STATE OF NEW HAMPSHIRE

SITE EVALUATION COMMITTEE

October 19, 2016 - 1:39 p.m.
Public Utilities Commission
21 South Fruit Street
Concord, New Hampshire

DAY 10
Afternoon Session ONLY

IN RE: SEC DOCKET NO. 2015-02
ANTRIM WIND ENERGY, LLC:
Application of Antrim Wind Energy, LLC for a Certificate of Site and Facility.
(Hearing on the merits)

PRESENT FOR SUBCOMMITTEE:	**SITE EVALUATION COMMITTEE:**
Cmsr. Robert R. Scott *(Presiding as Presiding Officer)*	Public Utilities Commission
Cmsr. Jeffrey Rose	Dept. of Resources & Economic Development
John S. Clifford (Designee)	Public Utilities Commission/ Legal Division
Dir. Eugene Forbes (Designee)	Dept. of Environ. Services/ Water Division
Patricia Weathersby	Public Member

Also Present for the SEC:

Michael J. Iacopino, Esq. (Brennan...
Pamela G. Monroe, SEC Administrator
Marissa Schuetz, SEC Program Specialist

COURT REPORTER: Steven E. Patnaude, LCR No. 052

APPEARANCES:

Reptg. Antrim Wind Energy (Applicant):
Barry Needleman, Esq. (McLane...)
Rebecca S. Walkley, Esq. (McLane...)
Henry Weitzner (Antrim Wind Energy)
Jack Kenworthy (Antrim Wind Energy)

Reptg. Counsel for the Public:
Mary E. Maloney, Esq.
Asst. Atty. General
N.H. Attorney General's Office

Reptg. the Town of Antrim:
Justin C. Richardson, Esq. (Upton...)
Robert Edwards, Selectman

Reptg. Harris Center for Conservation Education:
James Newsom, Esq.

Reptg. Audubon Society:
Francie Von Mertens

Reptg. Abutting Landowners Group:
Barbara Berwick, *pro se*

Reptg. Allen/Levesque Group:
Charles Levesque, *pro se*
Mary Allen, *pro se*

Reptg. Meteorologists Group:
Dr. Fred Ward

Reptg. the Wind Action Group:
Lisa Linowes

Reptg. Giffin/Pratt Group:
Benjamin Pratt, *pro se*

APPEARANCES: (C o n t i n u e d)

Wes Enman, *pro se*

Reptg. Non-Abutting Landowners Group:
Richard Block, *pro se*
Annie Law, *pro se*
Robert Cleland, *pro se*

Reptg. Stoddard Conservation Comm.:
Geoffrey Jones

I N D E X

TRANSCRIPT READER'S NOTE:
Due to teleconference audio quality you will find the following herein:
[inaudible] = garbled or unclear audio
[?**]** = not sure if it is the correct word

E X H I B I T S

EXHIBIT NO.	**D E S C R I P T I O N**	**PAGE NO.**
Abutter 42	Article: "Wind Turbine Noise and Human Health: A Four-Decade History of Evidence that Wind Turbines Pose Risks", written by Jerry L. Punch & Richard R. James) *{Marked for* **ID only** *– not allowed into evidence}*	17

P R O C E E D I N G

(Hearing resumed at 1:39 p.m.)

PRESIDING OFCR. SCOTT: Okay. We're back. And I'm going to start with some administrative issues. So, we mentioned earlier we had some discrepancy on Wind Action's exhibit numbers. So, see if I get this right, somebody will help me.

So, what was discussed as "Wind Action 35x" yesterday is now -- which is a photocopy of some of the route from the Applicant, if people remember that, that is now going to be labeled "Wind Action" or "WA-41" **[**WA-41x**]**.

I think we erroneously, at some levels, discussed what is actually labeled, but it was truncated, "Wind Action 33" we called it, which is the discussion we had I think with Mr. Rose towards the end, Commissioner Rose, towards the end of the discussion with Mr. Jones. That's the two pages that had the 2010/2005 WAP issue. That was actually "WA-33x".

And, then, just for clarification,

what we are still saying is "WA-35x" is labeled on the top "AWEA: Voluntary Migration **[**Mitigation**?]** Practices will Reduce Impacts on Bats by 30%".

So, does that raise any questions or concerns?

[No verbal response.]

PRESIDING OFCR. SCOTT: Okay. So, we'll be clear on that.

MR. RICHARDSON: Mr. Chairman?

PRESIDING OFCR. SCOTT: Yes.

MR. RICHARDSON: Will the Committee, at some juncture, produce a Master Exhibit List? I'm thinking that might be very helpful. I have what I believe to be all of the exhibits, but there are a couple of holes. And it would justice be nice to know what's -- if something like that exists when we're doing the briefs.

PRESIDING OFCR. SCOTT: Yes. I think that's a good idea. And, as I think Attorney Needleman had mentioned, at some point we have to go through and decide what's going to be admitted and not, and that will probably speed

that process, is my guess also.

MR. RICHARDSON: Okay.

PRESIDING OFCR. SCOTT: So, the other administrative matter I'd like to discuss is scheduling.

So, Administrator Monroe, I know you've been trying to find some dates for us. Assuming we're done the hearing tomorrow, I'll talk about that in a second, but, even assuming that, we're having scheduling problems trying to get times for us to deliberate. So, you sent a Doodle poll. What were the results of that?

ADMINISTRATOR MONROE: We couldn't get the quorum of the Committee. The poll that I sent out was through the week of November 7. My understanding, Mr. Presiding Officer, is that you're not available the following week. Following week is Thanksgiving. So, the earliest we could reconvene deliberations would be the last week in November. And I haven't sent out a poll for that yet.

PRESIDING OFCR. SCOTT: Okay. And, as a practical matter, I'm not going to suggest

the Applicant likes this, but we've already agreed to the written briefs, with a timeframe notionally that's attached to that. So, we would need some time -- space in between finishing the hearings and deliberations anyways.

ADMINISTRATOR MONROE: Correct.

PRESIDING OFCR. SCOTT: Okay. So, a couple things. I'll ask the Committee, first of all, to re-engage on the original Doodle poll, though, I'm not sure the timing will work, because of the time lag because of the briefs. Is that correct? So that the Doodle poll wouldn't have worked anyways, for us, for deliberations?

ADMINISTRATOR MONROE: For the two weeks? I don't think it -- well, Mr. Iacopino is not available. So, --

PRESIDING OFCR. SCOTT: Okay. But that's surmountable, I think. The question is, is do we have a quorum?

ADMINISTRATOR MONROE: No.

PRESIDING OFCR. SCOTT: All right. So, I will ask two things. If you can relook

at your original Doodle poll for at least the members, as far as there's a difference between "I may have something that I prefer not to move" and "I have something that I can't move". So, I'll ask you to relook at that. And, when you do see the Doodle poll for the last week of November -- so, that's the week after Thanksgiving?

ADMINISTRATOR MONROE: Correct.

PRESIDING OFCR. SCOTT: Okay. We're getting pretty tight. We have a statutory deadline of 30 November?

ADMINISTRATOR MONROE: Correct.

PRESIDING OFCR. SCOTT: Okay.

CMSR. ROSE: Mr. Chairman?

PRESIDING OFCR. SCOTT: Commissioner Rose, yes.

CMSR. ROSE: As painful as it is to suggest this, but given where we are in the process, I'd like to make a motion that we temporarily suspend the deliberations and the timeframes under RSA 162-H:14. We're still going through the testimony phase. We still have the deliberation phase. And, then, we

have to write up the order.

And, just recognizing that we have, you know, it's in the public's best interest for us to have a fair, thorough, and complete process, I think that we're going to need to make a motion to suspend the deliberations.

PRESIDING OFCR. SCOTT: Do I have a second, before we discuss?

MS. WEATHERSBY: Second.

PRESIDING OFCR. SCOTT: Thank you. So, Attorney Iacopino, what's the standard? We have to show that this would be in the public interest?

MR. IACOPINO: Correct. Yes.

PRESIDING OFCR. SCOTT: Yes. Okay. Any discussion on that?

MR. NEEDLEMAN: Mr. Chair, I know it's unusual, but could I be heard for a moment?

PRESIDING OFCR. SCOTT: Go ahead.

MR. NEEDLEMAN: When this docket originally got underway, we noted to the Committee that there were some factual pressures on Antrim Wind to get some decision

before the end of the year. In particular, one of the leases will run out before the end the year. And financial commitments to secure the Production Tax Credit would also need to be made before the end of the year. And, if we got to that position and didn't have a decision, it could be materially detrimental to the Project.

