



factor and 0.5 ground factor (Schomer). Wisconsin PSC Docket 2535-CE-100, Transcript, Vol. 4, October 12, 2012 (PSC REF #[175015](#)).

4. Attached as Exhibit B is a true and correct copy of Testimony of Hankard (selected), Tr. p. 122, regarding use of ground factor of 0.5 for most projects with the exception of wind, where he stated:

The model that we use has been shown to predict conservatively with 0.5. I mean, 0.5 ground factor is used in probably -- well, with the exception perhaps of wind turbine projects which are different because the source is elevated. But for projects like a typical power plant, a solar plant where the sources are relatively close to the ground, I would say 90 to 99 percent of the studies use 0.5.

Testimony of Hankard, p. 122, Wisconsin PSC Docket 9697-CE-100, January 16, 2019, (PSC REF #[358548](#)).

5. Attached as Exhibit C is a true and correct copy of AFCL 35 ([20183-140948-08](#)), p. "15" of Wayne Brandt lease with Invenergy.
6. Attached as Exhibit D is a true and correct copy of AFCL IR-9 to Xcel Energy, Xcel's response regarding language that Xcel Energy assume responsibility for decommission be added to permit.
7. Attached as Exhibit E is a true and correct copy of AFCL IR-10 to Xcel Energy, Xcel's response, where Xcel states that it would not change language in leases regarding landowner responsibility regarding decommissioning.
8. Attached as Exhibit F is a true and correct copy of the decommissioning cost estimate for the Palmers Creek wind project, \$7,355,822 for 18 turbines (IP-6979/WS-17-265).
9. Attached as Exhibit G is a true and correct copy of the decommissioning cost estimate for Nobles Wind Project decommissioning cost. (IP-6646/WS-09-584).
10. Attached as Exhibit H is a true and correct copy of the Exhibit H, p 4 of 8, Lake Benton Decommissioning Plan (IP-6903/WS-18-179).
11. Attached as Exhibit I is a true and correct copy of the Pleasant Valley decommission cost estimate, see p. 2 of 3 (IP-6828/WS-09-1197).
12. Attached as Exhibit J is a true and correct copy of the Freeborn Wind Hearing Exhibit AFCL 21, IR 16, Dan Litchfield (January 12, 2018).

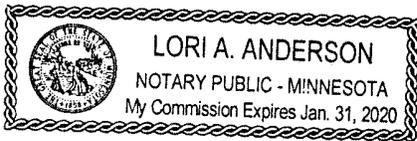
Based on the Application for Permit Amendment, and the above Exhibits, AFCL has identified issues of material fact that should be addressed in a contested case, including but not limited to:

- Whether the project can and will comply with the noise standard. Minn. R. 7030.0400.
- Whether 3 dB(A), a doubling of sound pressure, is a “non-significant increase.”
- Whether the 3 dB(A) modeling margin of error should be accounted for in determination of likely compliance.
- Whether use of a 0.5 ground factor is supported by the science of wind noise modeling.
- Whether use of 0.0 ground factor is the standard ground factor for wind noise modeling due to height of turbine and direct line to receptors on ground.
- Whether use of a 0.5 ground factor lowers modeled noise by 3 dB(A) from modeling results using 0.0 ground factor.
- Whether failure to include 3 dB(A) margin of error and 3 B(A) impact of use of 0.5 ground factors skews modeling results by predicting lower noise levels.
- Whether addition of 3 dB(A) margin of error and/or 3 dB(A) 0.5 ground factor decrease to the values of Table 5.1 demonstrates likelihood of noise levels above standard.
- Whether ISO 3613-2 and Minn. R. 7030.0400 were designed for wind noise modeling.
- Whether ISO 3613-2 and Minn. R. 7030.0400 were designed for modeling noise where noise source is high above ground level.
- Whether ISO 3613-2 and Minn. R. 7030.0400 were designed for modeling ground noise generation and ground receptors.
- Whether ambient sound measurements are to be included in modeling under 2015 Commerce and MPCA Comments and/or 2012 MPCA Guidelines.
- Whether cumulative impacts of outstate portion of this project and/or other nearby projects are to be included in modeling.
- Whether the increase in size of blades increases noise emitted, and if so, how much.
- Whether use of feathered blades decreases noise emitted, and if so, how much.
- Whether ISO 3613-2 and Minn. R. 7030.0400 address the expected sound power levels at lower bandwidths (i.e., 125, 63, 31.5, and lower).
- Whether participants and non-participants are afforded different treatment under the noise rule.
- Whether permit language and amended permit language and removal of Section 7.4.1 is consistent with requirements of Minn. R. 7030.0400.
- Whether setbacks proposed are sufficient to meet the noise standard.
- Whether small wind standards for noise and noise setbacks, are appropriate to use for LWECS.
- Whether the Commission’s/EERA’s draft site permit and site permit template sections regarding noise has a basis in law or rule.
- Whether shadow flicker modeling accurately depicts potential for impacts.
- Whether 30 hours annually is reasonable limit for shadow flicker.
- Whether project as proposed will limit shadow flicker to 30 hours annually, the ceiling for shadow flicker under both the permit and the Freeborn County ordinance.
- Whether project proposes different shadow flicker limits for participants and non-participants, and if so, whether that is a legitimate distinction.
- Whether reliance on complaints of the affected public to trigger investigation and mitigation of shadow flicker is reasonable.

- Whether applicant has provided all the required decommissioning information for Minn. R. 7854.0500, Subp. 13.
- Whether shifting timing of production of Decommissioning information out beyond granting of permit removes it from public participation and scrutiny, a limitation of due process.
- Whether lease clause allowing shift of decommissioning and cost to landowners, “allowing” landowners to then collect from owner is permissible.
- Whether financial assurance is adequate.
- Whether decommissioning costs are accurate given Xcel and other cost estimates.
- Whether Invenergy’s Dan Litchfield should be the pre-construction contact person.
- Whether the Complaint Procedures filed by Xcel Energy are adequate.

Further your affiant sayeth naught.

November 12, 2019



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Signed and affirmed before me this  
 12<sup>th</sup> day of November, 2019.

*Lori A. Anderson*  
 Notary Public

# Exhibit A

Testimony of Hankard (selected)

Wisconsin PSC Docket 9697-CE-100

January 16, 2019

PSC REF# [358548](#)

1 A I do recall that.

2 Q Do you believe that it would have been appropriate to  
3 apply a ground factor of 0.2 or 0.3 to your analysis  
4 of the Badger Hollow project?

