done a lot of things in several**  
 22 **different settings, academic settings, a**  
 23 **professional association setting and then in one**  
 24 **industry setting. I've published a number of**

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1 **papers, peer reviewed papers many of them, on**  
 2 **hearing, hearing disorders, hearing aids, with**  
 3 **apologies to Dr. Schomer they can't be better.**  
 4 **I've -- I was chair of the Department of**  
 5 **Communicative Sciences and Disorders for six years**  
 6 **at Michigan State University.**  
 7 **I became interested, if I may go into**  
 8 **this, why I'm interested in this area, I became**  
 9 **interested in about 19 -- I mean, sorry, 2009 or so**  
 10 **when asked to interview a family who was sleeping in**  
 11 **a motel at night, had been in their home, but they**  
 12 **were getting out of their house to sleep at night**  
 13 **because of nearby wind turbines. I couldn't believe**  
 14 **there was really a problem with wind turbines at**  
 15 **that point. I didn't experience a lot of perception**  
 16 **myself, I didn't -- I stayed around the property for**  
 17 **an afternoon, but I wasn't there very long. I could**  
 18 **sense maybe a little queasiness but nothing really**  
 19 **uncomfortable. I came back thinking, to my office**  
 20 **thinking I really would like to know more about**  
 21 **this. After reading a book by Paul Gipe, G-I-P-E,**  
 22 **which was pretty positive about wind turbines, I**  
 23 **thought it didn't make sense compared to all the**  
 24 **things I had begun to read on the internet about**

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1 **complaints. So I started to do more research.**  
 2 **In short, I'll try to make this brief, I**  
 3 **did a paper, a review paper for audiologists, in a**  
 4 **monthly magazine essentially, Audiology Today. I**  
 5 **was asked after that point to chair a technical work**  
 6 **group to revisit the Michigan onshore wind turbine**  
 7 **siting guidelines which at that time were allowing a**  
 8 **level of 55 dBA LEQ as sort of the norm acceptable**  
 9 **level. We were about ready to present our final**  
 10 **report after about 10 drafts after a year and a**  
 11 **half, and we were told that we were no longer needed**  
 12 **after a FOI request.**  
 13 Q. Let me interrupt you. If I can just get  
 14 some more of your educational background before we  
 15 get into some other history. Can you give us your  
 16 educational background, degrees you have and the  
 17 institutions they're from?  
 18 **A. Sorry, yes. I did have those on a slide,**  
 19 **but we'll go into it now. I have an undergraduate**  
 20 **degree in psychology from Wake Forest University, I**  
 21 **have a master's in hearing and speech sciences from**  
 22 **Vanderbilt University, and a Ph.D. in audiology from**  
 23 **Northwestern University.**  
 24 Q. And you're a professor of audiology at

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1 Michigan State University?  
 2 **A. Professor emeritus, retired.**  
 3 Q. Okay. How long were you a professor at  
 4 Michigan State?  
 5 **A. For 27 years. I'd say the last half of my**  
 6 **career.**  
 7 Q. And part of your career involves studying  
 8 the effects of sound on individuals' health --  
 9 **A. Yes.**  
 10 Q. -- and well-being?  
 11 **A. Yes. I've had a longstanding interest, I**  
 12 **haven't always been able to pursue it, in community**  
 13 **noise in general.**  
 14 **MR. ARMSTRONG:** I'll offer Dr. Punch as an  
 15 expert on audiology and the effects of sound and  
 16 noise on -- and for purposes of annoyance and health  
 17 of individuals.  
 18 **CHAIRMAN FINNIGAN:** Does the applicant  
 19 have a problem with that?  
 20 **MS. ANTONIOLLI:** The only objection I  
 21 would have is that he has not identified himself as  
 22 a medical professional, so his qualifications would  
 23 be limited to be able to be testifying about  
 24 annoyance and acoustics -- or I'm sorry, audiology.

1 **MR. ARMSTRONG:** Well, that's not -- it's  
2 not correct that he can't testify about annoyance  
3 and audiology because he doesn't have a medical  
4 degree.

5 **MS. ANTONIOLLI:** No, I said that he could  
6 be limited to testify about those things but not  
7 about health effects.

8 **MR. ARMSTRONG:** No, I disagree. He can  
9 certainly talk about health effects as an  
10 audiologist for more than 30 years. He just  
11 testified that's part of what he studied and part of  
12 what his profession was over the last 30 years. And  
13 if I may, I think it's clear that his testimony will  
14 assist the board in making its evaluation of whether  
15 it finds there are adverse health effects and, if  
16 so, what they are and to what extent they occur.

17 **MS. ANTONIOLLI:** He has not identified  
18 himself as a medical professional.

19 **MR. PUNCH:** May I say a few words about  
20 it?

21 **MR. ARMSTRONG:** I'll have Dr. Punch add  
22 some additional information.

23 **A. I think universally audiology is**  
24 **considered a healthcare field. Medical doctors,**

1 Q. And do they set other standards as well?

2 **A. Well, it's the American Speech-Language-**  
3 **Hearing Association sets standards for speech**  
4 **language pathologists as well as audiologists.**

5 **MR. ARMSTRONG:** Again, I offer Mr. Punch  
6 as an expert on the subjects that I mentioned.

7 **MS. ANTONIOLLI:** And I would say that  
8 based on his qualifications he couldn't offer a  
9 medical opinion.

10 **MR. ARMSTRONG:** We're not proposing that  
11 he offer a medical opinion.

12 **MS. ANTONIOLLI:** Okay, what's the ruling  
13 of the board?

14 **MS. WALLEY:** Dr. Punch, did you say that  
15 you worked -- you did clinical trials as an  
16 audiologist?

17 **MR. PUNCH:** Clinical trials is a  
18 particular kind of research. I've done a lot of  
19 clinical audiological research. Most of my research  
20 has been clinical as opposed to basic hearing  
21 research or basic science.

22 **MS. WALLEY:** I guess what I'm getting at  
23 is did you have any particular practice where you  
24 treated individuals is what I'm getting at. I

1 **including ears, nose and throat physicians and**  
2 **practitioners and others, considered us allied**  
3 **health essentially. We don't really like to think**  
4 **of ourselves that way so much, but we do provide a**  
5 **lot of information for them to use in diagnosis and**  
6 **so forth, but we do treat people with hearing loss.**  
7 **People with hearing loss have a lot of health issues**  
8 **themselves. By virtue of having a hearing**  
9 **impairment, particularly severe hearing loss or**  
10 **profound hearing loss, they tend not to find jobs**  
11 **like the rest of us, they tend to be more depressed,**  
12 **they tend to spend more days in hospitals, they're**  
13 **sicker, and having a significant -- I mean having a**  
14 **hearing loss does impact their overall health and**  
15 **well-being as defined by the World Health**  
16 **Organization. I do not cast myself by the way as a**  
17 **medical expert. I cast myself as a health expert.**

18 Q. And do you have any certifications from  
19 any bodies, and if so, can you tell us what the  
20 bodies are and what the certification is?

21 **A. Since 1967 to this date, I'm certified by**  
22 **the American Speech-Language-Hearing Association as**  
23 **a -- in audiology. They set the standards for**  
24 **practice in our field including the code of ethics.**

1 understand that you have a dearth -- a wealth of  
2 knowledge when it comes to research, but did you  
3 treat anyone?

4 **MR. PUNCH:** Oh, yes, the first at least  
5 half of my career I was a clinical audiologist, and  
6 supervising students, I worked directly with  
7 patients.

8 **MS. WALLEY:** Okay.

9 **MS. ANTONIOLLI:** And that would be  
10 specific to hearing loss; is that correct?

11 **MR. ARMSTRONG:** Hang on a second. We're  
12 not during cross-examination here. I'm laying a  
13 foundation for him I think at this point. I think,  
14 you know, if she wants to cross-examine him on his  
15 qualifications during their cross-examination, then  
16 that's fair, but I don't think it's fair for her to  
17 cross-examine here about, you know, how many,  
18 whether he -- beyond or in addition to what the  
19 questions were by counsel for the board about his  
20 experience in clinical audiology.

21 **CHAIRMAN FINNIGAN:** I think what we've  
22 decided, we will see if the board will go with me on  
23 this, but that he's an expert in hearing loss and  
24 hearing, but not a medical doctor.

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1       **MR. ARMSTRONG:** Yeah, I mean, as I said,  
 2 we're not offering him as a medical doctor.  
 3       **CHAIRMAN FINNIGAN:** It's a fine line here,  
 4 so watch it.  
 5       **MR. ARMSTRONG:** Well, Dr. Punch, do you  
 6 want to go ahead and start your presentation?  
 7       **MR. PUNCH:** May I add one word? I've been  
 8 in a number of hearings and heard medical doctors  
 9 and I've seen what they write. Medical doctors  
 10 basically mainly do medical practice and they don't  
 11 tend now to know a lot about wind turbines and wind  
 12 turbine noise. Steven Rauch is one in Massachusetts  
 13 Eye and Ear Infirmary who has treated patients, has  
 14 seen patients who complain of wind turbine noise,  
 15 but there aren't too many experts I don't think  
 16 you'll find who are medical -- medically trained who  
 17 know a lot about this area.  
 18       My, quote, expertise I think comes from my  
 19 hopefully unbiased look at the literature and length  
 20 of review that I think is an exhibit.  
 21       **MS. ANTONIOLLI:** Start the clock.  
 22       **MR. PUNCH:** Okay, I'll get into my  
 23 presentation now if that's okay. Are we ready?  
 24       I was just going to -- I'll spend a few

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1 minutes, just a short time, on these issues. I've  
 2 already talked about my professional background I  
 3 think. Relevant noise regulations and guidelines,  
 4 you people on the board know these guidelines very  
 5 well I think, define the difference between  
 6 nuisance, annoyance and adverse health effects.  
 7 I'll spend most of my time talking about the  
 8 evidence that wind turbines generate noise that  
 9 causes or is related to adverse health effects.  
 10 There are a number of slides, three or four I think,  
 11 that contain references from the literature. These  
 12 references, about 98, 99 percent of them, are in  
 13 this one article that I have footnoted on this slide  
 14 by Punch and James 2016, and my understanding is  
 15 that it's an exhibit; is that correct?  
 16       **MR. ARMSTRONG:** We have it marked SLG  
 17 Exhibit No. 19, which is an article titled Wind  
 18 Turbine Noise and Human Health: A Four-Decade  
 19 History of Evidence as prepared by Dr. Punch and  
 20 Richard James. We'll offer that into evidence.  
 21       **MR. PUNCH:** About my background, the one  
 22 thing I didn't say --  
 23       **CHAIRMAN FINNIGAN:** Do you have any  
 24 objections to that?

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1       **MS. ANTONIOLLI:** I do not.  
 2       **CHAIRMAN FINNIGAN:** We can do that then.  
 3       **MR. PUNCH:** The one thing I didn't mention  
 4 in terms of my background is I've been a legal  
 5 consultant as an expert witness on health matters in  
 6 a variety of cases in multiple states and currently  
 7 in Ontario. You people know, people in this room I  
 8 think know that generally nuisance is defined by the  
 9 dictionary as anything that is unreasonable or  
 10 unwarranted or unlawful in terms of interfering with  
 11 the enjoyment of people's property, other people's  
 12 property, or it can be an act of omission that  
 13 obstructs or damages or inconveniences the right of  
 14 the community.  
 15       Annoyance of course relates to -- it's  
 16 very subjective. Of course, nuisance is subjective  
 17 as well, but annoyance, there's a lot of variations  
 18 as I think Dr. Schomer alluded to, refers to an  
 19 unpleasant mental state. It can be -- it can  
 20 involve irritation, being frustrated, distracted or  
 21 angry. It can lead to a deterioration of health  
 22 under certain circumstances, health and well-being,  
 23 and even in some cases, a few cases, to violence.  
 24       Health is defined by the World Health

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1 Organization, or the WHO, as -- I think it's been  
 2 defined since the late 1940s by that organization as  
 3 a state of complete physical, mental and social  
 4 well-being and not merely the absence of infirmity  
 5 or disease. A number of scientific studies of  
 6 course have shown wind turbine noise to be annoying  
 7 to a substantial number of people. And the WHO  
 8 considers annoyance to lead to a deterioration of  
 9 health, particularly high levels of noise.  
 10       There's the EPA which had the Noise  
 11 Control Act and the Quiet Communities Act of the  
 12 1970s. Those acts have not been updated since.  
 13 They did talk about -- they do talk about exposure  
 14 to high and constant noise levels leading to  
 15 numerous adverse health effects, stress, things like  
 16 high blood pressure, sleep disruption and loss of  
 17 productivity. They really did concentrate I think a  
 18 lot on speech interference and hearing loss. We're  
 19 not really talking very much about those here  
 20 because to date there have been no major concerns  
 21 that wind turbine noise causes hearing loss or that  
 22 it practically speaking interferes with people's  
 23 conversations.  
 24       ISO and ANSI standards recommend a 15 dB

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1 penalty for new noise sources that are located in  
 2 quiet rural communities. They recommend reducing  
 3 the allowable limits for noise that contain a  
 4 significant low frequency content. These standards  
 5 are not directly applicable. They weren't at least  
 6 developed to address wind turbine noise directly.  
 7 Dr. Schomer and Hessler jointly have recommended  
 8 permissible levels of 40 dBA LEQ or less for wind  
 9 turbines to protect people from substantial amounts  
 10 of annoyance and health problems.