PRESIDING OFCR. SCOTT: Thanks for that. That reinforces my understanding it would be important for the Applicant to move as quickly as possible, so that reinforces that.

And I will assert, if we end up doing this, it's my intention we'd be talking weeks, not months, of moving forward.

Any further discussion?

MR. CLIFFORD: I have a question.

PRESIDING OFCR. SCOTT: Go ahead.

MR. CLIFFORD: Mr. Needleman, so, is the decision require -- an unappealable decision required? In other words, must the appeals period pass for you to -- to get the production tax credits.

MR. NEEDLEMAN: No.

MR. CLIFFORD: I'm just worried about, you know, deadlines and having an order issued and having it --

MR. NEEDLEMAN: I'm going to tell you what I think, and I'm going to look at my clients so they can yell at me if I'm wrong.

I believe, if we had an oral decision from the Committee. So, if you deliberated and reached a decision, I believe that would be sufficient for their purposes.

MR. CLIFFORD: Thank you.

PRESIDING OFCR. SCOTT: Thank you for that. Are we ready for a vote?

And, again, if we go this way, I'm going to push as hard as we can to finish the hearings tomorrow. I'm not sure, we'll see where we end up, but that's certainly my desire.

Okay. All in favor?

[Multiple members indicating "aye".]

PRESIDING OFCR. SCOTT: Any opposed?

[No verbal response.]

PRESIDING OFCR. SCOTT: All right.

MR. IACOPINO: So, that was all -- all who voted voted in favor?

PRESIDING OFCR. SCOTT: Yes. It was unanimous.

Again, unfortunately, it's taken longer than we expected. So, trying to get everybody's schedule together is not easy.

Okay. Any other administrative issues, before we move on to Mr. James? Who I think is on the telephone, is that correct? Mr. James?

MR. JAMES: That's correct.

PRESIDING OFCR. SCOTT: Okay. Great. How can you hear us, Mr. James?

MR. JAMES: Some of the microphones sound like they're overloaded. How am I coming through?

PRESIDING OFCR. SCOTT: I think you're okay.

MR. PATNAUDE: It's iffy.

PRESIDING OFCR. SCOTT: Okay. Mr. James, can you be a little bit louder? We haven't started the proceeding, *per se*, yet, but we're on the record. But can you go a

little bit louder? So, you're being transcribed, and the transcriptionist, it's not ideal for him.

MR. JAMES: Can I be louder?

PRESIDING OFCR. SCOTT: Yes, if you would.

MR. JAMES: How's this?

PRESIDING OFCR. SCOTT: Almost no difference. Can you come closer to whatever you're speaking into?

MR. JAMES: No difference? Well, I've got a headset, I've got a headset microphone on. So, let's see what I can do about that.

Is this any louder?

PRESIDING OFCR. SCOTT: Not to me. We'll press on. But, if you can remember to speak up, as may be artificially loud for what may make sense for you, but that may help us.

So, why don't we start. Is he already sworn in, Steve?

MR. PATNAUDE: No.

PRESIDING OFCR. SCOTT: All right. We'll start. You're going to need to be sworn

in. So, we'll start with that.

(Whereupon ***Richard James***, appearing via teleconference, was duly sworn by the Court Reporter.)

PRESIDING OFCR. SCOTT: And next, Mr. James, Attorney Iacopino is going to ask you to swear in any testimony.

RICHARD JAMES, SWORN

DIRECT EXAMINATION

BY MR. IACOPINO:

Q. Good morning, Mr. James. Here in the hearings room we have a document entitled "Prefiled Testimony of Richard R. James prepared on behalf of Antrim resident Janice Longgood", dated May 23, 2016. Is that, in fact, your prefiled testimony in this case?

A. Yes, it is.

Q. Okay. And we also have a document entitled "Prefiled Supplemental Testimony of Richard R. James, August 16, 2016". Is that your supplemental prefiled testimony in this case?

A. Yes, it is.

Q. Okay. And, if you were to testify in person

here today, would you testify in accordance with those two documents?
A. Yes, I would.
Q. Okay. And do you have any changes or additions to make to your testimony?
A. Not to that testimony. I have had some changes on my personal qualifications.
Q. Okay. We'll leave that --
A. I don't know if you want to address those now or later?
Q. No. We'll leave that to the parties to ask you about, okay?
A. Okay.

MR. IACOPINO: Ms. Berwick is raising her hand. She had passed out before a document that's been marked as "Abutter 42". And, Ms. Berwick, your floor.

MS. BERWICK: I had understood, Mr. James, that you wanted this to be an addition to your testimony?

WITNESS JAMES: Yes. Since I last filed my qualifications, I have had another paper published in a peer-review journal. Title of it is "Wind Turbine Noise and Human

Health: A Four-Decade History of Evidence that Wind Turbines Pose Risks". And that was co-authored by Dr. Jerry Punch and myself, and published on the Hearing Health Technology Journal website just a few weeks ago.

MR. NEEDLEMAN: And, Mr. Chair, I'm going to object to this exhibit.

PRESIDING OFCR. SCOTT: So, Mr. James, we have an objection. So, we're going to discuss that next. So, if you could hold on.

MR. NEEDLEMAN: So, I have several bases for my objection. First of all, Mr. James is not being offered as a health expert here. As far as I recall, there is a single line in his testimony which mentions that he could be available to answer health questions, if called upon. He provided no affirmative testimonies about health impacts, number one.

Number two, it's my understanding that he doesn't have a medical background professionally and he's not an epidemiologist professionally. And, so, I wouldn't be qualified professionally to speak to health

impacts.

And, number three, to the extent that this is an effort to supplement testimony in any way, it could have been done and should have been done on August 15th, when everybody else supplemented, including Mr. James. And, trying to slip it in as a new report, that then becomes the basis for talking about the substantive content of the report, I think is unfair.

PRESIDING OFCR. SCOTT: I'm inclined to agree. Before I rule, is there any -- I'm sorry.

WITNESS JAMES: I would like to comment. It wasn't available --

[Court reporter interruption.]

PRESIDING OFCR. SCOTT: Hold on, Mr. James. Mr. James. Mr. James, can you hold on please.

WITNESS JAMES: Yes.

PRESIDING OFCR. SCOTT: First of all, before we -- Mr. James, hold on. So, we'll come back to you. We didn't get any of that. So, just hold on while we discuss things in

here.

Ms. Berwick.

MS. BERWICK: I just want to say, it's my understanding that, and I haven't had a chance to actually read the whole thing through, but it's my understanding that this -- this is a new article that he wrote, in which they reviewed different studies that were done. And, so, you don't have to be a doctor to review medical studies. I'm a nurse, but I can review medical studies. I can actually review wind turbine studies, and I'm not, you know, a wind expert. But I do know how to tell junk science from real research.

So, and it wasn't available, because it wasn't completed. This is a long project, I believe, he's been working on.

PRESIDING OFCR. SCOTT: Ms. Linowes.

MS. LINOWES: Mr. Chairman, if I may? I just wanted to correct the record regarding something that Attorney Needleman had said. He said that "there is only one line in Mr. James' testimony".

I believe that there is a question

dedicated to his having been satisfying the Daubert Standard to -- in a court of law where he was qualified by a judge, a federal judge, to -- I believe it was federal, he can correct me on that, to discuss the impacts of wind turbines on human health. So, it is not -- I have no intention of asking questions about that, but I did want to make that clarification.

PRESIDING OFCR. SCOTT: Anybody else, before I go to Mr. James?

MS. MALONEY: I just, I mean, I understood that there was -- I, obviously, haven't read this, but I understood that there was an obligation to submit supplemental testimony by August 15th. But I think that there was, in general, you can correct me if I'm wrong, as things changed, if things changed, there was an obligation to supplement your testimony. And I think he said he's supplementing this as part of his -- his credentials and his resumé and his CV. So, I think that's what he said, so --

MS. BERWICK: And can I just say one

thing? I made copies --

PRESIDING OFCR. SCOTT: Hold on a second please.

(Presiding Officer Scott and Mr. Iacopino conferring.)

PRESIDING OFCR. SCOTT: Go ahead, Ms. Berwick.

MS. BERWICK: I made hard copies for all the Committee and for just Mr. Needleman and Public Counsel. I sent everyone else an e-mail link. But I sent you a message by e-mail with a link so that you can get to the study.