5 A No.

6 Q Why not?

7 A The model that we use has been shown to predict  
8 conservatively with 0.5. I mean, 0.5 ground factor  
9 is used in probably -- well, with the exception  
10 perhaps of wind turbine projects which are different  
11 because the source is elevated. But for projects  
12 like a typical power plant, a solar plant where the  
13 sources are relatively close to the ground, I would  
14 say 90 to 99 percent of the studies use 0.5. And  
15 when consultants like myself go out and measure these  
16 plants after they're constructed to verify our  
17 modeling assumptions, that assumption checks out as  
18 being, if anything, overpredicting the levels. So  
19 there's no need to -- there would be no justification  
20 to use something like a .2 or .3 which would predict  
21 yet higher levels because we're already demonstrating  
22 that the model is probably overpredicting. So that  
23 would not be justified for those reasons.

24 MR. NOWICKI: Thank you. No further  
25 questions.

# Exhibit B

Testimony of Hessler and Schomer

Wisconsin PSC Docket 2535-CE-100

October 10, 2012 - Volume 4 ([PSC REF # 175015](#))

1 wondering if he's looked at these.

2 EXAMINER NEWMARK: Follow-up on what?

3 MR. REYNOLDS: Follow-up on the question  
4 of recent science. He's reviewed the literature. I  
5 want to know if he's reviewed these two articles.

6 MR. WILSON: You already released him.

7 EXAMINER NEWMARK: He's answered the  
8 question. You've had your chance to cross him.

9 MR. REYNOLDS: Well, this is in response  
10 to the redirect. Just two articles.

11 EXAMINER NEWMARK: You had your chance to  
12 cross him. You're excused. Thanks.

13 (Witness excused.)

14 EXAMINER NEWMARK: Is that the balance of  
15 the applicant's witnesses?

16 MR. WILSON: They're all done.

17 EXAMINER NEWMARK: Okay. Believe it or  
18 not, hm? All right. I think we have time for  
19 Mr. Hessler.

20 MS. NEKOLA: Clean Wisconsin would like to  
21 call Mr. Hessler.

22 DAVID HESSLER, CLEAN WISCONSIN WITNESS, DULY SWORN

23 EXAMINER NEWMARK: Thanks for your  
24 patience.

25 DIRECT EXAMINATION

1 BY MS. NEKOLA:

2 Q Good morning, Mr. Hessler.

3 A Good morning.

4 Q Please state your name and business address for the  
5 record.

6 A My name is David Hessler. My business is located at  
7 3862 Clifton Manor Place in Haymarket, Virginia.

8 Q Did you prepare 12 pages of direct testimony, nine  
9 pages of rebuttal testimony, five pages of  
10 surrebuttal testimony, and three exhibits in this  
11 proceeding?

12 A Yes, I did.

13 Q And is the information in your testimony and exhibits  
14 true and correct to the best of your knowledge?

15 A Yes, it is.

16 Q Mr. Hessler, have you had the opportunity to review  
17 Mr. Schomer's surrebuttal testimony?

18 A Yes, I have.

19 Q Mr. Schomer states that low frequency pulse will be  
20 audible to many residents of Forest. Do you agree  
21 with that?

22 A No, I don't think that's an inevitable or foregone  
23 conclusion. The --

24 MR. McKEEVER: Excuse me, Mr. Hessler.

25 Could you speak up.

1 THE WITNESS: I'm as close as I can get to  
2 this thing without eating it.

3 MR. McKEEVER: Thank you.

4 A No, I don't think that conclusion is inevitable.  
5 That research that his testimony is based on is 30  
6 years of experience evaluating health effects from  
7 low frequency noise associated with military sources  
8 like artillery and tanks. And he has just taken that  
9 result and just applied it wholesale to wind turbines  
10 without considering the dramatic difference in the  
11 magnitude of the two sources.

12 An artillery shot is, I think everyone  
13 realizes, much, much louder than any wind turbine  
14 could be. There are many studies that show that wind  
15 turbines -- the low frequency content of wind turbine  
16 noise is very, very low and is around the -- at or  
17 under the threshold of hearing. So tanks and  
18 artillery are not -- I wouldn't describe them as  
19 being near the threshold of (inaudible).

20 THE REPORTER: Near the threshold of what?

21 THE WITNESS: Hearing. (Laughter.) How  
22 about that?

23 BY MS. NEKOLA:

24 Q Mr. Hessler, is there a particular recent study that  
25 you can point to that assesses the magnitude of low

1 frequency wind turbine noise?

2 A Yeah. There's many, many studies that have been  
3 done, I've taken my own measurements. But there is  
4 one that I think kind of epitomizes the research on  
5 this topic, and it's a study that was undertaken  
6 specifically to try to address this issue of what is  
7 going on with low frequency noise in wind turbines.  
8 It's a study that was published in the Noise Control  
9 Engineering Journal April of last year by O'Neal.  
10 And just to very briefly summarize it, they kind of  
11 went through the literature and found all of the  
12 existing -- all the ones they could, all the existing  
13 thresholds for the perception of low frequency noise  
14 worldwide.

15 They did a literature review of all the  
16 papers that have -- that they could find that were  
17 ever written on the subject and they summarized the  
18 results of all of those. All of those results  
19 essentially say that it's so low in magnitude that  
20 it's pretty much inconsequential.

21 And then the last part of this study is  
22 that they went out and did their own field  
23 measurements on two different types of turbines; and  
24 then they compared those findings to all of the  
25 thresholds that they had found, and found that the

1 levels were under the threshold of hearing in every  
2 instance, every ANSI standard, every threshold they  
3 could find.

4 (Hessler Exhibit No. 4 was marked.)

5 Q I'd like to hand you this. Is this a true and  
6 correct copy of the study that you were just talking  
7 about?

8 A Yes, it is.

9 MS. NEKOLA: Your Honor, we'd like to move  
10 this study into the record as Hessler Exhibit 4.

11 MS. BENSKY: We object, Your Honor.

12 EXAMINER NEWMARK: Okay. Go ahead.

13 MS. BENSKY: Well, I haven't seen it. I  
14 haven't had a chance to look through it. I'm paging  
15 through his testimony now to see if he did talk  
16 extensively about low frequency noise. I don't  
17 recall that he did. I don't believe this was cited  
18 in his testimony. So our witness can't see it and I  
19 don't have the ability to read it now and ask  
20 questions. So that's why I object.