11 The World Health Organization says that  
 12 anything under 30 dBA has no substantial biological  
 13 effects. I'm not saying -- I'm not a medical doctor  
 14 as we said, but the World Health Organization has  
 15 access to physicians all over the world who say  
 16 these things. Between 30 and 40 decibels, dBA,  
 17 these are long-term averages basically, sleep is  
 18 affected, people are awakened, they're aroused more,  
 19 they are aroused significantly by noises in this  
 20 range of sound levels. And they say that vulnerable  
 21 groups are more susceptible. Vulnerable groups are  
 22 classified as children, young children, older adults  
 23 and people with significant acute -- I'm sorry,  
 24 chronic health conditions.

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1 So they're typically concerned about low  
 2 frequency noise, but again the World Health  
 3 Organization is not concerned or hasn't been  
 4 concerned yet with wind turbine noise per se, so  
 5 even their work has not been directed towards wind  
 6 turbine noise specifically. There is the thought  
 7 that because wind turbine noise seems to contain  
 8 more low frequencies or infrasound than most other  
 9 industrial noises and transportation noises and so  
 10 forth, that the limits they put out in tables like  
 11 this possibly should be even lower. I read that in  
 12 a number of places.

13 Long-term effects. Long-term averages  
 14 are -- long-term average noise effects are related  
 15 to cardiovascular problems according to the WHO. I  
 16 think Dr. Schomer touched a little bit on this when  
 17 he said that the IPCB regulations were maximum  
 18 levels. The World Health Organization says that  
 19 short-term sounds that they specify as LAmax are  
 20 linked to sleep disturbance and a variety of adverse  
 21 health conditions. We wake up when we hear -- when  
 22 we are exposed to levels that exceed 40 dBA max  
 23 measured outside, usually at the facade of the  
 24 residence, meaning typically fairly near a bedroom

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1 window.  
 2 The F in that parenthesis stands for fast.  
 3 There's fast and slow settings on sound level  
 4 meters, so fast is recommended because a lot of the  
 5 bursts in wind turbine noise are very transient,  
 6 very short pulses, and these are what we think are  
 7 disturbing people most, and you don't pick that up  
 8 with a slow response on your sound level meter, but  
 9 rather you have to use fast to integrate the sound  
 10 over a very short period of time of 125 milliseconds  
 11 I believe.

12 So where the noise consists of -- and this  
 13 is a quote. "Where the noise consists of a small  
 14 number of discrete events, the A-weighted maximum  
 15 level, or the LAmax, will be a better indicator of  
 16 the disturbance to sleep and other activities."  
 17 Berglund who writes for the World Health  
 18 Organization is the primary author of that document  
 19 in 1999. That's a quote from his group. The World  
 20 Health Organization 2009 Nighttime Noise Guidelines  
 21 for Europe mentions LAmax 93 times in that document.  
 22 The term is essentially ignored by the wind  
 23 industry.  
 24 And getting to the IPCB regulations, you

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1 all are probably more familiar with these  
 2 regulations, although I've read them, than I am.  
 3 Noise pollution, again the emission of sound that  
 4 unreasonably interferes with the enjoyment of life  
 5 and other lawful business or activities. So nobody  
 6 should emit sounds beyond the boundaries of his  
 7 property essentially that is disturbing or a  
 8 nuisance to other people.

9 The IPCB standard or regulation tends to  
 10 be, I think as I read it, deals only with annoyance  
 11 not really health effects directly and, as everybody  
 12 knows and has been discussed tonight, emphasizes  
 13 control of octave band levels from 31.5 hertz to  
 14 8,000 hertz. Schomer has stated that the numeric  
 15 limits of the IPCB regs were never designed for  
 16 or -- and are not protective from in terms of  
 17 protecting people from wind turbine noise. The IPCB  
 18 regs do not consider infrasound which is a major  
 19 component of wind turbine noise and one of the  
 20 problems with noise that creates the resultant  
 21 effects that we see today.

22 I asked the question: How do octave band  
 23 noise levels equate to dBA levels? We can, Dr. --  
 24 again, referring back to what Dr. Schomer said

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1 tonight, if you do an equivalent dBA calculation,  
 2 it's just math. For the IPCB permissible octave  
 3 band noise limits, you get an equivalent dBA of 51  
 4 dB, okay? Using -- I've just been looking into this  
 5 recently, but using octave band levels at 1,000  
 6 hertz in DNV's Table 5-1, I noticed that several, at  
 7 least several receptors can readily be identified  
 8 where we will have -- you will have dBA levels  
 9 exceeding 40 dBA. Certainly these levels are higher  
 10 than the 38 to 40 dBA limits that Dr. Schomer and  
 11 others have recommended.

12 Industrial wind turbines, in fact, produce  
 13 pulsed, amplitude-modulated sounds that are  
 14 unpredictable and uncontrollable by receptors,  
 15 sometimes tonal in nature, and that disturbs sleep.  
 16 And we know from the literature that  
 17 amplitude-modulated and impulsive noises are more  
 18 readily perceived and more annoying than sounds that  
 19 are constant. Tonal sounds are certainly more  
 20 annoying than sounds containing energy across a  
 21 broad band of frequencies, like shhhh, that type of  
 22 noise. In fact, many physicians I think recommend  
 23 for tinnitus, for example, shhhh sound. White noise  
 24 is one sound that can put you to sleep.

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1 So we don't mind -- if they're not too  
 2 loud, we don't mind constant level noises as much as  
 3 intermittent and tonal. We don't mind broadband  
 4 noises as much as we mind tonal sounds, pure tones.  
 5 Sounds that are unpredictable and uncontrollable  
 6 increase noise annoyance. We know that nighttime  
 7 noise is, of course, more annoying than daytime  
 8 noise. Rural noise is more annoying than urban  
 9 noise.

10 There's a lot of models of the  
 11 relationship between annoyance and health. What I'm  
 12 trying to say here is that all these models show  
 13 that there's either direct or indirect relationship  
 14 between the two. Noise can directly cause -- I  
 15 don't know if I can use this. I can't really use my  
 16 -- it won't shine. My laser won't shine on there.

17 But there's a direct line from noise to  
 18 health, and some people are directly affected in  
 19 terms of health: burnout, sleepiness, depression,  
 20 those kind of things. Noise can cause annoyance  
 21 which indirectly relates to health effects or  
 22 health -- adverse health effects. Noise can produce  
 23 physiologically -- physically measurable outcomes,  
 24 like cortisol levels, which indicates stress, and

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1 that could also lead to health problems. Actually I  
 2 should say it's correlated to health problems, even  
 3 though one is self report and one is physiological.

4 There's that thing at the top called  
 5 effort-reward, which I would call risk-reward  
 6 imbalance. If people say -- if people think the  
 7 risks outweigh the benefits, then they may suffer  
 8 health problems. That's probably what's behind some  
 9 of the Swedish and other studies that show that  
 10 annoyance is, in fact, probably related to -- lost  
 11 my train of thought, sorry.

12 In other words, people who don't want  
 13 turbines -- or no, people who make money from  
 14 turbines tend not to be annoyed when it comes to  
 15 tests of their annoyance. When they're asked to  
 16 rate annoyance, they don't rate it annoying as much  
 17 as people who are not benefitting financially. So  
 18 that's part of the risk-reward factor and I think  
 19 that is in play, it's in the literature, and it's  
 20 part of the consequences of the situation.

21 A lot of studies show that annoyance is --  
 22 has a link, direct or indirect, to low frequency  
 23 noise. Those references are in our 2006 paper, all  
 24 except the Cooper and Chan paper 2017. It came out

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1 just recently obviously.

2 This is a study from Pedersen and  
 3 colleagues in Sweden where he compared annoyance at  
 4 various dBA noise levels. Looking at the 35 to 40  
 5 and 40 to 45 dBA levels, the darkened and the white  
 6 boxes are Dutch, that is a Netherlands study, and  
 7 the open or white boxes are I believe the Swedish  
 8 study. So if you look at the numbers on the right,  
 9 9 to 30 percent of people are annoyed, I'm sorry,  
 10 that's extremely -- I'm reading that wrong. The top  
 11 one I believe is annoyed and the bottom one is very  
 12 annoyed. These two areas, these two categories are  
 13 mutually exclusive, so you can actually add them  
 14 together. From 6 to 30 -- sorry, from 15 to 50  
 15 percent of people are annoyed depending on the level  
 16 30 to 45 dBA.

17 Again, Dr. Schomer alluded to the Health  
 18 Canada study which does consider extreme or high  
 19 annoyance to be an adverse health effect. If you  
 20 look at people exposed to 35 to 40 dBA, about 10  
 21 percent will be highly annoyed. If you look at 40  
 22 to 46 I believe it is dBA, they have 13.7 percent in  
 23 their study indicated high annoyance. So that means  
 24 that the proposed project would expose at least one

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1 in ten people in the project area who are exposed to  
 2 levels above 35 dBA to high annoyance and some  
 3 adverse health effects.  
 4 Some receptors will be -- exposed to  
 5 levels above 40 dBA would obviously experience even  
 6 higher levels of annoyance we think. And I think  
 7 that agrees with what Dr. Schomer was saying, the  
 8 higher the noise level, the higher the annoyance.  
 9 The World Health Organization has talked about some  
 10 direct and indirect effects of noise in general,  
 11 particularly low frequency noise, concentrated more  
 12 on low frequency noise because low frequency noises  
 13 are not as easy to attenuate as high frequency  
 14 noises. Walls and barriers don't do much to  
 15 attenuate noise. We were talking about that I think  
 16 with Dr. Schomer earlier.  
 17 There were other indirect effects like  
 18 social handicap, decreased performance on the job,  
 19 reduced productivity, absenteeism in school,  
 20 increased prescription medicine use, increased use  
 21 of prescription medicines, and accidents  
 22 particularly on the job when people are exposed to  
 23 noise.  
 24 The common complaints are listed here in

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1 terms of those that we see that are reported in the  
 2 literature and are self-reported by people who live  
 3 near wind turbines. Sleep disturbance by far is the  
 4 most common, most frequent complaint. Things like  
 5 headaches and dizziness, ear pressure, ear pain.  
 6 Some symptoms under number 3 I would classify as  
 7 largely vestibular, which is our inner ear,  
 8 includes -- our ear is not just for hearing. Our  
 9 inner ear is also our balance or equilibrium system,  
 10 so we maintain our balance partly through that  
 11 mechanism of the inner ear.  
 12 Motion sickness. If you think about water  
 13 in a vessel sitting on a table, I have seen water  
 14 ripple when turbines were running, and that's  
 15 analogous -- to me, an analogy between a real-life  
 16 situation that you can visually see and the inner  
 17 ear because the inner ear works by the relative  
 18 motion of fluids flowing around hair-like  
 19 structures. So this is really like when heads turn,  
 20 when the body accelerates or decelerates, when the  
 21 body goes up and down elevator style, for example,  
 22 or forward and backward on a walking sidewalk in the  
 23 airport, you get -- you can get motion sickness.  
 24 And the problem with these kinds of situations is

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1 that people don't really see what's happening. It's  
 2 like if you were standing on a -- the deck of a  
 3 ferry boat looking down at your feet, you don't seem  
 4 to be moving because everything seems stationary,  
 5 but your inner ear is sensing that movement, and  
 6 those two are in conflict.  
 7 You also have -- in addition to your  
 8 visual sense and your ear, your auditory sense or  
 9 your vestibular sense, you also have muscular sense,  
 10 proprioceptive muscular, your muscles feel movement,  
 11 right? So those three things together make up --  
 12 give us our ability to maintain position in space  
 13 and a sense of where we are and if we're moving or  
 14 not. If they're out of sync, then we get confused  
 15 and we might experience motion sickness. And motion  
 16 sickness happens with very, very low frequencies.  
 17 We think it's related to infrasound mainly around  
 18 anywhere from .2 to .7. So, okay, you can see the  
 19 rest of those on the slide.  
 20 Again, the most well-documented symptom is  
 21 sleep disturbance. There are these studies, I think  
 22 I counted about 30 of them in our larger paper, that  
 23 talked about sleep disturbance. Quality of life,  
 24 another factor that's affected. World Health

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1 Organization talks about it quite a bit. The  
 2 Nissenbaum, et al., 2012 study talks about it in a  
 3 very experimental kind of way. And again, I'll let  
 4 you read this slide.  
 5 This is the National Institutes of Health  
 6 talk about adverse effects of sleep disturbance on  
 7 us as humans, including weight gain, learning  
 8 capacity is affected, heart health, et cetera.  
 9 In addition to the Cape Bridgewater study,  
 10 Cooper has done another study recently where he was  
 11 able to create legitimate infrasound in a laboratory  
 12 setting and he was able to conduct an experiment.  
 13 And so he took nine subjects this time instead of  
 14 six, nine sensitive people. He was able to show  
 15 that infrasound in fact causes or is related to  
 16 these sensations that he talked about in the Cape  
 17 Bridgewater study.  
 18 The middle bullet is the most important.  
 19 This is essentially from that Cooper-Chan study. He  
 20 presented it in New Orleans in 2017. Wind turbine  
 21 sound emissions consisting of dynamically modulated  
 22 pressure pulsations at infrasonic rates synchronized  
 23 to the blade pass frequency, the rate of the blades  
 24 turning in relation to the tower, have been shown to

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1 cause sensations and other adverse health effects  
 2 under controlled, visually blinded laboratory  
 3 conditions. And he says that alternative  
 4 explanations such as the well-known placebo effect  
 5 are no longer acceptable as counter arguments  
 6 because direct cause and effect has been  
 7 established.