MR. RICHARDSON: Mr. Chairman, if I may? I think, unfortunately, in any proceeding like this, you know, the key is everyone needs to get the testimony and needs time to review it and digest it. And, if, under the circumstances that this has arisen, I think it would just be highly prejudicial to the process. So, I think sometimes, unfortunately, while it would be great to allow everyone the opportunity to get all information, sometimes we do have to draw a line. And I think, in

fairness to everyone, makes that appropriate here to do that.

MS. BERWICK: May I say that I thought that the Antrim town had expressed that they wanted all adoptions to -- I mean, they wanted the Committee to have all the information so that they could make an intelligent decision based on their superior knowledge of the situation.

MR. RICHARDSON: And precisely my point is, is that, you know, if we get the information now, we can't review it. We don't know what weaknesses may be in it. I mean, I haven't even seen the document, I don't have a copy of it. So, it would be admitting something into the record that none of us have had a chance to look at, which is the underlying problem.

PRESIDING OFCR. SCOTT: I agree. I did -- I guess I suppose I promised Mr. James that, do you have a comment on this, before I rule?

WITNESS JAMES: My comment on it is that I provided a list of publications and

qualifications. And I wanted to make sure that this was added to that.

I don't intend to testify on anything in the document, unless questions are asked by opposing counsel.

PRESIDING OFCR. SCOTT: All right. Thank you.

MR. NEEDLEMAN: Mr. --

PRESIDING OFCR. SCOTT: All right.

MR. NEEDLEMAN: I'm sorry. And really one further point. I was going to save this for cross-examination, but I feel obligated to bring it up now.

Ms. Linowes mentioned that, on Pages 2 and 3 of Mr. James's testimony he talks about being qualified in a federal court under the Daubert Standard. A later decision from a federal court, after that one, that came out one month before Mr. James filed his testimony, in the case of *Williams versus Invenergy*, which is the United States District Court opinion from an Oregon Federal Court, also looked at Mr. James's qualifications with respect to testifying as a health expert in wind cases,

and found that he was not qualified to do so.

And Mr. James -- that opinion came out after these other ones, and before he filed his testimony, and that was not at all indicated --

WITNESS JAMES: Can I comment -- can I comment on that?

PRESIDING OFCR. SCOTT: All right. One last comment, before I rule. Go ahead.

WITNESS JAMES: Can I comment on that?

PRESIDING OFCR. SCOTT: Yes.

WITNESS JAMES: That decision was not a Daubert hearing. It was a motion for a Daubert hearing. And the client in that case did not have the funds to go forward with it. So, the judge's decision was not an overruling of a prior Daubert decision. It was only the judge's decision based upon my client's decision not to pursue the Daubert hearing.

MR. NEEDLEMAN: I would be happy to provide a copy, which I have here. But it specifically is an order saying that Mr. James's causation opinion is not

scientifically reliable.

PRESIDING OFCR. SCOTT: All right. So, --

WITNESS JAMES: Because he did not go through the Daubert hearing.

PRESIDING OFCR. SCOTT: Okay. So, I'm going to finish the discussion on this.

I'm going to sustain the objection and not allow this in, frankly, mostly based on procedural grounds. Nobody, including the Committee, has had a chance to -- we've never seen this before. So, as Attorney Richardson said, I have to agree, we have to draw a line someplace. It doesn't mean that perhaps, I'm sure there's a lot of work that went into this, but that's not the point for this proceeding at the moment.

MS. LINOWES: Mr. Chairman? Mr. Chairman?

PRESIDING OFCR. SCOTT: Yes.

MS. LINOWES: Would it be possible to at least amend his resumé to state that the document exists, without having to put the document itself in? Because I think that's

what he is looking to do. The document itself does not have to be put into the record.

PRESIDING OFCR. SCOTT: Well, I think he could state that in the record, that he has a new document. But, as far as admitting this document as evidence, we're not going to do that.

MS. LINOWES: Okay.

MR. IACOPINO: Can I ask a question?

PRESIDING OFCR. SCOTT: Please do.

MR. IACOPINO: Has his CV been marked as an exhibit?

MS. LINOWES: Yes, it is. It is actually, I believe, Janice Longgood's "Abutter Number 2".

MR. IACOPINO: Thank you.

MS. LINOWES: I think that's where it is.

PRESIDING OFCR. SCOTT: All right. So, I think I lost where we were. So, I think now, Mr. James, you'll be asked questions by different intervenors. And we're going to start with the Audubon Society.

MS. VON MERTENS: Thank you. No

questions.

PRESIDING OFCR. SCOTT: Got off easy. All right. Mr. James, now it will be Ms. Linowes, with the Windaction Group, will ask you questions.

MS. LINOWES: Thank you, Mr. Chairman.

WITNESS JAMES: Okay.

MS. LINOWES: Mr. James, can you hear me okay? Mr. James?

WITNESS JAMES: Yes.

MS. LINOWES: You can hear me? Okay.

WITNESS JAMES: Yes, I can.

MS. LINOWES: Okay.

CROSS-EXAMINATION

BY MS. LINOWES:

Q. So, just housekeeping then, I'd like to ask you a couple of questions regarding your biographical sketch, which is Exhibit Abutter 2. Appears that you've been working as an acoustician for 45 years, is that correct?

A. Yes. That is correct.

Q. And how many years have you been involved with predicting and measuring noise emissions

related to operating wind projects?
A. Almost approximately nine years at this time.
Q. And, roughly, how many administrative and civil hearings have you participated in as an expert in -- on wind energy noise?
A. Thirty-five, in which there was official hearings, many more in a nonofficial capacity.
Q. And you were also a witness before the Site Evaluation Committee on the prior docket for Antrim Wind?
A. Yes, I was.
Q. Okay. Thank you. And, Mr. James, and just -- I just have a series of questions I want to go through with you regarding the predictive modeling that was done on the Project. You're aware that Mr. -- you were available and listening in when Mr. O'Neal was on the witness stand, is that correct?
A. Yes. That is correct.
Q. And you're aware that, according to the SEC rules for wind energy facilities, applicants are required to prepare predictive modeling studies in accordance with the ISO 9613-2 Standard?

A. Yes. I was an advisor to the Committee preparing the rules, and I'm aware of that qual -- or, that requirement.
Q. Okay. Just to correct the record, you were -- you participated in the stakeholder process, is that correct?
A. That's correct.
Q. Okay. It was actually the Site Evaluation Committee that prepared the final rules. Now, do you recall that Mr. O'Neal ran his predictive model for the Project using a ground absorption factor or G factor of 0.5?
A. Yes, I do.
Q. And a turbine manufacturer uncertainty factor or K factor of 1.5, based on the Siemens turbine. You recall that?
A. Yes, I do.
Q. Okay. Good. Thank you. And, on cross, Mr. O'Neal explained that the ground attenuation is mainly the result of sound reflected by ground surface interfering with sound propagation directly from the sound to the receiver. And, in layman's terms, would this mean that this noise coming from the source could hit the

ground or forest canopy and a portion of that energy will be absorbed, which would reduce the overall sound level. Is that what that means?

A. That's what he is saying, yes.

Q. Okay. And he --

A. I don't agree -- I don't agree with it. But that's what he is saying.

Q. Okay. So, in this situation, the turbine hub height, for most of the turbines, is 92.5 meters, or 303 feet above the ground, situated on a ridgeline which is above residential properties. Is it possible that the sound emissions, in a circumstance like that, may not even touch the ground and could travel directly to the roof of a home?

A. As long as the hub and the blades are in line-of-sight, the primary noise that's going to be measured at the receiving location is going to be the direct sound, not the reflected sounds.

When you put a wind turbine on a ridge, over a forest -- or, a forest with a canopy, sometimes the sound won't even reach the ground, because it will reflect off of the

forest leaves.

So, the bulk of -- the primary sound reaching the homes is the direct, not the reflective. And that is why it's generally good practice to exclude the ground attenuation components from the ISO model. And that's done by setting them equal to zero.

Q. Now, he has argued that the 0.5 would be appropriate, which would be the "mixed ground". But has also stated that the difference between a ground absorption of zero, which you're saying "hard, non-reflective" -- or, rather, "reflective surfaces", I believe that's the correct term, --

A. Right.

Q. -- and 0.5 for mixed is a three decibel difference. Is that your understanding as well?

A. That is a good approximation.

Q. Okay.

A. That would be a reasonable approximation, yes. That, by not -- by considering ground absorption, the sound levels being received at distant properties is attenuated by three dB.

Q. Okay. Great. Thank you. I want to come back to the turbine tests a little bit later. But just let's leave the G factor for now, and I wanted to discuss the K factor.