21 EXAMINER NEWMARK: Response?

22 MS. NEKOLA: Your Honor, this is in  
23 response to surrebuttal testimony that referenced  
24 low frequency noise, and Mr. Hessler contemplated  
25 addressing low frequency noise all along in this

1 case. I think it's highly appropriate to add this  
2 to the record. It's a more recent study than  
3 anything else that we have so far in the record.  
4 And if we -- we could give parties a chance to read  
5 it and perhaps decide later. We think it's --

6 EXAMINER NEWMARK: And just -- I didn't  
7 catch who he was responding to.

8 MS. NEKOLA: Mr. Schomer.

9 EXAMINER NEWMARK: Schomer's surrebuttal?

10 MS. NEKOLA: Surrebuttal, um-hmm.

11 MS. BENSKY: I guess there is no reason  
12 this couldn't have been part of Mr. Hessler's direct  
13 testimony. His work for Clean Wisconsin, as I  
14 understand it, is quite extensive on this case. And  
15 if this was going to be an issue that he wanted to  
16 address all along, then -- this is a 2011 study,  
17 there is no reason this couldn't have come in  
18 earlier. It'll take me more than ten minutes to  
19 read this and understand it.

20 We don't have any ability to put any  
21 information in the record to rebut it. So that's  
22 where the prejudice is.

23 MS. NEKOLA: Your Honor, this is a 2011  
24 study that reviewed over 100 scientific papers  
25 worldwide on this topic, and also included a field

1 study to measure wind turbine noise outside and  
2 within nearby residences. I think it would add to  
3 the record.

4 EXAMINER NEWMARK: Yeah, it looks like,  
5 from what I can see on direct, Schomer does  
6 reference studies about low frequency noise. And so  
7 I don't see why this couldn't have come in earlier.  
8 I'm going to have to leave it out as prejudicial.  
9 It's just too late to go through all of this and to  
10 have another witness come in.

11 MS. NEKOLA: One more thing that is  
12 relevant here, I think, is that we anticipated that  
13 Mr. Hessler would be able to do his own study of low  
14 frequency noise in another wind farm in Wisconsin.  
15 And he was -- he has so far been unable to do that  
16 because we haven't been able to get access to any  
17 wind farms. And so I think this is also his attempt  
18 to put in the best recent information on low  
19 frequency noise that he has available to him.

20 EXAMINER NEWMARK: I understand. Does  
21 staff have any opinion on this?

22 MR. LORENCE: I was just paging through  
23 his testimony. I see a reference to low frequency  
24 in his surrebuttal. But can you tell me where it is  
25 in his direct?

1 EXAMINER NEWMARK: Yeah, Schomer page 3,  
2 that first top of the page, there's been a multitude  
3 of literature published over the last 40 to 50 years  
4 that indicates that low frequency, and it continues  
5 on from there.

6 MR. LORENCE: Page 2 or 3?

7 EXAMINER NEWMARK: 3.

8 MR. LORENCE: I guess the only thought I  
9 have is if this is the only reference, I don't think  
10 he was really asserting anything other than the  
11 statement saying that there is publications. I  
12 thought his testimony was more direct in the  
13 surrebuttal with respect to low frequency. And I  
14 guess I thought -- and that was at least on page 16  
15 of his sur-sur where he draws his last conclusion.  
16 Maybe it's the same thing. And so that's why I  
17 noticed that the -- the most as opposed to in his  
18 direct.

19 EXAMINER NEWMARK: And what pages on his  
20 surrebuttal? He just has surrebuttal, right? Does  
21 he have a third round?

22 MR. LORENCE: I saw it on surrebuttal  
23 page 16. And there may be other places. But I was  
24 looking at his last conclusion which is lines 12  
25 through 22.

1 EXAMINER NEWMARK: I don't see that much  
2 difference in those two passages. But let's back up  
3 a little bit because I am aware that there is an  
4 attempt to do a study, is that the Glacier Hills  
5 farm? Is that the case?

6 MS. NEKOLA: Or the Shirley site.

7 EXAMINER NEWMARK: Or Shirley.

8 MS. BENSKY: He was denied access several  
9 months ago; isn't that correct?

10 MS. NEKOLA: No. They have not made a  
11 decision, final decision. But it has the same  
12 effect of being denied, actually.

13 MS. BENSKY: But in his direct testimony,  
14 doesn't he say he was denied?

15 MS. NEKOLA: Well, I'm not sure, but  
16 the -- the truth is that he has not been able to get  
17 access.

18 MR. REYNOLDS: Has there been any reason  
19 given for that?

20 MS. NEKOLA: No. Right, his direct  
21 testimony just says that we have not been granted  
22 access to the site. So thus far, we haven't been  
23 able to -- he hasn't been able to do the study.

24 EXAMINER NEWMARK: Okay. Well, the  
25 problem with this is I don't think this is enough of

1 a substitute for a study at the other wind farms,  
2 and I know that the access question has not been  
3 fully determined.

4 MS. NEKOLA: That's right.

5 EXAMINER NEWMARK: And I would be prepared  
6 to reopen the hearing if we could have a study  
7 developed on that specific -- on those locations,  
8 one of those locations, if access is granted. But  
9 that would mean scheduling that and having a process  
10 for it.

11 But at this time in the game and at this  
12 hearing, I don't think we can admit this -- this  
13 study because the parties have not had a chance to  
14 review it and their witnesses aren't available. You  
15 know, if there is a point in time when we know  
16 access cannot be given, I can consider reopening the  
17 hearing to take a look at these late exhibits as a  
18 substitute. But I would like to, you know, try  
19 to -- I don't want to do that now and I don't want  
20 to thwart any attempts to get the studies done. I  
21 think that's much better evidence. So -- or it  
22 would be evidence rather than, you know, literature  
23 review.

24 So are there any other exhibits that  
25 relate to this? I saw you had a number of items

1           there.

2                       MS. NEKOLA: Not on low frequency noise.  
3 We have one other that we want to offer on another  
4 matter.

5                       EXAMINER NEWMARK: Okay. All right. So  
6 are we okay with that?

7                       MS. NEKOLA: We just want to point out  
8 that the study that we're -- tried to move in was  
9 not just a literature review, but that there were  
10 also actual sound measurements at wind farms.

11                      EXAMINER NEWMARK: Okay. Thanks for  
12 clarifying that. So for now we will hold off on  
13 that.

14                      MR. WILSON: Your Honor, for what it's  
15 worth, I had a discussion with Cindy Smith yesterday  
16 morning where this topic came up about the inability  
17 to do the low frequency testing --

18                      EXAMINER NEWMARK: Let's go off the  
19 record.

20                      (Discussion off the record.)

21                      EXAMINER NEWMARK: Let's get back on.

22 BY MS. NEKOLA:

23 Q       Okay. So do you think that low frequency noise  
24 problems can be ruled out?

25 A       No. Despite the findings in that study, no, I don't

1 think we can just assume that there won't be any  
2 problems. And I say that with respect to the  
3 testimony we heard yesterday from those three  
4 homeowners that had to leave their house -- houses at  
5 Shirley. That was very compelling and I think  
6 irrefutable evidence that there is a problem at that  
7 site. The question is why is that? And that's what  
8 we were hoping to explore with that field survey.