8 **MR. ARMSTRONG:** Can I interrupt you for a  
 9 second? Can you open up this computer? I want to  
 10 ask you some questions before you get to your  
 11 conclusions.

12 **CHAIRMAN FINNIGAN:** We're going to give  
 13 you another five minutes. We got kind of started  
 14 late, so Darrell put eight minutes on there.

15 **MR. ARMSTRONG:** Okay, that will help.  
 16 I'll let him finish then and we'll get to the other  
 17 issues. I didn't want to run out of time. Thank  
 18 you.

19 **MR. PUNCH:** So we know that things that we  
 20 can't see, touch, taste or smell can definitely hurt  
 21 us. Why then can't we believe that things we can't  
 22 hear can also hurt us? Cooper's research, as I just  
 23 said, has shown under controlled laboratory  
 24 conditions that wind turbine noise can cause

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1 identifiable sensations and other adverse effects in  
 2 some people. Again, these are sensitive listeners,  
 3 sensitive people. These effects are consistent with  
 4 complaints of people who live near wind turbine  
 5 projects similar to the one proposed by the Bright  
 6 Stalk Wind Farm project.

7 And in conclusion, I would say that what I  
 8 tried to say here is that annoyance can lead to  
 9 health issues based on the World Health Organization  
 10 definition of health; that there are a lot of  
 11 anecdotal and a lot of peer reviewed scientific  
 12 studies that demonstrate both direct and indirect  
 13 associations between audible and inaudible wind  
 14 turbine noise and a variety of adverse health  
 15 effects. Infrasound at levels below the levels at  
 16 which we can hear them has been shown to relate  
 17 directly to negative sensations and adverse health  
 18 effects. Therefore, what we can't hear can hurt us.  
 19 Can hurt us.

20 The IPCB regulations fail to account for  
 21 infrasound given their lack of attention to  
 22 frequencies below 31.5 hertz. Also those  
 23 regulations don't adequately protect the health and  
 24 well-being of community residents, whether they're

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1 participating or nonparticipating residents. And a  
 2 preliminary analysis of the octave band levels  
 3 modelled by DNV for this project will undoubtedly  
 4 expose a number of McLean County residents to  
 5 extreme annoyance and adverse health effects.

6 **QUESTIONS BY**  
 7 **MR. ARMSTRONG:**

8 Q. Dr. Punch, you mentioned during your  
 9 presentation about the ability to do a calculation  
 10 to see what the dBA level is when you have the  
 11 frequency and dB level at a receptor. Do you recall  
 12 that?

13 **A. I did, I do.**

14 Q. Did you do that for a sampling of the  
 15 receptors using the information that was provided by  
 16 the applicant in this case?

17 **A. I did. I believe it's Table 5-1.**

18 Q. There are other --

19 **A. I don't know what the numbers are.**

20 Q. Okay.

21 **A. It's a long list of receptors.**

22 Q. So you did a calculation where you  
 23 converted the applicant's dB level in its sound  
 24 study to a dBA level.

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1 **A. Yes.**

2 Q. Is that what you did?

3 **A. Yes, there's a formula by which you can**  
 4 **convert.**

5 Q. And --

6 **A. It's a dB formula.**

7 Q. It's a dB formula?

8 **A. It is.**

9 Q. Okay. And you said that you did, you did  
 10 a sampling of the table. You did not do the entire  
 11 table?

12 **A. No, it takes a long time to do this and I**  
 13 **just --**

14 **MS. ANTONIOLLI:** I'm going to object to  
 15 his testimony about doing calculations to come up  
 16 with model results if he's not qualified to do that.  
 17 I'm assuming he's not qualified to do that.

18 Q. Do you know how to make -- do you know how  
 19 to do the dB calculation that you just testified to?

20 **A. Are you asking me?**

21 Q. Yes.

22 **A. Yes.**

23 Q. How do you do it?

24 **A. There's a formula, it's a mathematical**

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1 **formula, it's dB, I deal with dB a lot, I've done**  
 2 **this before and --**  
 3 Q. Can you generally explain what the formula  
 4 is in non --  
 5 **A. Yeah.**  
 6 Q. And the trends or is the actual  
 7 calculation --  
 8 **A. Well --**  
 9 **MS. ANTONIOLLI:** I object to him  
 10 testifying about this information. He has not  
 11 qualified himself as an acoustician. He's an  
 12 audiologist.  
 13 **MR. ARMSTRONG:** I think, you know, he's in  
 14 the process of explaining why he knows how to do it  
 15 and how he knows how to do it.  
 16 **MS. ANTONIOLLI:** Are you claiming that  
 17 he's an expert in this area?  
 18 **MR. ARMSTRONG:** I'm claiming that he can  
 19 do the calculation.  
 20 **CHAIRMAN FINNIGAN:** We're going to let him  
 21 do it. We can put the emphasis on it we want to.  
 22 We can decide whether we want to use the evidence or  
 23 not.  
 24 **MS. ANTONIOLLI:** Okay, understood.

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1 **BY MR. ARMSTRONG:**  
 2 Q. All right. Are you able to in relatively  
 3 simple terms explain the mathematical calculation or  
 4 is it a complicated --  
 5 **A. Well, I think I --**  
 6 Q. -- mathematical calculation?  
 7 **A. Well, the simple -- I mean the basis for**  
 8 **this conversion capability is that dBA subtracts a**  
 9 **number of decibels from frequencies below 1,000**  
 10 **hertz, and it does subtract it a little bit from**  
 11 **frequencies above 1,000. There's no subtraction or**  
 12 **correction at 1,000 hertz. And you can look at**  
 13 **1,000 hertz and pretty well predict roughly, albeit**  
 14 **roughly, you can predict the relative dBA level**  
 15 **that's going to come out of that conversion applying**  
 16 **that formula, dB formula.**  
 17 Q. And that's a generally accepted  
 18 calculation?  
 19 **A. Yes, it is.**  
 20 Q. And you did that calculation with a  
 21 sampling of these receptors, using the information  
 22 for the receptors that was provided in the sound  
 23 study by the applicant?  
 24 **A. Yes.**

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1 Q. Did you find any receptors that, that --  
 2 let me start with this. Did you find any receptors  
 3 that exceeded 40 dBA after you did the calculation?  
 4 **A. I did.**  
 5 Q. About how many of the receptors did you  
 6 examine as part of your sampling?  
 7 **A. I looked at 1,000 hertz, I looked also at**  
 8 **500, but I thought -- I found looking at 1,000 was**  
 9 **sufficient.**  
 10 Q. How many, how many receptors did you  
 11 examine?  
 12 **A. Oh, did I calculate?**  
 13 Q. Yes, that you calculated.  
 14 **A. Yes, okay, I think 14.**  
 15 Q. Okay. And of those 14, did you find any  
 16 that exceeded 40 dBA?  
 17 **A. I did.**  
 18 Q. Okay. And did you find any that exceeded  
 19 38 dBA?  
 20 **A. Yes.**  
 21 Q. Okay. How many did you find that exceeded  
 22 40 dBA?  
 23 **A. I think I did a count of the number that**  
 24 **exceeded 38 because I -- I learned looking at a**

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1 **number of these across the total number, that any**  
 2 **receptor that receives 38 dB at 1,000 hertz, the**  
 3 **octave band of 1,000 hertz, if you add those**  
 4 **together and do the conversion, those will show a**  
 5 **dBA value exceeding 40 dBA.**  
 6 Q. How many receptors did you find in your  
 7 sampling that exceeded 38 dBA?  
 8 **A. 42 I think.**  
 9 Q. Okay. And do you recall how many you  
 10 found that exceeded 40 in your sample?  
 11 **A. No, I didn't do that separately. As I**  
 12 **said, this takes a lot of time.**  
 13 Q. Okay. And you said you didn't do this  
 14 calculation with every single receptor.  
 15 **A. That's right.**  
 16 Q. And of the ones that you did sample, do  
 17 you recall what the highest dBA was that you found?  
 18 **A. I have it here.**  
 19 Q. What are you looking at there?  
 20 **A. I'm looking at a table of the ones that I**  
 21 **calculated. I think there are 14 in that list --**  
 22 Q. Okay. Now --  
 23 **A. -- that exceeded.**  
 24 Q. Hang on. I want you to review the table

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1 but not say anything until I ask you a question,  
 2 okay? Go ahead and review the table.  
 3 **A. It's a three column table.**  
 4 Q. Just review it, don't say anything about  
 5 it, tell me when you're done.  
 6 **A. Just review the layout of the table?**  
 7 **Describe it?**  
 8 Q. Well, no. Would reviewing the table  
 9 refresh your recollection about how many, about what  
 10 the highest dBA level was you found from your  
 11 sampling?  
 12 **A. Oh, yes, I see.**  
 13 Q. Okay, now --  
 14 **MS. ANTONIOLLI:** I object. They're  
 15 talking about a table we don't have in front of us.  
 16 We don't know what calculations he's done or haven't  
 17 seen them.  
 18 **MR. ARMSTRONG:** I -- he explained the  
 19 calculations that he did just now. I'm -- the  
 20 table, the reason she doesn't have it is because we  
 21 didn't have it either. I have it and I'm happy to  
 22 provide it to her and I'm happy to provide it as an  
 23 exhibit. I just don't have it in printed fashion  
 24 right now. I can do it and bring it next time and

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1 I'm happy to email it to her if she wants.  
 2 **CHAIRMAN FINNIGAN:** I don't think we can  
 3 talk about it until she's seen a copy of it.  
 4 **MR. ARMSTRONG:** Well, and on top of that,  
 5 any document can be used to refresh a recollection,  
 6 refresh the recollection of a witness. Doesn't have  
 7 to be admissible, doesn't have to be disclosed.  
 8 **CHAIRMAN FINNIGAN:** She should have a  
 9 chance to prepare, see what she's working against,  
 10 so --  
 11 **MR. ARMSTRONG:** I'll be happy to show it  
 12 to her and she can --  
 13 **CHAIRMAN FINNIGAN:** She should have it.  
 14 **MR. ARMSTRONG:** I'll be happy to show it  
 15 to her and she can cross-examine. And I'll note for  
 16 the record there were several exhibits that were  
 17 handed to me earlier during these proceedings after  
 18 the witness testified, so --  
 19 **CHAIRMAN FINNIGAN:** Okay.  
 20 **MS. ANTONIOLLI:** Well, you don't --  
 21 correct me if I'm wrong, but you don't have it even  
 22 available today?  
 23 **MR. ARMSTRONG:** You can look. It's right  
 24 here on the computer.

