STATE OF ILLINOIS
PIATT COUNTY ZONING BOARD

GOOSE CREEK WIND, LLC
APPLICATION FOR A SPECIAL USE PERMIT
11/16/2022, 2022
6:06 P.M. - 9:00 P.M.
Held at Monticello, IL, Community Building

PIATT COUNTY ZONING OFFICER:
Keri Nusbaum

HEARING FACILITATOR:
Scott Kains, Esq.

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

PIATT COUNTY STATE'S ATTORNEY:
Sarah Perry

PIATT COUNTY BOARD MEMBERS:
Jerry Edwards
Shannon Carroll
Todd Henricks

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COURT REPORTER: Holly Wingstrom, CSR, RPR, CRR

I N D E X

E X H I B I T S

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

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

(PLEDGE OF ALLEGIANCE.)

MR. WAX: Now could we have the rollcall?

MS. NUSBAUM: Mr. Larson?

Mr. Harrington?

MR. HARRINGTON: Here.

MS. NUSBAUM: Mr. Lovin?

Mr. Wax?

MR. WAX: Here.

MS. NUSBAUM: Mr. Chambers?

MR. CHAMBERS: Here.

MS. NUSBAUM: Mr. Foran?

MR. FORAN: Here.

MS. NUSBAUM: State's Attorney Perry?

MS. PERRY: Here.

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

MS. NUSBAUM: Mr. Spencer?

Mr. Carroll?

MR. CARROLL: Here.

MS. NUSBAUM: Mr. Edwards?
MR. EDWARDS: Here.
MS. NUSBAUM: Ms. Jones?
Mr. Henricks?
MR. HENRICKS: Here.
MS. NUSBAUM: Mr. Shumard?
Thank you.
MR. KAINS: Thank you. Well, good evening, ladies and gentlemen.
First of all, I would like to apologize for being late. It's a heck of a drive from Barnes Hospital in St. Louis to Monticello, Illinois, but I only exceeded the suggested speed signs just by a few miles an hour. So, I'll let the fellows in the back know, it wasn't even Piatt County.
One thing that came to mind after last night's session, the first night of this public hearing, while folks were speaking in the microphones, we up front could hear, Holly, the court reporter, who takes everything down could hear, but some folks in the back of room could not hear.
So, to remedy that situation, we are just going to ask that any folks who are speaking to the

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

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

OPENING STATEMENT ON BEHALF OF APPLICANT

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

MR. LUETKEHANS: Thanks.

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

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

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

Very quickly, as you know, we've applied

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

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

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

Hold on a second. I have to move two of

these at once.

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

You stated and the county board stated:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Our telecommunications studies, Alan talked about during his presentation.

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

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

The sound modeling report, same statement.

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

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

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

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

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

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

We have shown, if you look at Section 2.1,

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

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

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

renewable energy as Alan testified.

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

Do you want to confirm?

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

MR. GERSHON: Great. Thank you.

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

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

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

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

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

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

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

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

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

MR. LUETKEHANS: Which one is 3 and which

is 4?

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

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

MR. GERSHON: That will be our pleasure.

MR. KAINS: Thank you.

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

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

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

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

Do you want to reserve that for the

beginning of your case?

MR. LUETKEHANS: Yes, please.

MR. KAINS: Thank you. All right.

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

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

JEFFRY M. ELLENBOGEN, MMSc, MD, FAASM,

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

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

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

MR. KAINS: Thank you, sir.

Mr. Gerson, you may proceed.

EXAMINATION

BY MR. GERSON:

Q. We are trying to share this microphone

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

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

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

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

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

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

MR. GERSHON: Great.

BY MR. GERSHON:

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

A. Sure.

Good evening, folks.

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

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

I have board certification in both neurology and in sleep medicine.

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

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

MR. LUETKEHANS: No.

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

MR. GERSHON: Thank you.

THE WITNESS: Thank you.

BY MR. GERSHON:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

stress, I mean physiological stress.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Again, I was able to speak with him. He

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

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

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

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

MR. KAINS: Thank you, Doctor.

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

MR. GERSHON: No further questions at this time.

MR. KAINS: Very good. Thank you.

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

EXAMINATION

BY MR. CHAMBERS:

Q. I have a few questions.

Is this mic on?

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

A. Yeah. Another good question.

The only experience that I have with that

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

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

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

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

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

A. Yes.

Q. What experience do you have with any of

those topics and past research there?

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

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

Q. Right.

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

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

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

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

MR. CHAMBERS: No further questions.

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

Any other questions?

Mr. Harrington?

EXAMINATION

BY MR. HARRINGTON:

Q. Thank you for your presentation. I have a

couple questions in regards to it.

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

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

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

A. Yes, sir.

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

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

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

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

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

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

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

Q. That is your goal, right?

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

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

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

A. Definitely.

Q. Right.

A. Cloudy conditions.

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

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

Q. Culmination of days and times?

A. Yeah. Exactly.

Q. Okay.

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

Q. They didn't look at what?

A. They didn't look at seizures.

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

A. Right.

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

A. I understand.

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

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

A. Yeah.

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

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

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

Q. Okay.

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

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

again, a sort of average of the bands there?