9 So I think what's happening is that there  
10 is a low frequency noise that is associated with very  
11 specific turbine models or types of blades or blade  
12 control mechanisms that results in, according to the  
13 studies that I've seen recently, results in inaudible  
14 low frequency sounds that can produce adverse  
15 symptoms and problems in certain people in rare  
16 cases. But it needs to be investigated. And that's  
17 really the state of knowledge on that.

18 Q You say that these instances are rare. Can you give  
19 an example of a more typical situation?

20 A Yeah. Yesterday we also heard from Jeff Bump who  
21 lives at the Glacier Hills site. And I'm familiar  
22 with Glacier Hills. And I know -- I met Jeff Bump.  
23 My brother and I set up instruments at his house last  
24 winter, and we measured day and night at his house  
25 for about 18 days I think at his house, and ten other

1 houses around that site. All the ones with the  
2 closest possible exposure to turbines. We measured  
3 off of the site to get the background conditions on  
4 a -- kind of a running time history of background  
5 throughout the survey.

6 And, you know, he said he was bothered by  
7 this horn sound and that's -- I heard that, that's  
8 associated with the hydraulic system in the Vestas  
9 V90 turbine that's at that site. He said he was kept  
10 awake by a swishing noise. That's mid-frequency  
11 oscillation, around 500 hertz, due to the blades.  
12 But what he didn't complain about is low frequency  
13 issues and any of these adverse health effects. He  
14 said, well, he might have got a headache once, but  
15 really it was all about the fact that he was bothered  
16 at night.

17 But the point is that this project,  
18 Glacier Hills, has over -- I think it's over 120  
19 turbines that are distributed over an area that's  
20 about, very roughly, 40 square miles. There are  
21 hundreds and hundreds of people that live in close  
22 proximity to turbines at that project. Yet the only  
23 people that are complaining are Mr. Bump and another  
24 fellow that lives next -- or nearby him. Those two  
25 people are the only ones that have any problem with

1 noise out of many, many hundreds. And that is the  
2 typical situation based on all of the  
3 post-operational surveys that I've done. The number  
4 of people that are actually complaining or bothered  
5 by it is very, very low compared to the total  
6 population.

7 Q Thank you. Mr. Schomer also mentioned that the data  
8 contained in your Exhibit 1 is artificially elevated  
9 by pseudo-noise or instrument error. Do you have a  
10 response to that?

11 A Yeah. What we did in our analysis of the applicant's  
12 sound study was to look at the data, the sound data,  
13 as a function of wind speed. And that's been  
14 criticized as, well, the sound levels are elevated  
15 because the wind was blowing over the microphone.  
16 But the fact of the matter is that the winds were  
17 very light during that survey; and the peak wind, the  
18 highest wind, at the microphone during that entire  
19 two-week period was only seven miles per hour.

20 We have -- some years ago, I think it was  
21 about 2008, we did study, a wind tunnel study, to  
22 evaluate that phenomenon of wind blowing over the  
23 microphone to quantify what that error is. And in  
24 that study, what we found was for a  
25 seven-mile-per-hour wind, the self-generated noise or

1 pseudo-noise would be only around 20 dB, whereas in  
2 the field survey at Highland, the levels being  
3 measured under those conditions was in the  
4 neighborhood of about 45 dBA. So there wouldn't be  
5 any effect at all from a pseudo-noise. I believe the  
6 data is perfectly valid.

7 (Hessler Exhibit No. 5 was marked.)

8 Q You've been handed a copy of a study that you just  
9 referred to and described. Is that a true and  
10 correct copy of that study?

11 A Yes, it is.

12 MS. NEKOLA: We'd like to enter this into  
13 the record as Exhibit 5.

14 EXAMINER NEWMARK: Any objections?

15 MS. BENSKY: No objection.

16 EXAMINER NEWMARK: All right.

17 (Hessler Exhibit No. 5 received.)

18 BY MS. NEKOLA:

19 Q Turning to the surrebuttal testimony of  
20 Mr. Horonjeff, have you had an opportunity to review  
21 that testimony?

22 A Yes, I have.

23 Q Mr. Horonjeff points out that your comparison of the  
24 Highland sound data with the met mast wind speed  
25 shows considerable scatter at any given wind speed,

1 and he suggests that the mean value should not be  
2 used. Do you have a response to that?

3 A Yeah. It's not really a matter of where you draw the  
4 line, the mean trend line, in that data. What it  
5 shows is that the vast majority of the sound levels  
6 that were measured during the survey were measured  
7 under very low wind conditions that -- below the  
8 point, generally speaking, where the turbines would  
9 begin to operate. And the principal point is that  
10 during the windier conditions when the project would  
11 be operating, there are very, very few measurements  
12 of low sound levels during those wind conditions,  
13 only about six to a dozen ten-minute samples out of  
14 roughly 2,000 measurements that were taken.

15 Mr. Horonjeff is saying that, well,  
16 sometimes it's quiet when it's windy, but that is a  
17 rarity and that's what that figure shows.

18 Q You were present yesterday when Mr. Reynolds  
19 questioned Ms. Blank about the sound modeling for the  
20 project, correct?

21 A Yes.

22 Q And do you recall that Mr. Reynolds quoted your  
23 direct testimony at page 11 as saying that sound  
24 models should have an ideal target level of 40  
25 decibels? Do you recall him saying that?

1 A Well, I think what he said was that the project  
2 should be designed to 40. 40 is the recommended  
3 level. My view on that is -- and what we've asserted  
4 in papers and things that we've published based on  
5 our field studies of completed projects -- is that if  
6 possible, projects should use 40 dBA as an ideal  
7 design goal if at all feasible because what we find  
8 is that below 40 there's very few, if any,  
9 complaints. But as a regulatory limit, we've put  
10 forward a level of 45 because the regulatory limit is  
11 different from an ideal design goal. A regulatory  
12 limit has to balance everybody's best interest. So  
13 the 40 we weren't saying was a suggested regulatory  
14 limit but rather an ideal design goal.

15 Q So just to be clear, is it your position that the  
16 Highland wind project should meet the 40 decibel  
17 noise standard?

18 A Should it meet the 40?

19 Q Right, is that your position?

20 A No. I think it -- I would be satisfied or I would  
21 recommend that it meet the 45 limit as currently it's  
22 obligated to do.

23 MS. NEKOLA: Mr. Hessler is available for  
24 cross-examination.

25 EXAMINER NEWMARK: All right. Do you have

1 questions?

2 CROSS-EXAMINATION

3 BY MS. BENSKY:

4 Q Good afternoon, Mr. Hessler.

5 A Good afternoon.

6 Q In your papers, you have a very distinct talent in  
7 taking complicated information and making it  
8 understandable for everyone, so I commend you on that  
9 and I ask that you do your best to keep it at that  
10 level here.