According to Mr. O'Neal, and I know you have seen this, and I'm just confirming, that the Siemens turbine has an apparent sound power level of 106 decibels, and a K factor of 1.5 decibels, bringing the total output of -- noise output level at 107.5 decibels. Is that your understanding?

A. Yes.

Q. Okay. Now, I'd like to call your attention to the Exhibit WA-12. Do you have the exhibits that we're going -- the Wind Action exhibits that we're going to be talking about today?

A. Yes, I do. It will take me a while to find that one in particular, but, yes, I do.

Q. This would be the Massachusetts --

A. Here we go.

Q. Okay. This is WA-12, the Massachusetts CEC Wind Turbine Acoustics Study?

A. Yes.

Q. And, if you can go to PDF Page 62, there's a

section there called "Wind Turbine Sound Emissions". Do you see that?

A. Yes, I do.

Q. Okay. In the first paragraph, there's a brief discussion of a standard noted as the "IEC 61400-11 standard" for measuring wind turbine sound in a standardized way. Can you explain what the purpose of this standard is? Why it's conducted? And what you understand the conditions surrounding the test are?

A. Yes, I can. The paragraph, that I think the most important word in that paragraph is the word "standardized". The goal of the IEC standard or test, 61400 Part 11 and the other parts, is not to produce a stress test on wind turbines, but to produce a standardized way of measurement, so that a test done on one turbine by one -- by one lab and can be compared to tests done on another turbine by another lab, so that people can make decisions as to which one produces the least noise.

I try to -- I try to represent this test as the familiar test we've seen on automobiles for mileage, EPA mileage tests. Those are

standardized, so that each manufacturer has to put a label on a car that describes the city and the highway mileage. And, because that is a standardized test, they always include the disclaimer that "your" -- and I'm going to paraphrase this, "your mileage may differ".

The IEC test has to be looked at in the same way. It is a standardized test designed to allow people, purchasers or communities, to compare one wind turbine's noise output to another. But it is by no means going to be entirely predictive of what happens when that wind turbine is operated in different weather conditions or in a different operating mode or on different *[inaudible*]. And, therefore, "standardized" really means "your mileage may differ".

Q. Okay. And what are the conditions -- oh, I'm sorry.

A. [inaudible] usually done a test for that test to correct.

Q. Thank you, Mr. James. What are the conditions that that test is conducted? I mean, Mr. O'Neal did say that it occurs on "flat ground".

But, other than that, we really didn't discuss the conditions under which the test is done.

A. Could you repeat please?

Q. Sure. The conditions in which the turbine noise are tested -- in which the turbine is tested for noise, Mr. O'Neal did confirm on the witness stand that he understood the test to be done on "flat ground", so not on a ridgeline. But are there other conditions that you can -- that you might know about when the test is done?

A. Yes. Yes. Okay. Yes. Well, first of all, it is flat ground. But, not only is it flat ground, it's generally an area that has very little vegetation. Because any kind of surface vegetation, which, in the model is -- not in the model, in the test s called "surface roughness". Any shrubbery, any trees, any structures, *etcetera*, cause turbulence, and that can affect the noise output of a wind turbine. So, these test sites are essentially barren land, with nothing that would obstruct the windfall **[**?**]**. So, that's one thing, and that's very non-typical of where wind turbines

are located, except in some ideal situations on flat land, definitely not ridge land.

The other is that the assumption is that there's no surface shrubbery. And, on a ridge, we definitely have vegetation below the wind turbines, and in the valleys, over on the ridge and in the valleys below.

The other is that the IEC test carefully controls the wind conditions coming into the blades. While I have not seen the part of the standard that specifies wind and weather, I have seen test reports that show that a 0.2 -- a wind shear of 0.2 is the highest wind shear that these tests are conducted under. And many of the wind turbines, where I've seen the data from the tests, show wind shears of about 0.13. And these are low enough wind shears that there's little difference in wind speed between the air moving into the blades at the bottom and at the top of the rotation pattern. Which is that *[inaudible]* energy production and for minimizing noise.

So, those are the kind of -- those are the kind of controls put on it for the standardized

test, that don't really apply once you locate a wind turbine in the real world.

Q. Okay. Thank you. Now, I want to go down, in that same section on that page, "Wind Turbine Sound Emissions", there's a section -- there's a third paragraph that starts "In addition". Do you see that?

A. Yes, I do.

Q. Okay. And the last sentence of that paragraph says "This uncertainty factor", which is the K factor, "accounts for a 5 percent chance that an apparent sound power level measurement made according to the standard would exceed the declared value." And it says a "K factor typically ranges from one and a half to two decibels."

What is that saying right there?

A. Well, that's saying -- that's saying quite a bit. First of all, I want to draw everyone's attention to the word "apparent sound power level". The reason why the phrase "apparent" -- or, the word "apparent" appears with that, is that this isn't a true sound power level measurement. And maybe the discussion goes on,

I can give an example of just why I say that.

The other is that the K factor is not -- is a measurement uncertainty factor. In other words, under the control conditions of this standardized test, at a distance that is only one and a half times the height -- total height of the wind turbine away from the base. So, we're up fairly close to the wind turbine. They can take a measurement and have it be repeated within one and a half to two decibels. So, this is measurement repeatability for that measurement.

That uncertainty, however, is not assured, once you move to a different location, and it definitely is not assured as you move further and further away from the wind turbines, or the weather conditions change from those that are used for the wind turbine IEC test.

Q. Okay. Okay. You're getting a little ahead of me, but that --

A. [inaudible] It has to be understood as the accuracy of the test under these standardized conditions, and taken with more than a grain of salt, when you talk about how those apparent

sound power levels propagate out in the community when the distances are greater than only the 400 feet from the base of the wind turbines.

Q. We're going to come back, because I do have an exhibit that I want to go over with you, to talk about what you just mentioned. Let's just stick with what we have here. And there is, under the Site Evaluation Committee rule for conducting predictive modeling, this would be 301.18(c)(3), the study is required, again, this is under New Hampshire's rules, to "include predictions made at all properties within two miles of the project's turbines for the wind speed and operating mode that will result in the worst case wind turbine sound emissions during the hours from 8:00 a.m. and after" -- excuse me -- "before 8:00 a.m. and after 8:00 p.m. each day". Are you aware of that, the requirement?

A. Yes, I am. Yes, I am.

Q. So, operate the worst case wind turbine emissions? Now, --

A. That's correct.

Q. Okay. So, then, according to Mr. O'Neal, in his report, and we could pull it up, but I believe you know this, he input the 107.5 decibel dBA from the IEC test into his model, which he said was the highest wind turbine sound power level that the turbines would produce, and, therefore, was the worst case.

Does the 107.5 decibels represent the highest sound power level and, therefore, the worst case for the Antrim Wind facility?

A. Now, this, again, is where I repeat the metaphor of using the EPA mileage standardized test. When he says "worst case", he's referring only to the test done at the laboratory, which is not a worst case for sound power output. What he's using is the highest sound power level that was produced during a condition that is the ideal operating condition. The ideal operating condition being the one that produces the most power and produces the least noise.

So, his worst case is the worst case for a rosy scenario. A rosy scenario doesn't occur out in the real world.

So, does the 107.5 dBA represent the highest sound power level and the worst case for Antrim? No, it doesn't.

Q. Okay.

A. It represents the worst case for the test lab, and that's all it represents.

Q. Thank you. Okay. So, now, in the next paragraph there, it talks about -- it begins with "Manufacturers may use the results from the IEC test", Part 11 and 14, "to guarantee to the purchaser the sound emissions from their wind turbines." Then, it says "However, the guarantee may be lower or higher that the IEC Part 11 tests. For example, in a guarantee, a manufacturer may increase the declared sound level to account meteorological conditions that may occur outside of the test conditions." Is that what you're talking about?

A. That is exactly what I'm talking about, and that is what I am claiming Mr. O'Neal ignores. Even the standard and the paper done by Mr. O'Neal and Mr. Kaliski for the Mass. CEC admit that different wind conditions and meteorological conditions can result in

increased sound levels. But, somehow, in what I gather from Mr. O'Neal's written and oral testimony, he is now claiming that no such increase can ever happen under any conditions.

Q. Okay. Mr. James, I would like to now direct your attention, and everyone here, to Wind Action -- Wind Action Exhibit WA-08, these would be our data requests. And, specifically, Question Number WA 1-10. Do you have that?