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1 **MS. ANTONIOLLI:** Okay, well --  
 2 **MR. ARMSTRONG:** I'll give you the computer  
 3 and you can look at it.  
 4 **MS. ANTONIOLLI:** What I'm saying is, first  
 5 of all, we've established that he's not an  
 6 acoustician. He's talking about calculations he's  
 7 done to show compliance with some standard that he's  
 8 talking about, and now we don't have those  
 9 calculations even to look at.  
 10 **MR. ARMSTRONG:** Well, first of all, the  
 11 board already permitted him, they already decided to  
 12 permit him to testify about this. The calculations  
 13 are available on a spreadsheet.  
 14 **MS. ANTONIOLLI:** Okay, I object to this  
 15 line of questioning, but I'll let the board decide  
 16 what to do.  
 17 **CHAIRMAN FINNIGAN:** If we would take just  
 18 a little recess, could you email that to the, to  
 19 our -- and then she would have it?  
 20 **MR. ARMSTRONG:** Do you have WiFi here that  
 21 it could be emailed? Sure, we'll be happy to do  
 22 that.  
 23 **CHAIRMAN FINNIGAN:** She's pretty smart.  
 24 **MR. ARMSTRONG:** It's not her I'm worried

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1 about. It's us on this side of the table.  
 2 **MS. WALLEY:** Mr. Armstrong, we'll just go  
 3 get a thumb drive and he can just upload it on there  
 4 and I can give it to Ms. Antonioli.  
 5 (Pause at 8:37 p.m. to 8:45 p.m.)  
 6 **CHAIRMAN FINNIGAN:** Did you get that?  
 7 **MS. ANTONIOLLI:** I did, thank you.  
 8 **CHAIRMAN FINNIGAN:** So far she hasn't  
 9 objected, so I guess you can go ahead.  
 10 **MS. ANTONIOLLI:** Go ahead.  
 11 **MR. ARMSTRONG:** You have the file, the two  
 12 files?  
 13 **MS. ANTONIOLLI:** Yes.  
 14 **BY MR. ARMSTRONG:**  
 15 Q. Okay, I'm not sure I remember where we  
 16 left off, Dr. Punch, but you were explaining how you  
 17 performed the calculation to convert from dB to dBA  
 18 and then you had done that using the applicant's  
 19 tables, right?  
 20 **A. Right.**  
 21 Q. And you found -- you didn't do that for  
 22 every receptor.  
 23 **A. No, just a sample.**  
 24 Q. Okay. And the sample that you did was

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1 approximately how many receptors, do you recall?  
 2 **A. I think it was 14.**  
 3 Q. Okay.  
 4 **A. All of which showed --**  
 5 Q. Hang on.  
 6 **A. Okay.**  
 7 Q. And do you have your -- do you have your  
 8 table? Not your spreadsheet but your table.  
 9 **A. No, I just shut my computer down, I don't**  
 10 **have it. You told me to shut it down.**  
 11 Q. Turn it back on please.  
 12 **CHAIRMAN FINNIGAN:** Stop the clock,  
 13 Darrell.  
 14 **A. It's an older computer. Here it comes.**  
 15 Q. All right, you did a sampling, as we said  
 16 several times, of approximately 14 or 15 receptors?  
 17 **A. Correct.**  
 18 Q. And what -- how many of those receptors  
 19 were, that you sampled were above 38 dBA?  
 20 **A. 14 I believe. 14 I believe.**  
 21 Q. So all 14 that are shown up here on your  
 22 table, correct?  
 23 **A. Yes.**  
 24 Q. And did you sample other receptors -- or

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1 strike that, let me ask you this. How many on the  
 2 table are above 40 dBA?  
 3 **A. All of them.**  
 4 Q. All right, what's the highest dBA of your  
 5 sample that's on the table?  
 6 **A. I believe it's 44.7.**  
 7 Q. Okay.  
 8 **A. Receptor 1.**  
 9 Q. And having done the sample of this  
 10 approximately 14 receptors, do you believe that had  
 11 you done every single receptor that you would have  
 12 found additional receptors that exceed 40 dBA?  
 13 **A. I do believe that, yes.**  
 14 Q. And do you believe that you would -- if  
 15 you had done the entire table, you would find  
 16 additional receptors that exceed 38 dBA?  
 17 **A. Oh, yes, there are definitely more.**  
 18 Q. Okay. And again, just tell us what's the  
 19 significance of a dBA figure that is over 38. Why  
 20 is that important?  
 21 **A. If, if at 1,000 hertz you see -- the**  
 22 **octave band of 1,000 hertz you see something around**  
 23 **37 or 38 or higher, almost inevitably your dBA is**  
 24 **going to be equivalent to something over 40 dBA.**

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1 Q. How does a dBA over 38 relate to  
 2 annoyance?  
 3 **A. Well, as I showed in that one slide I**  
 4 **believe from Health Canada, annoyance is going to be**  
 5 **pretty high among people over -- exposed to over 35,**  
 6 **certainly over 40 dB.**  
 7 Q. And the higher the dBA, generally the  
 8 higher levels of --  
 9 **A. That's what the literature has shown, the**  
 10 **research has shown.**  
 11 Q. And you agree with that research and  
 12 literature?  
 13 **A. Yes.**  
 14 Q. Okay.  
 15 **CHAIRMAN FINNIGAN:** Are you about at the  
 16 end of it?  
 17 **MR. ARMSTRONG:** Yeah, I was just going  
 18 to -- I was just going to say I apologize for not  
 19 having paper copies of these today. I would like to  
 20 offer these, the table, as an exhibit. And the  
 21 applicant's counsel has been provided with the  
 22 spreadsheet as well that is the backup, so I'd like  
 23 to offer that. And I'd also like to offer SLG  
 24 Exhibit 17 which is Dr. Punch's c.v., SLG Exhibit 18

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1 which is a paper copy of the PowerPoint presentation  
 2 that he presented tonight, and then lastly --  
 3 actually I think I already admitted the paper that  
 4 he wrote, I believe. Is that over there?  
 5 **MR. DICK:** SLG 19.  
 6 **MR. ARMSTRONG:** Okay, okay. So in  
 7 addition to that, SLG 18 which is the PowerPoint,  
 8 SLG 17 which is the c.v., and I'll have to mark his  
 9 other documents later.  
 10 **MS. WALLEY:** Do you have copies of 17 and  
 11 18 to hand out?  
 12 **MR. ARMSTRONG:** Yes, I do.  
 13 **MS. WALLEY:** Okay, have they been given to  
 14 Ms. Antonioli?  
 15 **MR. ARMSTRONG:** Yes.  
 16 **CHAIRMAN FINNIGAN:** Any objections to  
 17 those?  
 18 **MS. ANTONIOLLI:** No.  
 19 **CHAIRMAN FINNIGAN:** We can -- do you have  
 20 any objection to the PowerPoint?  
 21 **MS. ANTONIOLLI:** No.  
 22 **CHAIRMAN FINNIGAN:** What was emailed to  
 23 you or on the spreadsheet, you're okay with that?  
 24 **MS. ANTONIOLLI:** No objection.

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1           **CHAIRMAN FINNIGAN:** Okay, we'll admit  
2 these.  
3           **MR. ARMSTRONG:** And I just want to make  
4 sure I understand what -- number one, what has been  
5 admitted and what has not been admitted, and if the  
6 items that are objected to are not admitted, I'd  
7 like to know what the objection is so I can respond.  
8           **MS. ANTONIOLLI:** I'm not objecting to any  
9 of the exhibits that you just -- did you move them  
10 into the record yet?  
11           **MR. ARMSTRONG:** I did and the chair said  
12 that they will be admitted. I assumed he was  
13 referring to SLG 18 which was the PowerPoint as well  
14 as 17 which is the c.v., but maybe we should get  
15 clarification on that.  
16           **CHAIRMAN FINNIGAN:** Everything we've got  
17 we admitted. The only thing that she has an  
18 objection to in my understanding is the thumb drive  
19 spreadsheet, whatever you're going to call it; is  
20 that right?  
21           **MR. DEAN:** She didn't object to it. She  
22 said no.  
23           **CHAIRMAN FINNIGAN:** I thought she did.  
24           **MS. WALLEY:** Is this what you gave me?

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1           **MR. ARMSTRONG:** Yeah, that's what --  
2           **MS. WALLEY:** Is that the spreadsheet?  
3           **MR. ARMSTRONG:** That's the paper copy.  
4 She has the electronic copy.  
5           **MS. WALLEY:** We've got copies. Do you  
6 want to go ahead and admit them now?  
7           **MR. ARMSTRONG:** Yes.  
8           **MS. WALLEY:** What do you want to mark them  
9 as?  
10           **MS. TAYLOR:** We're short one on 17.  
11           **MS. ANTONIOLLI:** Can I take a copy?  
12           **MS. WALLEY:** We'll be passing them out.  
13 Mr. Armstrong, how do you want these marked?  
14           **MR. ARMSTRONG:** The table marked as SLG  
15 Exhibit No. 22 and the spreadsheet as SLG Exhibit  
16 No. 23.  
17           **MS. WALLEY:** Okay.  
18           **CHAIRMAN FINNIGAN:** Those are fine, those  
19 are -- we've got them already. Those are admitted.  
20           **MR. ARMSTRONG:** Thank you.  
21           **MR. DEAN:** Mr. Chairman, was that the  
22 thumb drive thing we just dealt with?  
23           **MS. ANTONIOLLI:** Yes.  
24           **MS. WALLEY:** Yes.

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1           **MS. ANTONIOLLI:** Were there any extras?  
2           **MR. HOHULIN:** You can have mine.  
3           **MS. ANTONIOLLI:** Appreciate it, thanks.  
4           **CHAIRMAN FINNIGAN:** Are we good on that?  
5           **MS. ANTONIOLLI:** Yes.  
6           **CHAIRMAN FINNIGAN:** I think we're were up  
7 to questions from the board, right? Questions?  
8           **MR. BANGERT:** Did any of the receptors  
9 that you tested in your 14 receptors -- did any of  
10 the research that you did on the 14 receptors, of  
11 those 14, did you differentiate those between  
12 participating landowners and nonparticipating  
13 landowners?  
14           **MR. PUNCH:** I did not. I thought of that  
15 later, but there's no way I could really do that in  
16 the time I had. I'm not even sure I had the data to  
17 do that.  
18           **MR. BANGERT:** And then why did you stop at  
19 14?  
20           **MR. PUNCH:** I picked the ones that were in  
21 the high range of 37, 38 dB and higher only at 1,000  
22 hertz because that's a rough index. That tells me  
23 that it's -- the dBA is going to be probably near 40  
24 and higher. That's been known I think for a long

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1 time, at least by acousticians.  
2           **MR. BANGERT:** Okay, thank you.  
3           **MR. DEAN:** Okay, I get a little confused  
4 sometimes between dBA and dB. So the applicant  
5 turned in dB, is that what I'm understanding from  
6 you?  
7           **MR. PUNCH:** My understanding is the DNV  
8 report reported octave band levels. I was not  
9 frankly aware of the history of IPCB as Dr. Schomer  
10 described it. I didn't know, for example, that it  
11 was maximum at any time, but dB -- dB is not dBA if  
12 you're talking about octave bands. dBA is a  
13 compilation of, a calculation of what the total  
14 would be in dBA terms if you take all those bands  
15 and combine them.  
16           **MR. DEAN:** And the applicant didn't do  
17 that process?  
18           **MR. PUNCH:** No, no. And -- no.  
19           **MR. DEAN:** Okay, can you help me  
20 understand the LEQ and how it relates to dBA? Is  
21 dBA and LEQ the same thing?  
22           **MR. PUNCH:** Well, you have dB LAeq, you  
23 can have that, and most of the time dB EQ -- LEQ is  
24 dB LAeq, okay? Most of the time when we talk about

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1 LEQ, we're talking about a dBA number. The nice  
 2 thing about dBA is it is one number, and people can  
 3 use it, understand it, and apply it to many  
 4 situations. The bad thing I think in this case is  
 5 it doesn't -- it ignores infrasound, it ignores low  
 6 frequencies basically by filtering out those  
 7 frequencies.

8 **MR. DEAN:** Thank you.

9 **MR. KURITZ:** But the Illinois Pollution  
 10 Control Board standards are in dB not dBA, correct?

11 **MR. PUNCH:** That's correct.

12 **MR. KURITZ:** So when you're giving us  
 13 these dBA equivalents and saying that they're over,  
 14 they really need to go back to dB not dBA.

15 **MR. PUNCH:** They meaning -- I'm sorry,  
 16 who's they? I don't understand the question.

17 **MR. KURITZ:** I guess I don't either. If  
 18 you're saying that -- you're saying that they were  
 19 all above 41 dBA, but we really need -- since we  
 20 only have dB to reference it against, we need dB.

21 **MR. PUNCH:** Well, you have the dB values  
 22 at each octave frequency, narrow band of frequencies  
 23 from low to high, right?