11 A We'll see how it goes.

12 Q Let's start with page 2, I'm just going to go through  
13 your testimony. So direct testimony page 2. At line  
14 2, you say, "Typical projects involve field surveys  
15 to establish baseline background sound level  
16 conditions..." Is that the same way of saying  
17 ambient sound?

18 A Yeah. It's essentially the same thing.

19 Q And why is it important to establish that baseline?

20 A Well, the way most projects -- not just wind  
21 projects, but any fossil plant or any project --  
22 would be evaluated is to see how its noise is going  
23 to compare to the sound level that already exists at  
24 that location. If the facility noise is going to  
25 greatly exceed the existing level, then there's

1           likely to be an adverse impact. If it's below the  
2           background, you might not even hear it. So it gives  
3           you a baseline to make a judgment on what the  
4           impact's going to be.

5       Q     And in your view, is establishing that baseline an  
6           important thing to do?

7       A     Yeah. We typically do do that for wind projects or  
8           any power plant.

9       Q     Turning to page 3. You have your testimony up there  
10          with you?

11      A     Yes, I do.

12      Q     Now, page 3, and correct me if I'm wrong, it looks  
13          like you are first reviewing the initial predictions  
14          that were listed in the application using the zero  
15          coefficient assuming a total reflective ground?

16      A     Where is it that you're at there?

17      Q     On page 3, question number 7 -- or line 7. Your  
18          overall impression of the studies. I just want to  
19          clarify that what you're talking about right there is  
20          the modeling results where a zero coefficient was  
21          used; is that correct?

22      A     Yeah, yeah. That's correct.

23      Q     And looking at those results, if the average  
24          background noise was between 29 and 34 decibels and  
25          the project level was 45 decibels, your opinion is

1 that the project would be quite audible; is that  
2 correct?

3 A Yes, that's right.

4 Q If those were the actual numbers. And is the reason  
5 why the project would be quite audible is because you  
6 have that 11 to 16 above ambient level?

7 A That's right.

8 Q And do you have an opinion as to whether an ambient  
9 level of between 12 and 16 decibels -- or an actual  
10 level above -- let me start over.

11 Do you have an opinion as to whether that  
12 relative noise level would result in adverse  
13 community reaction?

14 A Yeah. If those were the actual levels, then we would  
15 conclude in any assessment that the project was  
16 likely to have a pretty significant adverse impact.

17 Q So it's not necessarily that 45-decibel level you're  
18 concerned about, you're more concerned about the  
19 relative difference, that 11 to 16 decibel  
20 difference; is that correct?

21 A Yeah. That's what I'm talking about in that  
22 particular paragraph.

23 Q Now, on page 4, going down to line number 12, you're  
24 talking about your review of the met tower data, and  
25 you had requested a site plan that you did not

1 receive?

2 A That's right.

3 Q And I understand later in your testimony that you  
4 kind of reverse engineered a site plan based on the  
5 available information?

6 A Yeah. It was possible to import into our modeling  
7 software the -- I guess the sound contour map from  
8 the application. It wasn't absolutely necessary to  
9 get the site plan in the first place. It was just --  
10 it would have helped things. That's all.

11 Q So what information would you have expected the site  
12 plan to contain that would have been helpful to you?

13 A Just a particular kind of computer file that is  
14 easily imported into the modeling program. Just more  
15 to save time. What we had to do was just take the  
16 PDF and work with it.

17 Q So you feel that you obtained all of the information  
18 that you needed?

19 A Yeah. We made do.

20 Q The information that you used in your gathering of  
21 that data, do you know if that's the exact data that  
22 would have been contained in the site plan?

23 A We used the actual site plan from the application.

24 Q But you said you didn't receive the site plan.

25 A We used the site plan that was published in the

1 environmental assessment. It was just a matter of  
2 convenience to get the computer file. It wasn't  
3 germane to anything really.

4 Q So the actual data would have been the same? What  
5 I'm --

6 A That's right.

7 Q What I'm getting at is do you think that you input  
8 the right numbers based on the information that you  
9 had?

10 A Yes.

11 Q Now, let's talk about the met tower. The met tower  
12 was 49.5 meters, 162 feet. And is it your  
13 understanding that the hub height of the proposed  
14 turbines is between 299 to 328 feet?

15 A Right. Yeah. This met tower anemometer puts it  
16 within the rotor plane, not exactly at the hub  
17 height. It's very rare to have a met tower high  
18 enough that it goes all the way up to 80 or so  
19 meters.

20 Q So it's at the bottom of the rotor plane, 162 feet  
21 would be at the very bottom assuming the blade  
22 lengths are between 160 and 180 feet?

23 A Right.

24 Q Is there some sort of formula that you applied to  
25 that 49 meters to estimate the wind speed at the hub

1 height?

2 A The hub height wind speed wasn't needed for anything.  
3 What we did do was take the met tower wind speed at  
4 49 and a half meters and then normalize that to 10  
5 meters because you have to put the wind speed data on  
6 an even footing with the turbine sound power level  
7 data which is also -- which is always expressed as a  
8 function of the wind speed of 10 meters.

9 Q But that's something different than estimating what  
10 the wind speed would be at the hub height?

11 A Yes. The hub height, whether it's near the bottom of  
12 the rotor plane or at the hub height, it doesn't make  
13 any difference here, to what we were shooting for  
14 here.

15 Q But wouldn't it be -- if you want to know how fast  
16 the blades are going to turn, wouldn't you want to  
17 know the wind speed at the hub height? Wouldn't that  
18 be ideal?

19 A No. It's really -- it's all about the wind speed at  
20 this normalized height of 10 meters that's relevant  
21 to this whole thing. Even if we had a met tower that  
22 was -- met mast that was 80 meters, we would have  
23 just taken that value and normalized it to 10 meters.  
24 It would have been the same.

25 Q But if you had a met tower at 100 meters, you would

1 not have had to apply that formula?

2 A No. We would have had to apply it to any elevation  
3 anemometer. We want to bring it down to 10 meters  
4 from whatever height, the highest possible height.

5 Q So based on the met tower data, you don't know the  
6 actual speed of the wind at the hub height; is that  
7 correct?

8 A We could easily infer it from this 49 and a half  
9 meter data if we wanted to know it.

10 Q So you didn't -- is your answer you did not have the  
11 actual wind speed at the hub height?

12 A Met mast wasn't high enough.

13 Q And you did not have the actual speed at the rotor  
14 tip of 500 feet?

15 A We could have inferred that if we needed to know.  
16 The ideal thing would have been to have anemometers  
17 over the whole diameter of the blade, but you never  
18 have that.

19 Q So you have to make some approximations?

20 A Oh, yeah.

21 Q Is there generally a difference -- or can there be a  
22 difference in wind speed at 500 feet as opposed to  
23 162 feet?