A. Okay. I have it.

Q. Okay. Now, the question here was, to Mr. O'Neal, on "Page 8-1 of Mr. O'Neal's noise report states that the "Antrim Wind Energy Project will easily meet the standards set forth by the New Hampshire SEC [rules]. Please state whether there are any atmospheric conditions, temperature gradients or wind shear gradients that could cause sound levels at any given location to be higher than what is predicted." And he says "No." Whether -- it says "Please state whether there are any circumstances where the predicted noise level will be higher" -- excuse me, I do this all the time. "Please state whether there are any

atmospheric conditions, temperature gradients or wind shear gradients that could cause sound levels at any given location to be higher than what is predicted." And he says that there are none. Do you agree with that?

A. Well, I don't agree with it, and it seems that he doesn't even agree with his written report to Mass. CEC, where he says that it can increase the sound level due to meteorological conditions.

I look at this kind of and know no one in science, no one in engineering, believes that there is no -- that their measurements in the models are precise. We always acknowledge tolerances. In his statement of "no", it just seems to be a blanket non-scientific response.

Q. Okay.

A. And it doesn't agree with what was written in the Mass. CEC Report.

Q. Now, Mr. James, there was substantial discussion when Mr. O'Neal was on the witness stand regarding inversions. And I'll just tell you, because it's already been stated here publicly, where this is where you have calm or

no winds near the ground, while there are quite turbulent winds aloft and the turbines are going to be operating at full power. Do you agree with that?

A. Yes.

Q. Now, can you -- can you explain your experience with turbine noise under these circumstances? That is, and I guess I would like to consider a case where you have highly turbulent wind conditions up at the hub height -- hub level?

A. I have done a number of tests where I have monitored a wind turbine at a residence from afternoon, into the late evening or even into the late night. And, in those situations, the daytime sound levels, which have low wind shear, and definitely are not subject to temperature inversions, particularly if it's sunny, the sound -- the sound from a wind turbine is about the same level as what we get from the IEC 61400-11 tests.

But, as the Sun goes down, and the surface of the ground begins to cool, and an inversion boundary forms such that we have cool air at the surface and warm air above it, we end up

with two things happening. One, it's very quiet at the ground. We don't have -- we don't have any sounds of wind blowing around structures. The leaves on the trees aren't moving.

And, yet, at the hub level, there's more than sufficient wind to power the wind turbine at optimal levels, and the character of the sound begins to change, from the steady roar, to one that has *a whooshing* or a thumping characteristic. And this is concurrent with an increase in the overall sound level.

So, this condition that we're looking at, of calm winds at night and high winds aloft, is actually the worst-case condition, because it increases both the sound emitted from the wind turbines, the apparent sound power level, and also increases the sound propagation.

And, because the turbine can no longer operate with what I would call "clean in-flow air", air that has no turbulence, and is relatively the same speed from the bottom to the top of a location. We begin to pick up these whooshes that are characteristic of night

complaints.

So, that's been my experience. And that condition is one of the worst case, particularly for outdoor noise.

Q. Okay. Did I also hear you use the term "thumping"? Because people have described the term -- so, there's the whoosh or the thump or the both -- or both?

A. Well, that is -- I've heard both.

Q. Okay.

A. I've heard both.

Q. So, now, I want to, again --

A. [inaudible] nothing seems to be more associated with high wind speeds and [inaudible] turbulence. When storm fronts are coming, and we have a lot of turbulent air, eddies, microbursts, where the wind -- where wind turbine's blades lose lift, and create a thump, not just a whoosh.

Q. So, you're saying there's lots of different types of sounds that can come out of the whole rotor structure, depending on the wind directions and the conditions of the wind?

MR. NEEDLEMAN: Mr. Chair, I'm just

going to --

BY THE WITNESS:

A. That is correct.

MR. NEEDLEMAN: -- I'm just going to object at this point. It seems as though -- I'm on Page 12, over to 13, of Mr. O'Neal's **[**Mr. James'**?]** Testimony. It seems as though a lot of questions are just designed to elicit responses that he's already testified to. I'm looking at descriptions of inversions, and the problems that he's been talking about with the tests, and the thumping sounds and whooshing sounds and so forth.

MS. LINOWES: Okay. I'll move on.

PRESIDING OFCR. SCOTT: So, again, for everybody, you can assume we've read the testimony.

MS. LINOWES: Yes. Thank you.

PRESIDING OFCR. SCOTT: Hold on a second.

[Brief off-the-record comment by the Court Reporter to the Presiding Officer.]

PRESIDING OFCR. SCOTT: Also, for the

record, when we have an intervenor, and I understand there's extenuating circumstances, asked to do, for instance, telephonically, part of that should be the assumption that, if we can't hear very well, the transcript may not be perfect. So, the transcriptionist is going to do the best he can.

So, Mr. James, what's happening, on occasion, you're cutting out. I don't know if it's your headset, if you could go to your handset instead, I don't know. So, it's not a great audio we're getting. So, I just want the record to reflect that the transcript will be reflecting that also.

So, why don't you proceed, Ms. Linowes.

WITNESS JAMES: Okay. I understand. I have intermittent cutouts from your microphones also. And I suspect it's more of a line condition than it is just my headset.

PRESIDING OFCR. SCOTT: Okay. With that --

WITNESS JAMES: If I move my headset closer -- I've moved my headset closer

to my mouth, and see if that will help in any way.

PRESIDING OFCR. SCOTT: All right. The very last of what you just said seemed to come in better. So, I think, if you do move it closer, that would help us.

Ms. Linowes.

MS. LINOWES: Thank you.

BY MS. LINOWES:

Q. Mr. James, if we could look at WA-08 again, and this time Question WA 1-12. And, in this question, I had asked Antrim Wind, "in looking at one year's worth of wind data collected at the meteorological tower, to please state the percentage of times when wind shear was measured greater than 0.2 at the hub-height when wind speeds were above 3 meters per second. And identify generally the periods of -- periods of higher wind shear were found at nighttime between the hours of 8pm and 8am."

Now, you had also mentioned the 0.2 with regard to the IEC test, is that correct?

A. Yes.

Q. Okay.

A. Yes. That is correct. That's the highest number for the IEC specs.
Q. And the Applicant responded "The wind shear exponent when **[**was**?]** measured, and greater than 0.2, at hub-height, when wind speeds were above 3 meters per second occurred 19 percent of the time during the calendar year 2010." And, then says "These periods occurred" -- "were measured these levels occurring during all hours of the day but with greater frequency during the hours between 8:00 p.m. and 8:00 a.m." What is that saying?
A. That's basically, if I interpret that, that's confirming my observations before. That, when wind shear does occur, when high levels of wind shear above 0.2 occur, they're commonly a nighttime phenomena, 8:00 p.m. to 8:00 a.m. And that this phenomena occurs at about 20 percent of the time. If you think of that, I mean, if you figure that most of it's nighttime. So, that's about 40 percent -- well, let's say 30 to 40 percent of all nights of the year. So, that's a fairly -- that's a fairly high percentage, when we have conditions

that do not relate back to the IEC standardized test and conditions that are known to increase the sound level that is above what is considered worst case for the IEC test. So, this is the true worst-case condition. And we see that it's roughly three out of ten nights over the year.

Q. Okay. So, then, bear with me for one second please. According to Mr. O'Neal, and what he said on the witness stand, was that the maximum noise level predicted from his model, excluding participating landowners and one other property, was 38 decibels, according to the -- according to the model. So, and that -- that model, the 9613-2, is that putting out absolute maximum figures? And, so, if that's what we're looking at, 38 decibels from his model, is that a long-term average or is that an absolute number?

A. Well, that -- first, we have to understand this model is very simplistic. It doesn't address the idea of sound levels fluctuating up or down, and doesn't address how wind is blowing, other than the requirement that we have calm

conditions and a noise source close to the ground.

What the ISO model requires is that the input data of apparent sound power levels to represent the worst-case conditions, that input sound power level has to be representative of what happens on a test band when the weather is similar with high wind shear. We don't get that kind of data from the manufacturers. Their standardized test is for the low wind shear condition.

So, what is generally recommended, by people like myself, is that we have an additive. We add five decibels, ten decibels, to the apparent sound power level, to account for the fact that the original data was for low or no wind shear. So, that is the only way to get the model to adequately predict noise levels when there's high wind shear, and that is to put in data that is adjusted to a -- to represent that higher shear.

Q. Okay. Thank you. Now, you have stated in your testimony, and you don't have to call it out, but it's with regard to the 9613-2 standard, it

comes with a plus or minus three decibel confidence limit. Is that -- you're aware of that, obviously?