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

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

A. What is the level?

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

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

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

A. It will be quite low.

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

A. Definitely.

Q. It is low, but there is some?

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

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

A. From a health point of view?

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

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

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

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

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

Q. Uh-huh.

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

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

different part of the hemisphere.

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

Q. Okay. I hear ya.

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

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

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

Q. I'll let it go.

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

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

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

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

A lot to say, right?

A. I understand it now.

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

on that?

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

MR. HARRINGTON: Thanks so much.

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

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

FURTHER EXAMINATION

BY MR. CHAMBERS:

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

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

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

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

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

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

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

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

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

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

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

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

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

Q. Right.

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

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

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

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

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

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

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

MR. CHAMBERS: Thank you.

MR. KAINS: Thank you, Mr. Chambers.

Any other questions from the members of the zoning board?

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

Any questions for the doctor from those folks?

Then Mr. Luetkehans?

EXAMINATION

BY MR. LUETKEHANS:

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

A. I believe twice.

Q. For whom? Which company? What counties?

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

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

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

MR. LUETKEHANS: Yeah.

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

THE WITNESS: That is correct.

MR. KAINS: Thank you for the clarification.

Now, Mr. Luetkehans, your cross?

BY MR. LUETKEHANS:

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

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

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

A. I believe so. Yes.

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

A. Approximately six.

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

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

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

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

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

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

A. Correct.

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

A. I do.

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

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

surprise me.

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

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

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

A. Correct.

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

A. I believe it's public data.

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

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

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

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

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

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

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

A. I do not.

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

A. Correct.

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

A. Yes.

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

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

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

A. I think the most worrisome probably is

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

Q. How about other obstructive sleep?

A. There is a textbook, a long number of them.

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

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

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

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

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

in December of 2014:

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

ANSWER: Yes.

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

ANSWER: Yes.

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

ANSWER: Certain kinds of sleep problems, yes.

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

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

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

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

my position.

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

A. It can be.

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

A. That is complicated.

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

A. Depending on the circumstances, yes.

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

A. "It" meaning what?

Q. Disruptive sleep.

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

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

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

correct?

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

Q. Thank you.

A. Can it also not? Yes.

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

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

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

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

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

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

A. Definitely.

Q. And that is because you know that the loss

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

A. Depending on the circumstances, yes.

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

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

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

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

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

A. Correct.

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

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

A. Correct.

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

A. Yes.

MR. LUETKEHANS: Nothing further.

MR. KAINS: Thank you, Mr. Luetkehans.

Questions from interested parties who are represented by licensed attorneys?

Any other attorneys with questions for Dr. Ellenbogen?

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

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

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

EXAMINATION

BY MS. CLAUDIA COIL:

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

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

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

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

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

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

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

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

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

A. Absolutely. Yes.

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

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

Q. Right, but I am just asking --

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

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

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

Q. Okay. How many years was it?

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

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

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

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

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

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

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

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

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

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

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

Q. Right.

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

Q. That is a shame nobody has studied this.

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

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

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

(PAUSE TO FIX AUDIO ISSUES.)

MR. KAINS: Back on the record.

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

BY MS. COIL:

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

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

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

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

MR. KAINS: Hold on, ma'am.

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

this board.

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

BY MS. COIL:

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

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

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

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

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

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

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

Q. Okay.

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

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

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

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

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

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

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

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

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

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

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

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

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

(BREAK TAKEN.)

MR. KAINS: Take your seats, please.

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

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

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

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

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

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

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

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

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

MR. KAINS: Okay.

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

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

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

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

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

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

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

Okay. Thank you.

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

THE WITNESS: Yes.

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

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

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

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

EXAMINATION

BY MEG MINER:

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

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

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

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

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

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

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

Q. Thank you.

A. Welcome.

MR. KAINS: Thank you, Ms. Miner.

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

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

EXAMINATION

BY ANNETTE WARSAW:

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

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

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

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

Q. Okay.

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

sort of an evaluation of the last year.

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

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

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

Q. Sure.

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

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

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

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

A. Okay. I like the not guess part.

Q. Yeah.

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

Q. Okay.

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

Q. Right.

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

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

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

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

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

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

MR. KAINS: Thank you, Ms. Warsaw.

Ms. Vetter, you had your hand up.

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

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

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

stuff. Do I have to sign in every night?

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

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

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

EXAMINATION

BY KELLY VETTER:

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

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

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

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

Q. Are you familiar with that publication?

A. Of course, I am.

Q. You are?

A. Yes.

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

A. Yes.

Q. I am trying to think of that.

A. I believe her last name is Pierpont.

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

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

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

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

you have anything in environmental science?

A. No, ma'am.

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

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

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

A. Any of what work, ma'am?

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

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

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

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

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

THE WITNESS: Yes.

BY MS. VETTER:

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

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

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

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

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

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

MS. VETTER: Sorry.