24 A Yeah. It is typically higher with elevation.

25 Q What happens when there's a very -- there's a higher

1 wind at the rotor tip than at the bottom of the  
2 rotor?

3 EXAMINER NEWMARK: In what sense? What do  
4 you mean what happens? In terms of what?

5 A Yeah, in terms of what?

6 BY MS. BENSKY:

7 Q When there is a higher -- when there's a higher wind  
8 at the top than there is at the bottom of the rotor,  
9 does that have any effect on the sound produced?

10 A Yeah. Yeah. The wind speed is typically always  
11 higher at the top than it is at the bottom. It's  
12 very rarely perfectly flat, although that does  
13 happen. The degree to which the wind speed varies  
14 from the top to the bottom or from -- between any two  
15 heights is the wind sheer, and the higher the sheer  
16 the more slanted that -- the greater the difference  
17 between the wind speeds at different heights, the  
18 greater the noise generation generally is.

19 Q Is there a particular season where the wind sheer is  
20 greater?

21 A Yeah, at most sites it's typically in the summertime.

22 Q The wind sheer is greater in the summertime?

23 A Yeah.

24 Q Are there any other weather conditions where the wind  
25 sheer would be greater?

1 A It's typically higher at night than it is during the  
2 day.

3 Q Now, looking at the bottom of page 4, is it your  
4 testimony that when the near ground level wind speed  
5 is very low, that does not necessarily mean that the  
6 hub height wind speed is the same; is that correct?

7 A Right. You -- it's hard to tell anything from the  
8 wind speed measured at a meter above the ground.  
9 That generally remains pretty low even when it gets  
10 really windy out. That's why we wanted to use the  
11 met mast that -- at the highest possible anemometer  
12 to get a sense of what's going on up at the elevation  
13 that the turbines would see that wind.

14 Q Just so we're all on the same page, what's an  
15 anemometer?

16 A A device for measuring wind speed.

17 Q And that's the thing that sits on top of that met  
18 tower?

19 A Yeah.

20 Q Let's turn to page 5. Looks like I already covered  
21 that. Let's go to page 10. Starting on line 6 and  
22 just follow along. Is it correct that you state, "A  
23 common design theory for new industrial projects of  
24 all kinds is to design the project so that its sound  
25 level does not exceed the background level by more

1 than 5 decibels..." Did I read that correctly?

2 A That's right.

3 Q Then you state, "...the logic being that such an  
4 increase is not particularly noticeable, at least  
5 when the character of the noise is rather bland and  
6 free of any prominent tones or other identifiable  
7 characteristics. Because wind turbine noise often  
8 has a variable, churning, sometimes periodic  
9 character to it, this approach is somewhat tenuous  
10 for wind projects, but nevertheless it is commonly  
11 used..."

12 Is it your testimony that wind turbines  
13 create a sound of such a characteristic that the 5  
14 decibel above ambient is too much?

15 A Yeah. Yeah. The 5 increase would -- makes the most  
16 sense when you have a, for example, a very constant  
17 source that has a bland character to it like a  
18 conventional power plant. That sound 5 above the  
19 background is usually -- or usually results in a  
20 negligible impact, people don't really notice it.  
21 Now, wind turbines don't have a particularly steady  
22 sound so that they are more audible than other  
23 sources relative to the background. So even a 5  
24 increase is generally pretty noticeable.

25 Q Thank you. Now, at the bottom of the page, you state

1 that assuming a background noise of 34 to 36  
2 decibels, your recommendation in an ideal world is  
3 that the project noise be limited to between 39 to 41  
4 decibels; is that correct?

5 A Yeah. That would be a 5 increase over this  
6 background level that I'm coming up with.

7 Q Okay. Now, on the next page, and I'm going to hand  
8 out an article that you reference and footnote on  
9 page 11.

10 EXAMINER NEWMARK: That's Hessler 5,  
11 right?

12 MS. NEKOLA: 6.

13 MS. BRANT: No, Your Honor. It's the same  
14 scientific journal, I believe, or a very similar  
15 format.

16 MS. BENSKY: No, it's a different article.

17 MS. NEKOLA: It's a different article,  
18 right.

19 BY MS. BENSKY:

20 Q And the first question is looking at the publication  
21 that I just gave you, is this indeed the publication  
22 that you reference in footnote 3 on page 11 of your  
23 direct testimony?

24 A Yeah, yeah. I'm glad you handed it out to everybody.

25 Q Now, let's turn to page 96, it's just this third page

1 in. And you're talking about the World Health  
2 Organization target noise level to protect the  
3 public. And that is listed at 40 decibels day or  
4 night; is that correct?

5 A I think they specifically call that the nighttime  
6 target.

7 Q Okay. Oh, you're right, nighttime sound levels.

8 And has that changed since this paper was  
9 published?

10 A Not to my knowledge, no.

11 Q And turning to page 98, first full paragraph  
12 beginning with Considering the EPA guidelines. And  
13 there's some discussion of day and night levels; and  
14 then you state -- first of all, did you author this  
15 paper?

16 A Yeah. I was a co-author on it.

17 Q Co-author with George Hessler?

18 A Yeah.

19 Q So you state, "A 45 decibel composite noise  
20 equivalent level with a 5 decibel evening weighing  
21 would be even more ideal at 45, 40 and 35 decibels  
22 for day, evening and nighttime levels, respectively."

23 EXAMINER NEWMARK: Can you point to that  
24 for the record.

25 MS. BENSKY: It is on -- it is a

1 publication which is footnote 3 of Hessler Direct  
2 11. It's called, "Recommended noise level design  
3 goals and limits at residential receptors for wind  
4 turbine developments in the United States," and it's  
5 on page 98 of that publication.

6 EXAMINER NEWMARK: And where on page 98?

7 MS. BENSKY: It's in the middle of the  
8 page. There's a first -- full paragraph begins with  
9 Considering the EPA.

10 EXAMINER NEWMARK: Okay. Thanks.

11 MS. BENSKY: And I'm looking at the last  
12 sentence.

13 EXAMINER NEWMARK: Um-hmm. Okay.

14 BY MS. BENSKY:

15 Q So my question is, is it correct that in this paper,  
16 you recommend an ideal design target of 45, 40 and 30  
17 decibels respectively during the day, evening and  
18 nighttime?

19 A No. What we're doing in that part of the paper is  
20 going through all of the regulations that pertain or  
21 could possibly pertain to wind projects and just  
22 summarizing each one. At the end of the section,  
23 then draw a conclusion on what we recommend based on  
24 all these various standards.

25 Q And your conclusion is that a composite noise

1 equivalent level would be even more ideal at 45, 40  
2 and 35; is that your conclusion in this paper?