A. Yes.

Q. Now, Mr. O'Neal --

A. Yes. But that --

Q. No, go ahead.

A. Go ahead.

Q. Mr. O'Neal --

A. I was going to say, that three dB confidence limit also applies to the limited weather conditions for which the model is validated. And that is for a noise source that is 30 meters or closer to the ground, at distances of a less than a kilometer, and for winds that doesn't have turbulence. A "mild downwind condition" is how you describe it.

Q. Okay. Then, --

A. So, all of those deviations have to be accounted for by the modeler using adjustments. And Mr. O'Neal doesn't do that.

Q. Well, he makes that same point, Mr. James. He says that the turbine is the -- the noise source is located outside the limits of the

model. The receptor is located outside the limits of the model. Therefore, those -- that three decibels should not be applied, and he doesn't apply it. So, all he does apply for --

A. That's absurd.

Q. Okay. Let me finish.

A. If I understand you correctly -- if I understand you correctly, what you're saying is that Mr. O'Neal notices that the receiving locations for Antrim Wind are at distances greater than how it was originally validated for. And that somehow, because it's at a greater distance, now we have a model that is perfectly accurate and doesn't require tolerances. That's scientifically absurd.

Q. Okay. Let's talk about that then. Because he points to -- he pulled two documents into the record, or cited them, the Wallace paper, which is the Exhibit WA-6, and also this Mass. CEC Report, which is, again, WA-12. And let's focus on that one then, the Mass. CEC Report. If you could go to Page 77 of that report. Which, by the way, --

A. Seventy-seven?

Q. Pardon me?
A. "Page 77" you said?
Q. Page 77, yes. And, also, for everyone that's here, I did make a paper copy of this one page. It will be WA-25x for convenience, if you wanted to look at that. And --
A. And just so I'm right. Are we looking here at Figure 24?
Q. That's correct.
A. "Comparison Between Monitoring Results and Modeling Results - Mountainous Locations Part 1"?
Q. Correct.
A. Okay.
Q. Now, Mr. O'Neal already explained, when he was on the witness stand, what this diagram shows. But I just wanted to get your understanding of what we're looking at.

If we look at the third graph on that page, the one that has associated with it the "ISO 9613-2", with a G factor of "0.5" and a K factor of "2 dB", which, for the turbines used at this mountainous location was 2, instead of 1.5.

Now -- so, these are the conditions. The model that was used are the -- uses the same parameters that Mr. O'Neal used when he ran his model on Antrim Wind. And what we're looking at is the -- how well the actual measurements at an operating wind project match the model, or how well the model match the actual measurements.

So, can you tell us what we're looking at here? What the results are?

A. That is correct. That's how I interpret it also.

Q. And what are you -- what do you see in this graph?

A. Well, the bottom graph, the one labeled "ISO 9613 Part 2", where G equals 5, and uses a plus 2 dB offset, we look at that graph, there's a vertical blue line roughly at about 41 decibels, maybe a little over 41 decibels, that rises up to the diagonal line. That represents the point where measurements and models are equal, where the model is accurate. All of those blue points over to the right of the blue line show where the model under predicted, in

other words, the measurements are higher.

Had we added the three dB that the ISO model calls for, in other words, G equals 0.5, plus 2 and a plus 3, then all the blue dots would be to the left of the blue line. And that is what I'm saying, because we need the plus 3 dB tolerance for the ISO model added, in order to be assured that the predictive values will be equal to or possibly greater than what would be measured in the real word for the same weather conditions. And, again, I don't know the weather conditions for this particular test. But it appears, from the clustering of the data, that they were not high wind shear conditions, or possibly these are the points for the high wind shear conditions.

Q. Mr. James, let me ask you this question. With regard to modeling, is it all -- is it generally better to have a model that slightly over predicts, rather than under predicts?

A. If the purpose of the model -- well, first of all, all models should be given tolerances. We see that when we look at models for polling, which we're getting inundated with. We can

have a poll, and it will say "plus or minus X percent". Now, that's the way science uses models, we put tolerances on it. And, even when we have models, like polling, where everyone does the polls the same way, we can look at two different polls and see two different means with two different statistical breakdowns. Models are not precise. Models are not accurate. So, if we're applying the output of that model to a decision that could affect human health, then it is absolutely necessary that the model have sufficient tolerances and be interpreted with those tolerances, so that we err on the side of caution.

Q. Okay. Thank you.

A. And that means the model should -- the model should be designed to over predict, so we have a margin of safety, to accommodate, you know, things like different weather conditions, *etcetera*. And, in the Antrim Wind model, there is no margin of safety.

Q. So, I don't have a lot of time, Mr. James. I'm just going to go quickly through the remaining

questions I have for you.

With regard to this, on the bottom of this page, it says "Comparison between monitoring results (five-minute Leq) and modeled results for mountainous locations." Okay. Now, that "Leq five minutes", and I want to talk to you for a moment about that. You know that the New Hampshire standard is a not-to-exceed standard of 40 decibels at night?

A. Yes.

Q. Okay. So, there is no averaging on the -- according to the standard in New Hampshire. So, how --

A. That is correct. That is correct. For this type -- for each of these little blue dots, the five-minute Leqs, if the wind turbine had fluctuating noise, whooshes or thumps during the measurement, we could expect that the sound levels on a not-to-exceed scale could be anywhere from three to five, possibly more, decibels above the average. And I believe, in my testimony, in my written testimony, I pointed out that that's commonly found by acousticians working on follow-up complaints,

including those like Mr. Hessler, who worked primarily for the wind developers.

Q. Okay. So, now, I wanted to give you -- I'm losing track of my questions. Hold on one second.

Okay. Now, Mr. O'Neal, when we talked about this chart with him, he had stated that the under predictions that are occurring, that situation where we have dots that are over on the right-hand side, was an artifact of the on/off tests. Now, the State of New Hampshire also requires, for its post-construction study, or at least one way of conducting a post-construction study is using an on/off test. Can you explain just briefly what the on/off test is, and how that could have been a factor in this, in what Mr. O'Neal is saying was a problem here with that data?

A. Well, first, I'd like to address his explanation. If the data that we're looking at on the charts is contaminated because part of the ten-minute or five-minute Leq included an on or an off condition, in other words, both, then that throws into doubt the entire study,

because we don't have good, clean data.

So, I'm going to start with the assumption that, being good scientists, this data does not have a lot of artifact from on or off. But, had it been -- if these were affected by on or off, you would expect that the "off" condition, which is quieter than the "on" condition, would result in lower measurements, not higher measurements. Because the off condition will, again, be anywhere from five to ten decibels lower than the "on" condition. And, so, we should see that affecting it.

But, first, I would say I would not start with the assumption that this data is contaminated, as he described, just because I think that, as researchers, they would have been much more careful and not allow that to affect the data.

Q. So, that would be the wrong thing to do? If you were doing an on/off test, you would not allow that artifact in --

A. I wouldn't make the model **[**?**]**. That's right. I would have test data for the "on" condition, test data for the "off" condition, and any data

where the condition -- where there was a transition, I would exclude that.

Q. Okay. Thank you.

MS. LINOWES: I just have a couple of more questions, and then I will be done, Mr. Chairman.

BY MS. LINOWES:

Q. You're aware that NARUC document that Mr. Hessler had authored, this would be Wind Action WA-28. I think that you had just mentioned him, David Hessler.

A. Yes.

Q. And, in that document, he said that "Extensive field experience measuring operational projects indicate that sound levels commonly fluctuate by roughly plus or minus five decibels [around] the mean trend line and that short-lived spikes on the order of 15 to 20 decibels above the mean [line]." Now, and it sounds like that's your experience as well?

A. That's been my experience. That's been the experience of technicians in Ontario that follow up on complaints. And it's not just, you know, I guess I'd have to say Mr. O'Neal is

an outlier in that opinion.
Q. And I believe that you also state that it's your opinion that it's five decibels, in your prefiled testimony, on Page 14?
A. Yes.
Q. Okay.
A. Yes.
Q. Okay. And one moment, one moment please. Okay. So, based on your understanding of Mr. O'Neal using a G equals 0.5 and adding in the 1.5 for the K factor, if this Project were built, what is -- is it your sense that there will be exceedances?
A. Could you repeat that again? That broke up a little bit. I'm sorry.
Q. Based on the model that Mr. O'Neal ran, using a 0.5 for the G factor and a 1.5 for the K factor, would it be your opinion that this Project will experience exceedances when built?
A. Yes.
Q. Above the 40 decibels?
A. I think -- I think that given the data we looked at from Mass. CEC, the experience of Mr. Hessler, myself, others, like Dr. Schomer and

Rob Rand, Steve Cooper in Australia, all of us have experienced this, there's almost a certainty that, under some weather conditions, the sound from the wind turbines will exceed the SEC rules.