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

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

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

MS. VETTER: Want me to ask it again?

MR. KAINS: Yes, ma'am.

BY MS. VETTER:

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

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

Q. Yes.

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

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

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

just a flat yes?

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

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

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

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

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

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

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

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

No.

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

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

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

A. I am not aware of that kind of information. No.

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

A. Yes.

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

A. I would --

Q. Did you sleep overnight somewhere and get it?

Did you camp out somewhere where they are?

What has been your experience?

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

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

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

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

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

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

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

THE WITNESS: Well, it is unfortunate --

MR. KAINS: Well, hang on.

Mr. Luetkehans, that is a very good point.

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

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

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

Thank you. All right.

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

BY MS. VETTER:

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

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

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

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

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

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

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

A. I am not aware of any --

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

MR. KAINS: That is a very good point.

MR. GERSHON: Okay.

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

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

MS. VETTER: Okay.

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

BY MS. VETTER:

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

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

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

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

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

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

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

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

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

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

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

MS. VETTER: I was just trying to figure

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

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

MS. VETTER: Okay. All right.

MR. KAINS: Thank you.

BY MS. VETTER:

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

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

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

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

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

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

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

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

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

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

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

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

MR. KAINS: Thank you, Ms. Vetter.

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

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

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

EXAMINATION

BY MR. REED:

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

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

A. I would like to clarify two things: 1.) I think that it's probably best for the acoustician who is here to answer about specific modeling things.

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

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

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

A. I can't speak for what.

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

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

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

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

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

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

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

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

A. They did. Yes.

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

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

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

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

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

Q. Do you regularly treat epilepsy patients?

A. I do.

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

Also, within the Epilepsy Foundation, do

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

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

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

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

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

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

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

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

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

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

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

County?

A. I am not aware of either of those.

MR. REED: Okay. Thank you.

MR. KAINS: Thank you, Mr. Reed.

Then no other questions from the public?

Are there questions for Dr. Ellenbogen from Piatt County staff and consultants?

Redirect, Mr. Gershon?

FURTHER EXAMINATION

BY MR. GERSHON:

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

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

A. I did, yes. Yes.

Q. Is Health Canada a Canadian government federal institution?

A. It is, yes.

Q. It was implied that Health Canada hid or

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

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

A. No.

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

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

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

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

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

MR. GERSHON: I do.

MR. KAINS: Very good. Go ahead.

BY MR. GERSHON:

Q. Are you a licensed medical doctor?

A. Yes.

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

A. Yes.

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

A. Yes.

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

A. No.

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

A. Definitely. Yes.

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

A. Yes, I did.

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

A. Yes, and I am reading from the Canadian

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

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

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

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

A. That is correct.

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

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

of the turbine shadow flicker.

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

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

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

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

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

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

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

MR. KAINS: Thank you, Mr. Gershon.

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

Any other questions?

All right. Very good, Doctor. Thank you.

THE WITNESS: Thank you.

MR. KAINS: You may step down.

(WITNESS STEPPED DOWN.)

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

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

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

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

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

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

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

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

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

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

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

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

EDDIE DUNCAN,

a witness herein, called by the Applicant, after having

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

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

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

MR. KAINS: Very good. Thank you.

Mr. Gershon, you may proceed.

EXAMINATION

BY MR. GERSHON:

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

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

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

MR. LUETKEHANS: I am not going to object

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

MR. KAINS: Mr. Luetkehans, thank you.

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

Go ahead, Mr. Gershon.

BY MR. GERSHON:

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

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

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

modeling that we conducted for this proposed project.

Next slide, please.

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

Next slide, please.

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

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

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

based off of full octave bands or octave band.

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

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

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

Next slide, please.

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

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

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

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

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

Next slide, please.

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

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

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

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

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

Next slide, please.

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

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

Next slide.

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

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

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

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

limits.

Next slide, please.

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

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

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

talk about those briefly here.

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

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

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

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

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

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

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

Next slide.

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

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

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

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

Next slide, please.

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

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

Next slide.

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

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

Next slide.

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

Next slide.

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

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

Next slide.

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

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

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

Next slide.

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

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

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

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

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

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

how we arrive at an overall sound level.

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

Next slide, please.

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

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

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

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

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

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

MR. KAINS: All right. All right.

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

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

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

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

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

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

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

MR. KAINS: Jason?

MR. GERSHON: Connelly.

MR. KAINS: Thank you. Regarding what?

MR. GERSHON: Regarding safety.

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

MR. KAINS: All right. Very good.

Anything further, Mr. Gershon?

MR. GERSHON: Nothing from us. Thank you.

MR. KAINS: Mr. Luetkehans?

MR. LUETKEHANS: No.

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

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

MR. KAINS: Go ahead, Mr. Luetkehans.

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

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

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

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

MR. KAINS: Very good. Thank you.

Anything further from counsel?

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

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

(END OF PROCEEDINGS.)

CERTIFICATE OF REPORTER

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

Holly Wingstrom, CSR #84-003888
Official Court Reporter

Dated: 11/27/2022

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