24 **MR. KURITZ:** Correct.

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1 **MR. PUNCH:** And you can convert those  
 2 using the formulas in the spreadsheet that I used to  
 3 dBA just to get one number, rather than looking at  
 4 the whole picture, looking at everything in the  
 5 table from 31.5 to --

6 **MR. KURITZ:** In the 1,000 hertz range, I  
 7 thought you said, and I think I had read else-wise,  
 8 that dBA and dB balance out at the 1,000 hertz  
 9 range.

10 **MR. PUNCH:** What I was trying to say, and  
 11 maybe not very well, was that there is no correction  
 12 factor at 1,000 hertz in the dBA formula. It's  
 13 zero.

14 **MR. KURITZ:** So dB equals dBA at the  
 15 1,000 --

16 **MR. PUNCH:** No, no, no, dBA -- sorry, I  
 17 don't mean to be disrespectful here. dBA is one  
 18 number that you tally, that you calculate that will  
 19 tell you what the equivalent dBA level is when you  
 20 combine all those frequencies, octave band  
 21 frequencies together if, in fact, you produce that  
 22 amount. In the spreadsheet for IPCB, I mentioned  
 23 51.2. I think it's 51.1 by the way, 51 dB. The  
 24 same formula applied to everything else gives you 40

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1 dB and over -- dBA, excuse me, and over when you  
 2 calculate the dBA equivalence for all those -- at  
 3 least for the ones I looked at, all those receptors  
 4 that were -- that would be getting 37 or 38 I think  
 5 I used, 38 dB or higher at 1,000 hertz.

6 You know, if I may say, this whole -- my  
 7 whole presentation was getting at the 40 dBA as the  
 8 standard. As like Dr. Schomer was saying, I'm  
 9 agreeing with him on this, that that's one thing  
 10 that we can agree on, it's LEQ over a long period of  
 11 time, and I'm trying to relate health effects to  
 12 that as I talked about with respect to World Health  
 13 Organization and other folks.

14 **MR. KURITZ:** I understand, but realizing  
 15 that we have the Illinois Pollution Control Board  
 16 standards that, again, are our standards and what we  
 17 have to -- what we have to go to. When we get dBA,  
 18 I don't know about the rest of them, but it's  
 19 confusing the issue for me. I need to know what it  
 20 is as it relates to what I have to -- the law that  
 21 I'm trying to follow.

22 **MR. PUNCH:** Well, Dr. Schomer related to  
 23 that. If you want to call it what he said, you can  
 24 do that. I mean he talked about sigma, three sigma

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1 and all that. One of my slides talked about a 15 dB  
 2 penalty for a number of things, like noise sources  
 3 in a quiet rural community, for example, tonal  
 4 sounds add to that 15, are part of that 15, and so  
 5 on. I think 15 is kind of the other approach you  
 6 could use counter, against or instead of the rule  
 7 that he was putting forth. I'm not saying which you  
 8 should use. I am saying that the IPCB board  
 9 regulations do not adequately protect people's  
 10 health in terms of annoyance and health.

11 **MS. TURNER:** What I'm gathering from what  
 12 you're trying to tell us in your presentation is  
 13 that elevated noise levels cause high annoyance  
 14 factors, and those high annoyance factors, according  
 15 to WHO, cause health problems, correct?

16 **MR. PUNCH:** Can cause health problems in  
 17 some people at least, in a substantial number, a  
 18 nontrivial number of people.

19 **MS. TURNER:** Okay, and you're saying that  
 20 noise level is what? I mean does the WHO  
 21 acknowledge a certain noise level that then  
 22 causes -- that can cause health factors or is that a  
 23 jump that you're making?

24 **MR. PUNCH:** Well, I showed a slide that

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1 talked about 30, below 30, and 30 -- I think at 40  
 2 sleep disturbance starts to affect some people. It  
 3 won't be a high, high number of people, but it will  
 4 be some people.  
 5 **MS. TURNER:** And in that sleep  
 6 disturbance, when you show sleep disturbance, are  
 7 there any cases where they had examples before the  
 8 wind turbines were in? Had anyone got their sleep  
 9 studies before the wind turbines were there versus  
 10 after the wind turbines were there? If we're  
 11 annoyed -- when I'm annoyed and when I am lacking  
 12 sleep, if I can find anything to blame it on after  
 13 I'm sleep deprived, I'm going to find it. So are  
 14 there -- do we know, are there any studies that show  
 15 that people weren't sleep deprived before and are  
 16 after?  
 17 **MR. PUNCH:** In the sense that people are  
 18 told by the wind companies don't expect any  
 19 problems, they look positively towards these coming  
 20 in, right?  
 21 **MS. TURNER:** I --  
 22 **MR. PUNCH:** And I understand that, okay?  
 23 **MS. TURNER:** I'm not sure everybody looks  
 24 positive --

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1 **MR. PUNCH:** Well, I mean --  
 2 **MS. TURNER:** -- towards these coming in.  
 3 **MR. PUNCH:** Well, a lot of people.  
 4 **MS. TURNER:** About 30 percent don't.  
 5 **MR. PUNCH:** I don't know that I have an  
 6 answer to your question, but the best I can do is to  
 7 say that a number of studies and self reports, a lot  
 8 of anecdotal stuff. Unfortunately the data don't  
 9 always agree with the anecdotal reports of people.  
 10 By the way, I think people are the most sensitive  
 11 receptors not sound level meters, okay?  
 12 **MS. TURNER:** Right.  
 13 **MR. PUNCH:** They started experiencing  
 14 these problems when the wind turbines, after they've  
 15 been there a little while, a few days, a few weeks  
 16 perhaps. I've interviewed three families and/or  
 17 individuals who abandoned their homes and we asked  
 18 them on the questionnaire that we developed how many  
 19 of these on this 70 point checklist of these  
 20 symptoms have you had -- did you experience after  
 21 the wind turbines came in or how many of these  
 22 symptoms got worse after the turbines came in? And  
 23 all of them had a number of those checked.  
 24 **MS. TURNER:** And I do think, you know,

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1 obviously we've heard this over and over again, and  
 2 people do leave their homes. Would you say that  
 3 people, when roads move in or when other progress is  
 4 done, that people also I mean -- or are there other  
 5 reasons besides just the noise, general annoyance  
 6 with the change, that people would leave their  
 7 homes?  
 8 **MR. PUNCH:** Are you asking if people --  
 9 why wouldn't people leave their homes from other  
 10 kinds of noises essentially?  
 11 **MS. TURNER:** Other kinds of annoyances.  
 12 **MR. PUNCH:** Well, these other kinds of  
 13 annoyances tend to be short-lived and temporary, and  
 14 wind turbines are permanent.  
 15 **MS. TURNER:** Yeah.  
 16 **MR. PUNCH:** 20 to 30 years.  
 17 **MS. TURNER:** Yeah. In your study, you  
 18 state in the beginning, and I didn't have time,  
 19 haven't had time yet to read it thoroughly, but I do  
 20 appreciate having a study to review, but just on  
 21 first glance, you take time to indicate that you do  
 22 use anecdotal information versus peer reviewed  
 23 literature.  
 24 **MR. PUNCH:** Did I say versus?

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1 **MS. TURNER:** No, I said --  
 2 **MR. PUNCH:** I said plus, plus.  
 3 **MS. TURNER:** Can you tell me approximately  
 4 what percentage in your study is, well, peer  
 5 reviewed versus anecdotal?  
 6 **MR. PUNCH:** There's various levels of peer  
 7 review, first of all --  
 8 **MS. TURNER:** Right.  
 9 **MR. PUNCH:** -- and then there's anecdotal  
 10 that's not peer reviewed at all. Some of my own  
 11 work has been in invited blogs, for example, I've  
 12 already talked about one, but I can -- again, I've  
 13 dealt with the peer review system, I've been a peer  
 14 reviewer a while, most of my career, and I know  
 15 what's involved, and most journals these days ask  
 16 for names, for example. Well, we won't get into  
 17 that I guess.  
 18 I believe that, as we say in that report,  
 19 that paper, that something can be good even though  
 20 it may not be -- it may not be to the highest  
 21 standard of peer review. There are many very I  
 22 consider them independent acousticians around the  
 23 world, Australia, New Zealand, the U.S., Europe,  
 24 Denmark, whatever, these are highly accomplished

1 people, and not everything they've done that I think  
2 is worth considering has been published in peer  
3 reviewed journals. Maybe it hasn't gotten there  
4 yet. But I try -- we try to pick studies that we  
5 thought -- and many are sort of pro-wind, if you  
6 will, studies. Even in those we pointed out there's  
7 some shortcomings in terms of showing the same kind  
8 of things we show I mean.

9 **MS. TURNER:** Sure.

10 **MR. PUNCH:** If they're trying to support  
11 wind, they don't always do that, but I'll let you  
12 follow up with another question.

13 **MS. TURNER:** And has the article that  
14 you've given us, has it been peer reviewed?

15 **MR. PUNCH:** It has.

16 **MS. TURNER:** Okay, and what was the  
17 outcome of that peer review? Is that set anywhere  
18 in --

19 **MR. PUNCH:** We were asked what -- I'm  
20 asked this by a lot of journals, give us some names.  
21 I've given them as many as five names, sometimes  
22 only one peer review was needed depending on the  
23 journal, and we gave them some names. I don't know  
24 any of the peer reviewers myself. I've never met

1 **MR. PUNCH:** Not necessarily. My  
2 dissertation was six people in a psycho-acoustic  
3 study back when, and it was published in the Journal  
4 of the Acoustical Society of America, which is one  
5 of the strongest journals there is. The number of  
6 subjects, it depends on the study. We get a lot of  
7 data on six people, but -- he did a lot of data on  
8 six people. That's why it would be in my view  
9 worthy of consideration as a peer reviewed paper.

10 **MS. TURNER:** Then why hasn't it been I  
11 guess is my question.

12 **MR. PUNCH:** I don't know. I don't know  
13 Cooper. I do see some emails from him occasionally.  
14 I'm on a list sometimes, sometimes not.

15 **MS. TURNER:** Okay. And do you when -- I  
16 don't know how it all works, the whole peer review  
17 system and the level of peer review. Do they assign  
18 a level of, I don't know, validation or whatever you  
19 would call it in peer review?

20 **MR. PUNCH:** There is a criteria, yes, that  
21 journals have, and they're pretty constant, I mean  
22 pretty universal.

23 **MS. TURNER:** And what you're saying is  
24 journals want it to be at a certain level before

1 them. I know their work. One was a lawyer. One  
2 was an acoustician in New Zealand I believe, Dan  
3 Shepherd. The lawyer I think was from North  
4 Carolina. The -- because we had some legal kinds of  
5 statements in that article, because we felt court  
6 records, legal proceedings were as important here in  
7 getting things hashed out one way or the other as  
8 scientific journals.

9 **MS. TURNER:** Like the Shirley study you  
10 mentioned.

11 **MR. PUNCH:** Yeah, like the Shirley wind  
12 study. As Dr. Schomer said, I don't think  
13 there's -- that Cooper's study could be classified  
14 as peer reviewed, but in my mind it's one of the  
15 strongest science pieces I've ever read because his  
16 appendix is like a hundred and plus pages showing  
17 what he did, photos of his equipment. I've never  
18 seen anything like it. So it's a very, I think a  
19 solid scientific study, even though to date I don't  
20 think it appears in a peer reviewed paper. It's --

21 **MS. TURNER:** So help me understand what  
22 determines peer review. I would imagine that Mr.  
23 Cooper's study wasn't peer reviewed because it  
24 essentially incorporated six people, correct?

1 they publish it; is that correct?

2 **MR. PUNCH:** Yes, according to their  
3 criteria.

4 **MS. TURNER:** Okay, and has this one that  
5 you gave us been published?

6 **MR. PUNCH:** It's online in a journal, but  
7 keep in mind most journals these days are online. I  
8 don't have any paper publications anymore. All my  
9 publications that I subscribe to are online.

10 There's some that are open access now. Those tend  
11 to require payment by the authors as opposed to by  
12 the subscribers so that things can get done faster.  
13 I worry a little bit about that system.

14 **MS. TURNER:** Yes, I understand.

15 **MR. PUNCH:** Have to, right?

16 **MS. TURNER:** Yeah, kind of self  
17 publishing, right?

18 **MR. PUNCH:** A little, it's like -- it's  
19 going more and more that way I think.

20 **MS. TURNER:** Okay. And what -- where is  
21 it published online?