Q. And, Mr. James, just one last question. Mr. O'Neal stated that the operational changes can be put into effect that would reduce the noise levels by 1, 2, and even up to 5 decibels, although there was no discussion about the economic effect of doing that. Are you familiar with that methodology and what -- and how effective is it?

A. Well, NRO modes, the Noise-Reduced Operating modes, essentially are where the operator, if I can use this term, "feathers the blades" slightly so that the total energy being extracted is lower, and, consequently you get a reduction in the sound level. I don't know the -- I don't know the impact for this Siemens model, but I've looked at NRO modes for other Siemens models in Ontario, and you get roughly about a decibel reduction for every notch on the NRO mode.

So, if you reduce the energy extraction of wind turbines with 10 percent for NRO Mode 1, you get a one decibel reduction; two, two decibels for NRO 2, but then you're looking at about a 20 percent reduction.

So, on the surface, what Mr. O'Neal was saying is that, yes, if you run these wind turbines in modes where they're not producing their full power, that you can reduce the sound level a few decibels. But that comes at a huge cost for capacity. I mean, and before -- if I was an operator, before I would look at that kind of commitment, buying a large 3-megawatt wind turbine, and running it as though it's only a 2-megawatt wind turbine, I'd take a look at reducing the number of these wind turbines, increasing the distance, or using a different model.

Personally, I think, if NRO modes are going to be used as a preemptive mitigation for arguing for a permit, that really what should be done is the permit should be -- the Application should be denied, and a new application submitted, with this data detailed,

with new wind turbine locations, identification of which turbines are in what modes, the information on the economic impact of that, because that could have an impact on the economic viability of the project.

It's a little too late to come in at the end and say "Oh, well, we can patch it up later." Because, if a mistake is made, there's nothing you can do, the project's built, the damage is done.

So, this statement being made, I think, really is a call for denial of the Application, and a re-submittal of the application, using NRO modes or different wind turbines.

MS. LINOWES: Okay. Thank you very much, Mr. James. I'm all set, Mr. Chairman.

PRESIDING OFCR. SCOTT: Mr. Ward, do you have questions?

DR. WARD: A few.

PRESIDING OFCR. SCOTT: And, again, I'll advise you, we're at a real tight time constraint. So, if you could try to be concise.

DR. WARD: Well, that always seems to

apply to me. I won't claim any prejudice.

Mr. James, Fred Ward, I'm a meteorologist.

BY DR. WARD:

Q. Would you say --

A. Hello, Dr. Ward.

Q. Would you say that one of the biggest factors affecting the noise level is the meteorology, the wind speed shear, temperature inversions and such?

A. Absolutely. That is the -- that is a much more important factor than even selection of which make or model is used. That's -- that is the big factor.

Q. You don't have to -- you don't have to ruffle my furs or try to keep it down. On Day 7, I don't know whether you've read any or listened to any of the -- read the transcripts or anything, on Day 7, in the morning, on Page 53, I made it a point to ask Mr. Kenworthy whether the Antrim Wind planned to meet the specifications in 301.18(c)(3), which states more or less, and I can read it if necessary, that they will meet the worst case. Do you

recall that?
A. Well, I recall seeing that, yes.
Q. Okay. Well, it's in. If you have a copy of the SEC rules, 301.18(c)(3) says that they will meet -- they will meet the sound standards for the worst day. So, my question is, could you describe what the worst case might be? And, I'll have to say, I can't.
A. I don't know what the absolute worst case might be, because that depends upon whether you're inside or you're outdoors. Worst case outdoors, generally, is calm winds at the ground, high winds and turbulence above the temperature inversion boundary.

Worse case inside can be during a storm, when you have so much turbulence that *[inaudible]* the thumping and the other sounds are dominant. And, in those cases, people aren't outside and probably couldn't take a good measurement outside.
Q. Well, let me ask an additional question. You've heard and read the testimony by Mr. O'Neal and others. Is there anything that you could point to which would indicate that they

have ever found out what the worst -- tried to find out what the worst case is or find out what the sound levels would be that would go with the worst case?

A. No, I -- I've looked at a lot of the work that Mr. O'Neal has done, and that he has co-authored with the Mass. CEC study. And most of the work that I've seen from them appears to be measurements taken during conditions that would not be "worst case", as I would define it.

Q. Okay.

A. I define it based upon complaints.

Q. Okay. On Page 13 of ISO 9613-2, it says, and I'm sure you've heard these words before, "as specified in Clause 5, limits the effect of variable meteorological conditions on attenuation to reasonable values." Does that indicate worst wave -- worst case?

A. No. That was -- that has to be taken in context. That entire standard is designed to reflect the simple conditions where weather is not causing an impact on sound propagation.

Q. So, you would --

A. [Inaudible].
Q. So, you would expect from that that any numbers --
A. [Inaudible].
Q. I'm sorry. You would --
A. Go ahead.
Q. You would expect then that any numbers generated from that, as Mr. O'Neal did, that the actual worst case would be a lot louder, the noise levels would be a lot higher?
A. That's correct.
Q. Let me then extend that to your comments about the -- how the standard test was run. I don't think there would be any competent meteorologist who would disagree with the idea that, when you have turbulence, things are going to shake a little more, any physical structure is going to shake a little more. Would that shaking, no matter where it came from, but from shear or one -- one kind or another, would that tend to increase the noise level?
A. Well, that shaking is going to be reflected as loss of lift on the blades. And it's the same

thing as when an airplane is flying through clear skies hits the turbulent air -- part of the air, and you watch the wings begin to bounce up and down. That up-and-down bounced wings also is resulting in increased noise often heard in the cabin.

So, when you have the turbulence in the blade area, you get a completely different type of sound from the wind turbine, because the blades are no longer producing energy. They're scrubbing around in the turbulence and creating whooshes and thumps.

More than that, the turbulence will cause the sound propagating from the wind turbine to the receivers to be anything but predictable. And, as a general rule, downwind they will be higher, and upwind possibly a little bit lower.

So, the model doesn't -- the model doesn't address specifically the kind of weather conditions that would leave to complaints, and that needs to be accounted for by conservative *[inaudible]* and design margins added into the sound power level or to the results predicted from it as a post-adjustment.

Q. I asked Mr. O'Neal specifically about three kinds of shear. One would be the one with steady winds, where the wind at the top of the struck **[**sic**]** and the wind at the bottom would be different. A shear which would come about because winds could go stronger and weaker. And a third shear, which would come from the turning of the whole structure as the wind direction changes. And he said that there would be no changes, no increases in noise, with any of these three kinds of shear, or any combinations. Do you agree with that?

A. No. I think that is overly simplistic and naive.

Q. And your guess would be that it would produce more noise, but the exact form of it may be open?

A. Well, not my guess. Not my guess. My measurements.

Q. Okay.

A. And those of many other people.

Q. Well, he was very clear. And I thought I understood from something you had said before or something that I read that the things --

that the meteorological factors that contribute to noise, of both the wind speed, that is, as if wind increases, the noise level goes up, and, when you get shear, that also adds another component increasing the noise. And Mr. O'Neal denied that flat-out. Do you?

A. No, I don't. Again, I said his understanding, his representation tend to be overly simplistic, and rely upon a narrow interpretation that a test lab -- a test condition value somehow is applicable to the real world. And I'm going to just refrain the U.S. EPA mileage warning, "your mileage may differ".

Q. Well, let me now go a little deeper, a little deeper into meteorology. Every meteorologist knows that winds blowing over peaks, ridges, isolated mountains and hills and so forth, the variability in the speed, the direction, the shear, the turbulence, everything, is much more than it is over flat ground.

Now, did you find anything in any of Mr. O'Neal's testimony that indicated that he took that into account in any way whatsoever?

A. No. I found nothing in his materials that indicated he took that into account.
Q. Thank you. I have more questions. Oh, while we're at it, there was some discussion about post-construction measurements, and this ability to, I guess, derate the turbines if noise got to be a problem. And I got thinking about that, and I'm wondering, and I'm asking you, if you were designing the system to, first of all, track when the noise might be a problem, and then, secondly, to know what you would have to do to alleviate the noise, can you come up with even the -- sort of the outline of how you might go about doing that, because I can't?
A. Well, that's probably a long answer. Let me give you the short answer. The time to have made those adjustments was when the Application was *written up*, when the models were done. And, since that wasn't done, the Application itself shows that it doesn't meet the SEC rules. And the Application could be redone by Antrim Wind with different models, different distances, different NRO modes, and with all

those details spelled out, not just an afterthought dream of cross-examination as it appears that was done.