3 A It's not a conclusion. It's just a comment on this  
4 particular measure.

5 Q But it's correct that -- I'm reading it correctly,  
6 right, that, "A 45 dBA composite noise equivalent  
7 level with the 5 dBA evening weighing would be even  
8 more ideal at 45, 40 and 35 decibels for day, evening  
9 and nighttime levels, respectively." Am I reading  
10 that correctly?

11 A Yeah, yeah. The lower the level the better. But we  
12 end up concluding later that as a practical matter 40  
13 is -- seems to make sense.

14 Q But taking out -- you're not a state regulator,  
15 correct?

16 A That's right.

17 Q So -- you're a noise engineer, correct?

18 A Right.

19 Q And based on your very extensive expertise as a noise  
20 engineer, your opinion is that it would be ideal to  
21 have a 45, 40 and 35 dBA level for day, evening and  
22 nighttime?

23 A I'll always say it's more ideal.

24 Q Let's move on. Tell me, did you make any differen --  
25 what hours are we talking about? What's daytime?

1 What are daytime hours as you're talking about here?

2 A It's usually 7 in the morning to 10:00 (sic) at  
3 night.

4 Q And what's evening?

5 A Then that goes to -- I'd say it's 7 to 10 p.m. or  
6 something.

7 Q So daytime would be 7 to 7, evening would be 7 to 10?

8 A Yeah.

9 Q And then nighttime would be 10 to 7 in the morning?

10 A Right.

11 Q Now, please turn to the next page, page 99, first  
12 full paragraph on that page says -- starts The States  
13 of New York, Massachusetts and California. Are you  
14 there?

15 A Okay. Yeah.

16 Q The first -- or the second sentence reads, "An  
17 ambient-based method is based on the perception of  
18 the new sound in a specific residential community. A  
19 perception-based method is clearly a better approach  
20 than a single absolute limit, and, in fact, many  
21 years of experience have shown this approach is  
22 working well in all these three states."

23 Did I read that correctly?

24 A Yes, that's right.

25 Q And you're talking about three states that have an

1 ambient-based guideline; is that correct?

2 A Right.

3 Q And the words that I just read, are those your  
4 recommendations in this article? You're not quoting  
5 anyone else. I want to know if that is your work  
6 right there?

7 A Yeah, yeah. We're talking about how they do things  
8 in New York, Massachusetts and California. And how  
9 that is, how that works, is that you measure the  
10 background, you add some factor to it, in  
11 Massachusetts it's 10, and essentially what you come  
12 up with is an absolute limit that is derived from the  
13 background. But the final answer is an absolute  
14 number.

15 Q But your opinion, is it correct that your opinion  
16 here is a perception-based method, which is this  
17 ambient relative standard, is clearly a better  
18 approach than a single absolute limit; is that your  
19 opinion?

20 A It's what's -- that's what it's saying here. But the  
21 end result of the paper is that it's better to go  
22 with absolute numbers.

23 Q So you contradict yourself in this publication?

24 A I suppose so. I think my father wrote that part,  
25 but -- in fact, I'm sure he did.

1 Q I'm going to tell him you said that.

2 A I'm always -- I'm used to that.

3 Q Now, on page 11 of your testimony, you're still  
4 discussing this article and you're discussing the  
5 results of it looks like a survey that you conducted?  
6 Is that correct?

7 A Okay. We're back in the direct testimony again?

8 Q Yeah. The direct testimony on line 12 --

9 A Yeah, okay.

10 Q -- you're referring to a study, and the study that  
11 you're referring to is still in this article?

12 A Yeah. It's just later on in the same article, yeah.

13 Q And you state at least 95 percent of residents were  
14 apparently satisfied with or unfazed by the sound  
15 emissions of the new wind project, even when sound  
16 levels were around or above 45 decibels. Was that  
17 your conclusion based on this study?

18 A Yes, it was. And what that study is all about is  
19 we're --

20 Q I'm sorry. Let me ask you the questions, keep this  
21 moving along.

22 A Okay. Go ahead.

23 Q Please look at Table 4 of your paper, it's on page  
24 101, and it looks like those are the results of this  
25 study that you're talking about in your direct

1 testimony?

2 A Yes, that's right.

3 Q So looking at site A, there are approximately 107  
4 households that are within this kind of target area  
5 near wind turbines; is that correct?

6 A Um-hmm. Yes.

7 Q And you found that when noise decibel levels were  
8 below 40, there were no complaints --

9 A That's correct.

10 Q -- correct? No sound complaints or no complaints at  
11 all?

12 A No complaints related to noise.

13 Q Okay. So the survey didn't ask about did people have  
14 problems with nausea or sleeplessness, it just said  
15 are you bothered by the sound?

16 A Well, there was no official survey. These houses  
17 that are in the table or are counted in the table,  
18 what those are are all of the houses where the  
19 project operations ever received a call with any kind  
20 of concern about the noise from the project. Some  
21 were definite complaints, others were just kind of  
22 mild concern. But they're all included here. When  
23 we do these surveys, we'll ask, you know, who has  
24 ever called about a problem; and then we will put  
25 instrumentation at that house and include them in the

1 compliance study. So we know how many complain and  
2 we know what the level was there.

3 Q Okay. So you had 107 homes where there were noise  
4 complaints --

5 A No.

6 Q -- correct?

7 A No, that's incorrect. The 107 is the total number of  
8 households that are within 2,000 feet of a turbine at  
9 that project.

10 Q I'm sorry, I didn't hear you. My colleague was  
11 talking to me.

12 A Yeah, the -- all the numbers in that column, the 107  
13 is how many houses there were within 2,000 feet of a  
14 turbine in that project. In other words, it's the  
15 total population essentially.

16 Q Okay. And this -- to obtain the complaint data, you  
17 went to the company to get their records, correct?

18 A Well, it was just a matter of talking with the  
19 operations people. No records per se.

20 Q So you didn't receive anything saying here's our  
21 stack of written complaints?

22 A We asked who has ever called with any kind of concern  
23 about noise. And they -- then they told us. There  
24 may be more. That's possible.

25 Q So it's -- you called up Bob who runs this project

1 and said who's complained and he said, well, I think  
2 this guy, this guy and this guy; that's what it was?

3 A Well, it's whoever called up at any time. And I  
4 think this is -- it seemed to be pretty accurate.

5 Q But you didn't go to every -- you didn't send out a  
6 survey to 107 residences --

7 A No, no, not at all. This -- the purpose of these  
8 surveys was never to -- was not primarily to evaluate  
9 the impact. It was to carry out a compliance survey  
10 to see whether the project was meeting its  
11 requirements. And we just were able to draw out of  
12 that this information.