22 **MR. PUNCH:** It's a journal really  
23 established for audiologists. It's called Hearing  
24 and Technology -- excuse me, Hearing Health and

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1 Technology Matters.  
 2 **MS. TURNER:** Okay.  
 3 **MR. PUNCH:** Matters is a noun. .org, I  
 4 think, hhtml.org.  
 5 **MS. TURNER:** Thank you.  
 6 **MR. KURITZ:** Which is that? Is that a  
 7 subscriber paid for or is that an author paid for?  
 8 **MR. PUNCH:** We pay a nominal fee, it was  
 9 very low, but they did do a lot of work on it and  
 10 said that it's -- it's like it's operated like an  
 11 open access journal after peer review.  
 12 **MR. KURITZ:** You earlier made a statement  
 13 that people who were participants and being paid  
 14 for -- paid for a wind turbine on their spot seem to  
 15 be less annoyed with the wind turbine noise and that  
 16 type of stuff. My question is how about the people  
 17 that are just that they're the demon and they're the  
 18 worst thing out there? Are they more likely to have  
 19 these annoyances? And then what about the neutral  
 20 observers or the people who aren't participants but  
 21 think that they're -- think that wind energy is good  
 22 and they like the wind turbines?  
 23 **MR. PUNCH:** Well, one of the problems with  
 24 the self-reported annoyance rating studies I think

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1 is that, in the past at least, there are contracts  
 2 signed by participants, i.e., gag clauses frankly,  
 3 that restrict in some capacity, in some way the  
 4 extent to which they can be open about their  
 5 annoyance if there is annoyance. They don't -- I  
 6 mean annoyance is not used in the contract I'm sure.  
 7 I've seen a number of contracts, not from EDP  
 8 Renewables, okay, but like I've seen other  
 9 contracts. And so you can't even -- I don't know if  
 10 you can ask that question because the way  
 11 participants are put under a contract not to express  
 12 any issues towards wind turbines essentially and to  
 13 support wind turbines in the future.  
 14 I didn't get all your question. I kind of  
 15 got lost at one point when you talked about the  
 16 people who are really against it.  
 17 **MR. KURITZ:** Well, you said that people  
 18 who are being paid for them -- at least I heard or  
 19 thought I heard you say that people who were being  
 20 participants report less annoyances, and maybe it's  
 21 because of the gag order or whatever, but you made  
 22 that statement. So my question was does it stand to  
 23 reason that the people who are dead set against them  
 24 and opposing them, do they show more annoyances?

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1 **MR. PUNCH:** I don't think that study has  
 2 been done. I don't know of any study.  
 3 **MR. KURITZ:** And I guess my real question  
 4 is, is how about people who are neutral on them or  
 5 just think wind energy is good, and they're not  
 6 participants but they just live out there and think  
 7 that they're good, they think that they're a good  
 8 thing and they like them? How about, I mean what  
 9 kind of annoyance --  
 10 **MR. PUNCH:** Well, there are studies  
 11 showing that people -- and it's just known in  
 12 hearings like this, I think, hearing people testify,  
 13 that people go into this, like I said before,  
 14 thinking it's going to be a good thing, and yet they  
 15 come out thinking it's not such a good thing after  
 16 they experience it. So that can happen certainly  
 17 with some people, but most people in a community not  
 18 like yours that has already had some experience with  
 19 surrounding communities perhaps, but where there's  
 20 no history of wind turbines tend to feel positive  
 21 about them.  
 22 As I said, my first reaction, I was  
 23 positive towards wind turbines. I'm very much for  
 24 green energy, renewable energy. I'll just say this,

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1 that I'm pro health not anti wind. I'm for wind  
 2 turbines as long as -- and I don't do economic  
 3 studies and all this sort of thing, property value  
 4 studies, I don't do all those things, but from where  
 5 I sit as a green energy lover, I wouldn't mind  
 6 having a small wind turbine in my own backyard if my  
 7 backyard were big enough. A small one, not one of  
 8 these towering ones. I think I better stop.  
 9 **MR. BANGERT:** Besides your research, I'm  
 10 just -- my question pertains to a type of research,  
 11 but on the other types of research, have you ever  
 12 utilized double-blind studies with a placebo?  
 13 **MR. PUNCH:** Double-blind, where the  
 14 investigator nor the subject of the study,  
 15 participants, know what's going on. It's very hard.  
 16 In Cooper's work, because Cooper wasn't there during  
 17 the time that people were taking the diary, putting  
 18 down the diary ratings of annoyance, et cetera, what  
 19 he did was synchronize those ratings and so forth  
 20 with the operation of the turbines because he had --  
 21 he was in a position to be able to get that data.  
 22 Like Dr. Schomer said, nobody else has ever done  
 23 that. I don't know that there's any other kind of  
 24 study that would come close to a double-blind study.

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1           **MR. BANGERT:** Do you believe that there is  
2 a value in that type of study for wind farms?  
3           **MR. PUNCH:** Oh, I think that, yes, it's  
4 almost like a clinical trial study in medicine. I  
5 know we do those kinds of studies in my field,  
6 double-blind random selection, et cetera. We talk  
7 in that long paper about the types of studies there  
8 are. There have been some cross-sectional studies  
9 where you look at people near and far from the  
10 turbines and look at dose -- look for a dose  
11 response relationship in relation to distance and/or  
12 noise levels. But to my knowledge, there's no  
13 double-blind studies.  
14           There is a type of study that comes close  
15 to being scientifically validated, which may be what  
16 you're getting at, and that is the crossover study  
17 where you put people in one situation like no  
18 turbine noise and then put the same people in  
19 another situation with turbine noise, for example.  
20 You could do that in a laboratory study if it were  
21 set up like Cooper did and put the same people, and  
22 if it shifts one way when you're in one condition  
23 and another way in another, that tells you  
24 something.

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1           My point is that's been done unwittingly  
2 by wind companies because people are living near  
3 wind turbines, they don't have any idea they're  
4 going to hurt them in any way, and they get sick or  
5 they get annoyed, highly annoyed, or they have  
6 even -- well, what they do is they feel the symptoms  
7 coming on, they leave and the symptoms go away, they  
8 come back and they come back. That's a crossover  
9 experiment. So that's been done many times but not  
10 in a laboratory kind of way.  
11           **MR. BANGERT:** Yeah, that would not -- you  
12 cannot categorize that as a double-blind because  
13 they're aware of --  
14           **MR. PUNCH:** No, not a double-blind, I  
15 didn't say that.  
16           **MR. BANGERT:** Because the annoyance and  
17 the complaint driven system has led a lot of this  
18 research, and that's hard to -- it's hard to isolate  
19 some of these external stimulus.  
20           **MR. PUNCH:** It is.  
21           **MR. BANGERT:** Thank you.  
22           **MS. TURNER:** What percentage of people --  
23 since you're an audiologist, you'd be the best to  
24 ask this. I've been wondering this, so I'm glad

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1 you're here. What percentage of people are  
2 sensitive, you know, to sounds and infrasounds and  
3 stuff?  
4           **MR. PUNCH:** It's called hyperacusis in  
5 audiology. I don't have data on that. I mean  
6 there's a study here and a study there, but nothing  
7 big enough to really give you a fix on a number.  
8 It's a fairly small percentage of people, I think.  
9 Hyperacusis, though, may not be the same as the  
10 kind of sensitivity we're talking about in the  
11 Cooper study, sensitive to infrasound. There are  
12 people who are very sensitive to any sound, music,  
13 higher frequencies basically. They typically have  
14 normal hearing or slightly better. We can only go  
15 10 dB normal when we're audiogram testing patients  
16 with hearing loss or not -- I'd say normal  
17 listeners.  
18           **MS. TURNER:** So you really don't have --  
19           **MR. PUNCH:** I don't have a fix.  
20           **MS. TURNER:** -- a number. But it's a  
21 small number, is that what you said?  
22           **MR. PUNCH:** In audiology it seems to be  
23 fairly small. There hasn't been a whole lot written  
24 on it.

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1           **CHAIRMAN FINNIGAN:** Questions from staff?  
2           **MR. DICK:** No.  
3           **CHAIRMAN FINNIGAN:** Applicant?  
4           **MS. ANTONIOLLI:** Yes. Do I need to  
5 reintroduce myself? Amy Antonioli, Schiff Hardin,  
6 counsel for EDP Renewables.  
7           **QUESTIONS BY**  
8           **MS. ANTONIOLLI:**  
9           Q. Dr. Punch, I wanted to follow up on some  
10 questions that Board Member Turner and Board Member  
11 Kuritz began with and they focussed on annoyance.  
12 And even in your article at one point on page 36, in  
13 reference to another report, it states that  
14 consideration should be given to other stressors  
15 present in the community.  
16           **A. Is that in relation to the McMurtry paper?**  
17           Q. Yes. So annoyances -- and you testified  
18 to this in your presentation too. Annoyance is a  
19 very subjective thing, isn't it?  
20           **A. It is.**  
21           Q. But can annoyance be influenced by a  
22 person's mental state?  
23           **MR. ARMSTRONG:** Objection. It's, number  
24 one, speculation and far beyond anything he

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1 testified about.

2 **MS. ANTONIOLLI:** I don't think so. We're

3 talking about stressors other than wind turbines,

4 stressors in the environment, stressors that may

5 affect the perception of annoyance.

6 **MR. ARMSTRONG:** I stand on my objection.

7 **CHAIRMAN FINNIGAN:** If you can answer the

8 question, go ahead. If not, say you can't.

9 **A. I can only take a stab and I'm not sure I**

10 **should. I think of the recent shooting, a mentally**

11 **unstable person took shots at high school kids in**

12 **Florida, and I guess it could, it could.**

13 Q. And things such as personal relationships

14 or major life changes, things like divorce or loss

15 of a job, they could affect one's perception of

16 noise or level of annoyance?

17 **A. I don't really have a basis to answer that**

18 **I don't think. I mean we can go on with a number of**

19 **factors, but I don't think I'd feel comfortable.**

20 Q. So referring to the reports you've

21 studied, the reports that you write about, do any of

22 those reports have a way of controlling for those

23 factors?

24 **A. Not to a sufficient degree probably**

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1 **ideally.**

2 Q. Okay. And at one point you testified in

3 your presentation that rural noise is more

4 disturbing than urban noise.

5 **A. Yes.**

6 Q. And we heard earlier from Dr. Schomer that

7 urban noise is more disturbing than rural, and I

8 want to figure this out because I live in the city

9 like three doors down from a music venue. Which is

10 it?

11 **A. Which is it? I heard him say that he**

12 **estimates -- I guess he was talking about the**

13 **ambient or the background sound being about 50 dB in**

14 **his neighborhood. That's pretty high. People in**

15 **cities get used to the constant din of noise and you**

16 **do get used to it. I don't know of any studies that**

17 **show that people around wind turbines get used to**

18 **it.**

19 Q. You don't know of any studies that show

20 they get used to it?

21 **A. No, there's one study that said people**

22 **don't have what's called restitution, the ability to**

23 **bounce back very well, after they are around wind**

24 **turbine noise. It doesn't seem to get any easier.**

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1 Q. And what doesn't get any easier?

2 **A. Being -- you know, living in the vicinity**

3 **of the noise.**

4 Q. Are you referring to the level of

5 annoyance?

6 **A. I believe that study talked about**

7 **annoyance rather than adverse health effects for**

8 **example.**

9 Q. Which --

10 **A. Quality of life.**

11 Q. Quality of life, okay. Which includes

12 annoyance?

13 **A. Well, increased annoyance can reduce**

14 **quality of life certainly.**

15 Q. And which you just testified is a

16 subjective issue?

17 **A. It's my opinion.**

18 Q. Okay. So I'm going to go back to your

19 professional career. As an audiologist, your

20 professional history is in analyzing auditory loss

21 as a result of noise, correct?

22 **A. Probably not most of my career. I mean**

23 **most of my career has been in clinical audiology and**

24 **research. Would you restate that again? Most of my**

Page 622

1 **career has been --**

2 Q. Analyzing auditory loss as a result of

3 noise.

4 **A. Noise-induced hearing loss is one of the**

5 **most -- is a preventable form of hearing loss and**

6 **among the highest causes of hearing loss, so the**

7 **people that I test may have been subjected to noise**

8 **and have a hearing loss because of it. Working in**

9 **factories year after year can produce hearing loss,**

10 **particularly if you don't protect your hearing with**

11 **hearing muffs or, you know, some kind of ear**

12 **protection, earplugs and so on.**

13 Q. And in performing that kind of work, were

14 you -- was it part of your job to determine the

15 cause of the auditory loss?