Q. Well, I have two questions then to you. Where am I going to measure the noises to know when they're happening? What kind of weather conditions they would happen under? If we're going to do it on the basis of somebody reporting that they heard more noise, what would keep me from yanking Mr. Kenworthy's chain some night when I thought he might be sleeping and just say "I hear some noise." I don't know what he'd do about it.

And I guess I'm asking you. If you had to design a system, what would you -- how would you go about doing it? Not into the details, but what would you be trying to get, so you would be able to know, if I call in and say "it's too noisy out here", whether Mr. Kenworthy would know whether it was, and what he might want to do to alleviate it?

A. I'm not sure there's anything that can be done when we're looking at *[inaudible]* slim design margins. The way to avoid that is to make sure

that the distances and the selective models are producing low enough sound levels that there's sufficient safety margins so that that doesn't occur. Once a project's built, there's not a lot that can be done about it. The work has to be done on the front-end, and it has to be done by providing some slack or some good safety margin to account for the uncertainties. And that hasn't been done in this particular model.

Q. So, you don't really know exactly how you'd go about it either?

A. No. It's a difficult thing, because the sound levels that wind turbines can produce under some conditions can be so much higher, five, ten, fifteen decibels. And, for a not-to-exceed standard, you need to have a safety margin. And, in this case, the safety margins were denied by Mr. O'Neal, the ISO plus or minus three, and I would throw another five decibels on top of it just as a safety margin, if he had included all of those, to account for the 19 percent of the time when wind shear is high.

Q. Well, I'm interested in your five, ten or

fifteen dB, because that is the kind of numbers -- those are the kind of numbers I'm thinking about, too. But I don't -- I really don't know, I've never measured them.

Let me go back to ISO 9613-2, on Page 12. And I will read you what it says. This is talking about "C_{met}", the meteorological correction. And, if you go through the equation, number (22), you basically have to conclude that C_{met} equals C_0. And, then, you go down to C_0, and it says, and I'll quote it, "is a factor, in decibels, which depends on the local meteorological statistics for wind speed and direction, and temperature gradients. What would I put in for a C_0 for Antrim Wind?

A. There was some break-up on that. There was some break-up on that, --

Q. I'm sorry let me read it again.

A. -- on that question.

Q. Okay. There's the --

A. Okay.

Q. Let me just go through it again. On Page 12 of ISO 9613-2, there's a thing called "C_{met}", meaning the "meteorological correction". And,

if you go through equation (22), you see that C_{met} equals C_0 in almost any case of interest. And, so, when you go down to C_0, and it is, and I'll quote it, "C_0 is a factor, in decibels, which depends on local meteorological statistics for wind speed and direction, and temperature gradients." Do you know what the C_0 is for the Antrim hills?

A. No. And here's why I'm going to say so. That entire section of the standard is predicated upon the noise source being close to the ground. And, in this particular case, underneath whatever temperature inversion might form, in that calm region of air, since wind turbine blades are operating above the temperature inversion, the formulas for C_{met} don't really apply.

Q. I guess that answers my --

A. They weren't designed -- they weren't designed to apply. That's one of the reasons why the use of this model is -- it's necessary to have caution and safety factors.

Q. Well, but you would agree C_{met}, which is called "meteorological correction", now doesn't that

imply some kind of a change?
A. Yes, it does. But, remember, the model -- the model is assuming that we are in a temperature inversion, with a noise source close to the ground, a receiver close to the ground, underneath the temperature inversion boundary, with winds of only 1 or 2 meters per second, a light breeze at most.
Q. Well, but Mr. O'Neal --
A. Impacted by the wind turbines.
Q. But Mr. O'Neal used this model.
A. Well, a lot of us use it, Dr. Ward.
Q. Yes.
A. A lot of us use it. We just don't put so much faith in it that we say that things "will never exceed the limits." We don't put so much faith in it that we don't apply the tolerances. We don't -- and we also use our judgment and experience to add in safety factors.
Q. Well, I guess --
A. Like I said, my safety factors, I said in testimony **[**?**]**, is going to use the K factor, the plus 3 dB, and another 5 decibels to account for the uncertainties from other

weather conditions.
Q. Well, I was -- I was sort of giving Mr. O'Neal a little boost there, by saying "okay, let's assume he doesn't know that it doesn't apply." Even giving him that, he's giving us numbers, and he still doesn't have a C_{met}, a correction. Doesn't that kind of hurt, no matter which way you believe him?
A. I can't explain why he makes these assumptions.
Q. Okay. Let me turn to --
A. I don't know any scientific reason or for -- or other reason. I would err on -- I would err on the other side with more caution.
Q. Well, let me try two other things, and I think I'll be pretty well finished.

You discussed and it's been discussed the G factor. This is that thing that counts for attenuation because of the -- whatever the ground consists of. And I have two questions under that.
A. Yes.
Q. Ice surfaces are almost completely reflective, aren't they?
A. Yes, they are.

Q. And that's a G of zero, more or less?
A. Yes.
Q. I don't know whether you've seen the weather data --
A. So, it's hard ground -- So, it's hard ground, granite-based **[**?**]** rock, exposed frozen ground. And, in wind turbine modeling, because you're looking for the worst case, the assumption should be to use a G factor of zero. But, remember again, this model assumed that the noise source is within 30 meters of the ground. So, if you're a kilometer away and you're looking at the noise source, the way the model looks at it, you're on flat ground, and the sound from the noise source to the receiver has plenty of opportunity to interact with the ground, bouncing back and forth several times, through absorption, *etcetera*.

When you put the wind turbine on a ridge, that doesn't happen. Most likely, the sound is coming off the forest canopy, or off of some other rock surfaces, but it isn't like the model algorithms were designed to address.

So, again, I urge caution in applying the

results.
Q. Well, I'm trying to give Mr. O'Neal the benefit of the doubt, but I'm having -- I'm running out of benefits.
PRESIDING OFCR. SCOTT: Mr. Ward, we're going to lose our quorum in five minutes. So, --
BY THE WITNESS:
A. I can't -- I can't explain it. It's not the way I would do it.
BY DR. WARD:
Q. Okay. Let me -- one last thing. When I asked Mr. O'Neal -- I'm sorry, let me ask to start it, you know what ducting is?
A. Yes, I do.
Q. Okay. When I asked --
A. [inaudible] if it means the same as "focusing". From an acoustical point of view, ducting leads to focused sound, where you can have sound not behave with a normal propagation, or decrease with distance.
Q. Right. It's like sound in a duct, is that correct?
A. Yes.

Q. Okay. You know what it is. When I asked Mr. O'Neal, he had never heard of it. What would your comment be about somebody talking about sound propagation who didn't know what "ducting" was?

MR. NEEDLEMAN: Mr. Chair, --

DR. WARD: You don't even have to answer it. I'm sorry.

MR. NEEDLEMAN: No, I'm going to object. I mean, that is a mischaracterization of the record, and there have been a number of them. And, I think, at this point, if people are going to talk about what Mr. O'Neal has been saying, I think they should be citing to transcripts.

DR. WARD: I'm done with the question.

PRESIDING OFCR. SCOTT: Okay. Sustained.

All right. So, Mr. James, what's your availability tomorrow morning? We are about to lose our quorum for the Committee here. So, we'll not be able to continue today. Are you available in the morning? Mr. James?

WITNESS JAMES: Yes.

PRESIDING OFCR. SCOTT: Are you available in the morning?

WITNESS JAMES: Around what time?

PRESIDING OFCR. SCOTT: It would be roughly nine o'clock, Eastern Standard Time.

WITNESS JAMES: I can be available.

PRESIDING OFCR. SCOTT: Okay. And Ms. Berwick?

MS. BERWICK: I thought there was no telephone communications over at the --

PRESIDING OFCR. SCOTT: They have a workaround they're going to try.

ADMINISTRATOR MONROE: We're going to try.

PRESIDING OFCR. SCOTT: All right. So, again, we're about to lose our quorum. So, we're going to conclude for tonight.

We will reconvene at nine o'clock, again, this is on Donovan Street. We will not be here tomorrow. We will be back to Donovan Street tomorrow.

And we'll see how far we can get. We would like to conclude, if possible. Thank

you.

(Whereupon the ***Day 10 Afternoon Session*** *was adjourned at 3:10 p.m., and the hearing to resume on* ***October 20, 2016,*** *commencing at 9:00 a.m.)*