16 **A. You certainly can get an audiogram which**

17 **has certain configurations. If it's due to noise**

18 **versus old age, for example, or drugs, toxic drugs,**

19 **for example, we can look at the audiogram and we**

20 **tell the doctor basically these are results that we**

21 **think are consistent with the diagnosis of such and**

22 **such. You talk about the site of lesion, where in**

23 **the system the problem is, such as the middle ear or**

24 **inner ear, but we typically don't say outright this**

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1 **is the cause as a diagnostic label.**  
 2 Q. Because it's hard to tie auditory loss to  
 3 one particular cause?  
 4 **A. Well, meningitis, for example, has a**  
 5 **particular configuration and audiologists know what**  
 6 **they're looking for. Rubella. As I mentioned,**  
 7 **noise-induced hearing loss has a notch at 4,000**  
 8 **hertz. Hearing in older age typically is declining**  
 9 **gradually in high frequencies.**  
 10 Q. So things other than drugs or old age, is  
 11 it difficult to tell what cause actually causes the  
 12 hearing loss, what source actually causes the  
 13 hearing loss?  
 14 **A. Well, there are some known causes. I mean**  
 15 **there's certainly causes that audiologists can't**  
 16 **confirm or medical doctors can't confirm.**  
 17 Q. So there could be more than one cause of  
 18 hearing loss.  
 19 **A. In a given person?**  
 20 Q. Yes, in a given person.  
 21 **A. Simply -- yes, a simple example is a**  
 22 **person who's worked in a factory when he gets older**  
 23 **will have presbycusis, noise-induced hearing loss.**  
 24 Q. And would you agree that there also could

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1 be more than one cause of annoyance?  
 2 **A. Oh, I think life throws a lot at us that**  
 3 **could cause annoyance, yes.**  
 4 Q. Okay. You said earlier you're currently  
 5 retired from audiology?  
 6 **A. I'm retired from -- I'm officially retired**  
 7 **as an audiologist from my -- what was my former**  
 8 **position originally on the faculty. As long as I**  
 9 **maintain my certification as an audiologist with the**  
 10 **American Speech-Language-Hearing Association, given**  
 11 **my experience and my interests in keeping on keeping**  
 12 **on, I consider myself an audiologist.**  
 13 Q. So what percentage of your income would  
 14 you say comes from your expert services?  
 15 **MR. ARMSTRONG:** I'm going to object to  
 16 relevance.  
 17 **MS. ANTONIOLLI:** I think it's relevant to  
 18 his -- his qualifications for being here.  
 19 **CHAIRMAN FINNIGAN:** I don't think it's  
 20 relevant to what we want to know.  
 21 **MS. ANTONIOLLI:** Okay.  
 22 Q. Have you ever performed studies or  
 23 analyses at the request of a wind energy company  
 24 seeking to site a wind farm?

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1 **A. No, because I've never been asked.**  
 2 Q. So on page 5 of your c.v., that section  
 3 entitled Nonrefereed Articles, this is what we were  
 4 discussing before, would you say another way of  
 5 saying nonrefereed is to say they're not peer  
 6 reviewed?  
 7 **A. They weren't as tightly peer reviewed.**  
 8 **Everybody who writes anything and gets it published**  
 9 **is going to be reviewed by at least one reviewer.**  
 10 **Somebody who owns the publication, journal or**  
 11 **whatever, somebody has to read it. So these are**  
 12 **what I consider -- I'm trying to be honest here**  
 13 **about my work. Some are -- I've had invited papers.**  
 14 **I've had other things I just thought I should write.**  
 15 **A lot of these nonpeer reviewed, nonrefereed**  
 16 **articles, just talking about page 5 onward, were**  
 17 **when I was working as an administrator, as project**  
 18 **director or research director, rather, at the**  
 19 **American Speech-Language-Hearing Association, and we**  
 20 **didn't -- we published data pages and things for the**  
 21 **association, so a lot of that nonrefereed stuff**  
 22 **comes from, I believe, from ASHA. The Hearing**  
 23 **Journal, for example, it's reviewed, I don't know by**  
 24 **how many people, but it wouldn't be the highest form**

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1 **of peer review, that good scientists would consider**  
 2 **the highest form.**  
 3 Q. Okay, thanks. I don't mean to cut you  
 4 off, but I asked a yes or no question.  
 5 **A. Ask it again please.**  
 6 Q. Oh, just that would you -- would you say  
 7 that another way of saying nonrefereed articles is  
 8 that they're not peer reviewed articles?  
 9 **A. It's hard to say yes or no. If you want**  
 10 **me to say yes, I'll say --**  
 11 **MR. ARMSTRONG:** No. If you can answer it,  
 12 answer it. If you can't answer it, don't answer it  
 13 or say you can't answer it.  
 14 **A. I really cannot answer it. There are**  
 15 **various levels of peer review.**  
 16 Q. Okay. Now, earlier -- let's see. You  
 17 discussed a chart and some calculations that you  
 18 did. Can you refresh my memory as to the number of  
 19 those exhibits?  
 20 **MR. ARMSTRONG:** The chart or the table is  
 21 SLG 22. The spreadsheet was marked as SLG 23. I  
 22 believe. If I'm incorrect, I think board's counsel  
 23 can correct me.  
 24 Q. So Exhibits 22 and 23. But you have not

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1 done your own noise study of the Bright Stalk Wind  
 2 Farm, correct?  
 3 **A. Correct.**  
 4 Q. Is the article that you testified to  
 5 earlier, is that based in any part on research that  
 6 you personally conducted on wind turbines?  
 7 **A. You're talking about the long article, the**  
 8 **70 some page article?**  
 9 Q. Yes, that's right.  
 10 **MR. ARMSTRONG:** Talking about SLG Exhibit  
 11 19; is that right?  
 12 **MS. ANTONIOLLI:** Yes, correct.  
 13 **A. It's not based on any kind of experimental**  
 14 **work that I did, no.**  
 15 Q. Okay.  
 16 **A. It's a review paper.**  
 17 Q. And the articles and reports that you cite  
 18 in that article, are there any of them where after  
 19 construction the wind turbines were turned off and  
 20 data was collected and then they were turned back on  
 21 and data was collected?  
 22 **MR. ARMSTRONG:** I think that's been asked  
 23 by a board member and answered.  
 24 **CHAIRMAN FINNIGAN:** If you can answer the

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1 question, I'll --  
 2 **A. If I understand the question, the Cooper**  
 3 **studies come close to that, the field study they did**  
 4 **and the laboratory study. It's easier, by the way,**  
 5 **to turn on from an off position and get results than**  
 6 **it is to turn them off -- I mean on and then turn**  
 7 **them off because the symptoms may not go away and**  
 8 **it's not like immediate.**  
 9 Q. So tell me about the Cooper study. When  
 10 was data collected when the wind turbines were  
 11 turned off?  
 12 **A. The wind company, Cape Bridgewater --**  
 13 **excuse me, it's getting late. Cape Bridgewater, the**  
 14 **wind company, agreed to -- they were going to do a**  
 15 **maintenance run anyway, so they agreed with Cooper**  
 16 **to allow him to take data on these six people while**  
 17 **the wind turbines were being turned on and off**  
 18 **during that maintenance period. Does that --**  
 19 Q. Okay. And for how long were they turned  
 20 off?  
 21 **A. Well, I don't know that. The data I don't**  
 22 **think show that. What it shows, that people could**  
 23 **detect the sensations when they were turned on, when**  
 24 **they were turned off, when they were turned up or**

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1 **down by 20 percent of their capacity or running**  
 2 **capacity, operating capacity, and I believe when the**  
 3 **wind speeds were at maximum. And I think in every**  
 4 **case, all six people, I think that's right, most of**  
 5 **the subjects anyway could tell when any of those**  
 6 **things happened.**  
 7 Q. Okay, these sensitive subjects.  
 8 **A. Sensitive subjects, yes.**  
 9 Q. Okay. In fact, they were highly sensitive  
 10 subjects?  
 11 **A. They were just described as sensitive**  
 12 **subjects because they had complained.**  
 13 Q. All right. So can we go to your  
 14 presentation slides?  
 15 **A. Sure.**  
 16 Q. On slide 5, you reference the Noise  
 17 Control Act of 1972 and the Quiet Communities Act of  
 18 1978, correct?  
 19 **A. Correct.**  
 20 Q. And those acts have been around for a  
 21 while. Are you aware of any claims brought under  
 22 those acts?  
 23 **A. I'm not personally aware of claims, no.**  
 24 Q. And are you aware of those acts being used

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1 in any way to address grievances related to wind  
 2 farms?  
 3 **A. No, no, not really.**  
 4 Q. Okay. Also on slide 5 you mention ISO  
 5 1996-1 and ANSI S12.9 Part 4 standards.  
 6 **A. Yes.**  
 7 Q. You say that it recommends a 15 dB penalty  
 8 for new noise sources in quiet, rural communities.  
 9 **A. There were other things I didn't say about**  
 10 **it. Tonal sounds.**  
 11 Q. I was just asking if --  
 12 **A. Yes, I said that.**  
 13 Q. -- you said that, correct?  
 14 **A. I said that.**  
 15 Q. And do you know what that 15 dB penalty  
 16 was developed to address?  
 17 **A. Tonal sounds, new sounds, rural area**  
 18 **sounds where people are not used to the noise or**  
 19 **accommodated to such noises.**  
 20 Q. Do you know if it was developed to address  
 21 road noise from traffic?  
 22 **A. I don't recall.**  
 23 Q. Okay. And is that plus 15 dB intended for  
 24 comparative purposes only?

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1 **A. It's there I think to be conservative.**  
 2 Q. But you wouldn't say it's meant for  
 3 determining compliance, correct?  
 4 **A. I read it that way. Maybe misread it, but**  
 5 **I read it that way.**  
 6 Q. Do you know what an LDN is or what that  
 7 stands for?  
 8 **A. Yes, DN is day/night. More weight is**  
 9 **given to nighttime sounds I think between 10:00 p.m.**  
 10 **and 7:00 a.m. in most of the cases where it's used**  
 11 **so that people will be less sleep disturbed**  
 12 **essentially.**  
 13 Q. And do you know what EPA recommends as the  
 14 maximum sound level for LDN?  
 15 **A. I don't recall that. I've read it, but I**  
 16 **don't recall it.**  
 17 Q. Does 55 LDN ring a bell?  
 18 **A. I believe Dr. Schomer has talked about**  
 19 **that in one of his papers. That seems familiar. I**  
 20 **think that's true.**  
 21 Q. And so tell me how the LDN and the 55 LDN  
 22 level factors in nighttime noise.  
 23 **MR. ARMSTRONG:** I'm going to object to the  
 24 relevance. LDN has nothing to do with any of the

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1 standards that the board has to use to decide this  
 2 issue or to recommend this issue --  
 3 **MS. ANTONIOLLI:** Well, it's in the  
 4 standard --  
 5 **MR. ARMSTRONG:** -- or to the Pollution  
 6 Control Board regulations.  
 7 **MS. ANTONIOLLI:** Well, that's great if  
 8 we're sticking to the Pollution Control Board  
 9 regulations, but a lot of his testimony doesn't, and  
 10 it is in his slide on page 5, it's included in those  
 11 standards that he references.  
 12 **MR. ARMSTRONG:** But the problem is she's  
 13 now asking for legal interpretations of what those  
 14 statutes require, and he's used them to reference  
 15 them to indicate some annoyance levels but not that  
 16 they're part of the standards by which the board has  
 17 to make its recommendation and therefore the purpose  
 18 of referencing the annoyance and nuisance levels.  
 19 **MS. ANTONIOLLI:** It's not a legal  
 20 standard.  
 21 **CHAIRMAN FINNIGAN:** We don't do dBAs  
 22 either, so I mean touche. I mean we've got -- so  
 23 you kind of went over that. If you -- I always go  
 24 back to what we talked about before. If he can

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1 answer the question, go ahead and answer it. If he  
 2 can't, just say I don't know.  
 3 **MR. ARMSTRONG:** Yeah, I think Dr. Schomer  
 4 and Dr. Punch indicated dBAs are, in fact, relevant  
 5 to the nuisance issues and the health, safety and  
 6 welfare issues which are also standards the board  
 7 has to consider.  
 8 **MS. ANTONIOLLI:** He's testifying at this  
 9 moment, but I have a question on the table for Dr.  
 10 Punch.  
 11 **A. Well, my response would be, at least my**  
 12 **understanding of dB DN essentially is that, as I**  
 13 **said, it corrects for -- puts more weight on**  
 14 **nighttime noise and reduces nighttime noise over**  
 15 **daytime noise to protect sleep. I don't know the**  
 16 **mathematical computations of it, but I do recall**  
 17 **and -- I think I recall that it was established**  
 18 **based on traffic noise certainly not wind turbine**  
 19 **noise.**  
 20 Q. Okay. Can we move on to slide 8?  
 21 **A. Okay.**  
 22 Q. You state in the last bullet the IPCB does  
 23 not consider infrasound which is a major component  
 24 of wind turbine noise.

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1 **A. Yes.**  
 2 Q. Correct?  
 3 **A. Correct.**  
 4 Q. Would you also agree that the emission of  
 5 infrasound is not regulated in Illinois?  
 6 **A. Must be true. I think that's true.**  
 7 Q. Can we go on to slide 9?  
 8 **A. Okay.**  
 9 Q. So you testified to the IPCB sound  
 10 emission standards earlier, so you must be familiar  
 11 with those?  
 12 **A. Somewhat, yes. Not to the degree Dr.**  
 13 **Schomer is of course, but somewhat.**  
 14 Q. Okay. To state that the IPCB limits are  
 15 equivalent to a 51.2 dBA threshold, you would say  
 16 that's a theoretical calculation, correct?  
 17 **A. It's as real as I can imagine it. I want**  
 18 **to point out it's 1 by way of correction. It's**  
 19 **equivalent in the sense that it is an agreed upon**  
 20 **use of the formula by acousticians.**  
 21 Q. But to arrive --  
 22 **A. And audiologists rely on those things when**  
 23 **we need to.**  
 24 Q. But to arrive at that dBA level, you would

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1 have to add up the IPCB limits for each frequency to  
 2 get an overall allowable sound of 51.1 dBA, correct?  
 3 **A. Correct. As Dr. Schomer stated, 51. I**  
 4 **heard him say that tonight.**  
 5 Q. So in order to generate that level of  
 6 sound in Illinois, the sound source would need to be  
 7 as forceful as the limits allow at those frequency  
 8 limits?  
 9 **A. If I understand your question, below those**  
 10 **limits, below those IPCB limits to arrive at -- are**  
 11 **you saying to arrive at 40?**  
 12 Q. No, to arrive at 51.1 dBA.  
 13 **A. I'm sorry, please repeat the question.**  
 14 Q. In order to generate that level of sound  
 15 in Illinois under the IPCB noise emission  
 16 limitations, the sound source would need to be as  
 17 forceful as the limits allow at all of the frequency  
 18 limits --  
 19 **A. That's true, that's true.**  
 20 Q. -- right?  
 21 **A. I understand your question now, yes.**  
 22 Q. Okay. So would you agree that it's not a  
 23 realistic level that people near a wind farm could  
 24 experience?

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1 **A. The dBA value?**  
 2 Q. The 51.1 dBA value.  
 3 **A. I think it's possible depending -- oh,**  
 4 **you're say it couldn't go over 51 dBA if the IPCB**  
 5 **regs were met.**  
 6 Q. I'm asking if that would be a realistic  
 7 level that people in the vicinity of a wind farm  
 8 could experience.  
 9 **A. If you're talking about this wind farm, I**  
 10 **don't really think it would reach that high a level.**  
 11 **I mean I put some credence in the DNV numbers.**  
 12 Q. For the reasons that we just discussed,  
 13 because to arrive at the 51.1 threshold, you'd have  
 14 to have a sound source that would be as forceful as  
 15 the limits allow at all IPCB frequency limits,  
 16 correct?  
 17 **A. Essentially, yes, yes.**  
 18 Q. Right?  
 19 **A. Yes.**  
 20 Q. So you'd agree that it wouldn't be a  
 21 realistic level.  
 22 **A. No, what I was trying to say tonight was**  
 23 **that using the data from EDP Renewables or from DNV,**  
 24 **the levels that are predicted for a number of**

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1 **receptors will receive 40 dBA not 51.**  
 2 Q. Got it, okay. And earlier you testified  
 3 that you based your understanding, and correct me if  
 4 I'm wrong, of the IPCB noise measurements procedures  
 5 on what Dr. Schomer told you.  
 6 **A. No, not just on what he said. I'm trying**  
 7 **to point out where I agree with him.**  
 8 Q. I'm referring to Dr. Schomer's testimony  
 9 about the noise measurement procedures, the Illinois  
 10 numerical noise limits being a traffic ticket type  
 11 of limit where they don't allow averaging.  
 12 **A. You're right. I mean that really is --**  
 13 **that could be tested on that basis I think. I mean**  
 14 **I think that is something to consider, but I don't**  
 15 **know how to untangle that mess.**  
 16 Q. Because you're basing your understanding  
 17 of it on Dr. Schomer's testimony from earlier  
 18 tonight, correct?  
 19 **A. Well, I did this well before I heard him**  
 20 **say what he said, so no, I guess the answer is no to**  
 21 **that.**  
 22 Q. Because Dr. Schomer earlier forgot that he  
 23 filed a public comment in a rule making amending the  
 24 noise measurement procedures in 2003, so I'm going

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1 to show you a section of the noise rules about noise  
 2 measurement procedures that factors in averaging,  
 3 okay?  
 4 **A. Okay.**  
 5 **MR. ARMSTRONG:** Well, I'm going to object  
 6 because Dr. Schomer was the one who testified about  
 7 the averaging issue and perhaps it would have been  
 8 appropriate to ask him, ask Dr. Schomer about this,  
 9 but he did not talk about how to do averaging,  
 10 whether the averaging is a correct method, so it's  
 11 well beyond the scope of what Dr. Punch testified to  
 12 in his direct exam.  
 13 **MS. ANTONIOLLI:** Well, he testified that  
 14 he couldn't remember about the rule making that was  
 15 adopted in 2006 that he commented on that changed  
 16 these procedures, so perhaps he forgot that there  
 17 was an averaging aspect.  
 18 **MR. ARMSTRONG:** That was Dr. Schomer who  
 19 testified to that not Dr. Punch.  
 20 **MS. ANTONIOLLI:** No, but Dr. Punch then  
 21 adopted his testimony.  
 22 **MR. ARMSTRONG:** No, that's not what he --  
 23 **MS. ANTONIOLLI:** He agreed to his  
 24 testimony.

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1           **MR. ARMSTRONG:** That's not what Dr. Punch  
 2 just said, so that's my objection.  
 3           **CHAIRMAN FINNIGAN:** You can ask if he's  
 4 familiar with that, but he doesn't have to -- if he  
 5 doesn't know anything about it, he doesn't have to  
 6 answer.  
 7           **MS. ANTONIOLLI:** Okay.  
 8           **A. The presentation material was developed**  
 9 **before tonight. Therefore, it couldn't be based on**  
 10 **what I heard Dr. Schomer say tonight. That's all I**  
 11 **can really say.**  
 12           Q. Earlier tonight you agreed with the idea  
 13 that Illinois regulations do not allow averaging.  
 14           **MR. ARMSTRONG:** It's the same objection.  
 15 She's trying to get to the same issue the same way  
 16 with a different question. He did not testify about  
 17 averaging. That was Dr. Schomer.  
 18           Q. Well, if I pointed to the regulation that  
 19 allows averaging, would you be able to look at it?  
 20           **MR. ARMSTRONG:** Again, it's the same  
 21 objection. He didn't testify to any of this.  
 22           **CHAIRMAN FINNIGAN:** Well, I think he's  
 23 testified that he is familiar with these standards I  
 24 mean, so she's just trying to get to the bottom of

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1 it, so if -- I'd say let him look at it.  
 2           Q. So Section 900.103 of the Pollution  
 3 Control Board's measurement procedures, look at  
 4 Subsection B. These are procedures applicable to  
 5 Section 901 of the board's noise regulations. Have  
 6 you read that first subparagraph 1?  
 7           **A. I've never seen this before and I really**  
 8 **don't -- I'd have to take a lot more time than I**  
 9 **think we have here tonight to understand this. I've**  
 10 **never seen it before, it's new to me.**  
 11           Q. Okay.  
 12           **A. I was not familiar with this before I**  
 13 **came. I had not seen this. This is a revision?**  
 14 **That's all I can say.**  
 15           Q. Okay.  
 16           **A. I would answer if I could.**  
 17           **MS. ANTONIOLLI:** I think that's all I  
 18 have.  
 19           **CHAIRMAN FINNIGAN:** Okay, we're going to  
 20 try and make sure he doesn't have to come back I  
 21 think. If there's any other questions out there?  
 22 Because I don't think you want to bring him back for  
 23 the next meeting, do you?  
 24           **MR. ARMSTRONG:** No. In fact, he's out of

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1 state, so I definitely want to finish tonight with  
 2 him.  
 3           **CHAIRMAN FINNIGAN:** We'll stay a few  
 4 minutes here if you have a little bit longer just to  
 5 make sure. Try and make the questions short if we  
 6 can. But if anybody has questions.  
 7           **MR. TAYLOR:** I just have --  
 8           **CHAIRMAN FINNIGAN:** Come forward.  
 9           **MR. TAYLOR:** Try to make it quick for  
 10 everybody. Just a couple if that's okay. It really  
 11 is. I'll try to be quick. Travis Taylor, 28686  
 12 North 3050 East Road, Chenoa, Illinois. Have you  
 13 noticed in any of the noise complaints that you've  
 14 worked with that the tower size or windmill size has  
 15 been a bigger variation in the annoyances?  
 16           **MR. PUNCH:** There's been no definitive  
 17 study I'm aware of that really studied that. In  
 18 general, my understanding is that the bigger, you  
 19 know, the tower, the taller the turbine, the more  
 20 will be the emissions. George Cameron, very  
 21 well-known in the acoustical world, has said that a  
 22 1 megawatt increase increases the noise emissions by  
 23 3 to 5 decibels. So as towers get bigger, without  
 24 other, you know, counteracting technological

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1 refinements, there's going to be more noise with a  
 2 3.6 capacity turbine than a 2.5. I'm not aware of  
 3 what those differences are.  
 4           **MR. TAYLOR:** Okay. I think the next  
 5 question I have is do you know if there's  
 6 regulations in other countries on the scale that you  
 7 referred to? Is it the regulation 51.2 that's on  
 8 there in other countries or do they have lower  
 9 regulations in some of the other countries?  
 10           **MR. PUNCH:** There is still a few countries  
 11 that have as high as 55 dBA, very few though. Most  
 12 of them come between 35 and 45 now. That's true  
 13 both internationally and within the States.  
 14           **MR. TAYLOR:** I don't want to stir the pot  
 15 on this, but can I ask if receptor 50 was one of  
 16 them that you reviewed during that or not?  
 17           **MR. PUNCH:** I don't think that was on the  
 18 list of the --  
 19           **MR. TAYLOR:** That you did the study on?  
 20           **MR. PUNCH:** That we looked at, right.  
 21           **MR. TAYLOR:** Okay, I think that's all of  
 22 my questions for tonight then. Thank you.  
 23           **CHAIRMAN FINNIGAN:** Any other questions?  
 24 I think we're going to call it. We're not going to

1 call it quits. We're going to reconvene Tuesday  
2 night, February 27th, in this room at six o'clock.

3 Did you want to do any redirect?

4 **MR. ARMSTRONG:** No.

5 **CHAIRMAN FINNIGAN:** Okay, thank you.

6 (Adjourned at 10:00 p.m.)  
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1 STATE OF ILLINOIS )  
2 COUNTY OF FORD )SS

3  
4 I, June Haeme, a Notary Public in and for  
5 the County of Ford, State of Illinois, do hereby  
6 certify that the following hearing was taken at the  
7 McLean County Government Center, 115 East Washington  
8 Street, Bloomington, Illinois, on February 22, 2018.

9 That the said hearing was taken down in  
10 stenograph notes and afterwards reduced to  
11 typewriting under my instruction and that the  
12 transcript is a true record of the testimony given  
13 at the hearing.

14 I do further certify that I am a  
15 disinterested person in this cause of action; that I  
16 am not a relative, or otherwise interested in the  
17 event of this action, and am not in the employ of  
18 the attorneys for either party.

19 IN WITNESS WHEREOF, I have hereunto set my  
20 hand and affixed my notarial seal this 8th day of  
21 March, 2018.  
22  
23  
24

JUNE HAEME, CSR  
NOTARY PUBLIC

25 "OFFICIAL SEAL"  
26 June Haeme  
27 Notary Public, State of Illinois  
28 My Commission Expires:  
29 September 28, 2020

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<b>9 (7)</b> 524:13,14,21; 545:18;554:10;574:9; 634:7 <b>90 (1)</b> 516:4 <b>900.103 (1)</b> 640:2 <b>901 (1)</b> 640:5 <b>93 (1)</b> 569:21 <b>94 (1)</b>				