13 Q And that obviously is a very important distinction.

14 A Yeah. Yeah. None of these surveys were undertaken  
15 with the primary purpose of counting how many people  
16 complained.

17 EXAMINER NEWMARK: Let me just note, on  
18 your direct, you label this study, not a survey. So  
19 I don't know if that makes a difference as to what  
20 we're really getting at. You weren't intending to  
21 do a survey here, you were doing a study?

22 THE WITNESS: Well, all of the examples in  
23 this table, they're all field surveys of actual  
24 projects.

25 EXAMINER NEWMARK: Okay. So it did make a

1 difference. All right.

2 BY MS. BENSKY:

3 Q So I just want to make a very important  
4 clarification. You did not go -- for site A, you did  
5 not go to 107 residences, personally ask somebody do  
6 you have a problem with the noise, yes or no, and  
7 then get a result, correct?

8 A Yeah, that's correct.

9 Q So if somebody didn't complain to the company -- even  
10 if they did complain to the company, they might not  
11 be included in this?

12 A Oh, yeah. There could be more. We're not claiming  
13 that it is the definitive number, but this was what  
14 we were able to find out.

15 Q Right. So you're not saying that 95 percent of 107  
16 households are -- don't have any noise complaints  
17 related to this project? That's not what this is  
18 saying?

19 A Well, what it's saying is that we know how many  
20 definitely did complain and there may be some more,  
21 but in general it shows that the vast majority did  
22 not complain.

23 Q All right. Now, you were here and -- you had the  
24 great pleasure of sitting here all day yesterday,  
25 correct?

1 A Yes, I did.

2 Q And you heard some people come up and testify that  
3 they had various complaints about noise, correct?

4 A Um-hmm. Yes.

5 Q Did you hear anybody say that they didn't go off and  
6 complain to the company?

7 A It seemed like when asked, most of them said they did  
8 call the company and made various progress.

9 Q Did you -- do you remember hearing anybody say they  
10 did not complain to the company?

11 A I don't specifically remember any examples.

12 Q Okay. That's fine. Going back to the actual text of  
13 your testimony, at line 11, the text reads, "In fact,  
14 an interesting finding of the study was that at least  
15 95 percent of residents were apparently satisfied  
16 with or unfazed by the sound emissions of the new  
17 wind project, even though sound levels around and  
18 above 45 dBA were observed..." That's what it says,  
19 correct?

20 A Yes, that's right.

21 Q But that's really not a conclusion that we can draw  
22 because you're assuming that at no -- that if a  
23 person did not complain to the company, that they are  
24 satisfied or unfazed by the noise, correct?

25 A That's why I used the word "apparently."

1 Q But that's an assumption that you're making in that  
2 statement?

3 A Yes. But this is -- as you can see from the table,  
4 this is repeatable over five sites in this study and  
5 several more after it.

6 Q I'm not concerned about the decibels right now. I'm  
7 just talking about the data, the number of  
8 complaints. So one big assumption of this study is  
9 that if a person was upset about the noise to any  
10 degree, that they complained to the company. Would  
11 you agree that that's an assumption that you're  
12 making in that statement?

13 A Yes.

14 Q Now, the second assumption that we're making is that  
15 the company gave you all of the complaints that they  
16 received?

17 A Yes.

18 Q And we don't know -- those are big assumptions. We  
19 just don't know if -- we don't know the answers, you  
20 never went back and double-checked that?

21 A They're assumptions, but I think they're fairly  
22 accurate.

23 Q But you really don't have a basis for thinking that  
24 they're accurate?

25 A I can't imagine that -- you know, in this first site

1           there was three complaints. I can't imagine there  
2           was 50 complaints there. I don't think that's the  
3           case.

4       Q     But --

5       A     And part of the reason for believing that is that we  
6           measure -- when we do these surveys, we measure in  
7           this example these three houses; but then at -- many,  
8           many others throughout the project area all have the  
9           houses that are closest to turbines. And not only do  
10          we measure, but I personally have talked to all these  
11          people, the ones that have complained and then the  
12          other ones elsewhere. And it's -- it's surprising to  
13          me, it was surprising to me how many people just  
14          don't -- it's not the noise, even though the levels  
15          are fairly high.

16       Q     But that information that you just gave us is not  
17           reflected in this survey? You said you went out and  
18           you talked to people.

19       A     Yeah.

20       Q     But we don't know, based on this survey here, how  
21           many people you talked to, what they said, there's no  
22           written survey; is that correct?

23       A     No. This is what I've gathered in the course of  
24           doing this work.

25       Q     Okay. Just a couple follow-up questions, one having

1 to do with this. So let's turn to page 97. And  
2 there's two columns on the right-hand column, first  
3 full paragraph, that begins with, "In addition, the  
4 report clearly indicates."

5 A Yeah. Okay. I'm there.

6 Q Okay. About -- looking at the very last sentence of  
7 that paragraph beginning with Schomer. Do you see  
8 that?

9 A Yes, um-hmm.

10 Q And you state, "Schomer suggests that an adjustment  
11 of 10 decibels should be subtracted for quiet rural  
12 environments and perhaps another 5 decibels if the  
13 project is newly introduced into such a long-standing  
14 quiet setting." Is that what this says?

15 A Um-hmm.

16 Q And getting into this issue of day and night levels.  
17 Is there anywhere in this paper that you criticize  
18 Mr. Schomer's suggestion?

19 A No. This is just saying that we're taking onboard  
20 what he has to say about it and figured it into this  
21 overall analysis.

22 Q But you agree that you're not critical of that  
23 particular suggestion in this paper?

24 A No. That's why it's in there.

25 Q Now, you spent the day here yesterday and you heard

1 Mr. Hankard say that if you measure at very close to  
2 a wall, you're going to get a result that's three  
3 decibels higher and that's not a good thing to do to  
4 measure sound in a wall. Do you agree with that?

5 A Yes, yes. You don't want to put the microphone right  
6 on a vertical surface, no.

7 Q My question is, what's the decibel level on the other  
8 side of the wall? Does sound -- can sound waves go  
9 through the wall?

10 A Yes. To some extent. Depends on the wall  
11 construction and so on, frequency content of the  
12 noise.

13 Q I hear some laughing behind me from Mr. Schomer, so I  
14 don't know if that was a question showing a lot of  
15 naivety.

16 But what I'm getting at is when there's a  
17 45-decibel level outside a home, what's going on  
18 inside the home? Does the sound travel through the  
19 wall such that the walls can create some sort of  
20 reverberation and make it even louder indoors than it  
21 is outdoors?

22 A No. What typically happens is the level inside is  
23 substantially lower than what you're measuring  
24 outside.

25 Q With any frequency of sound?

1 A Yeah, as a general rule.

2 Q Are there any frequencies that travel better through  
3 walls than other frequencies?

4 A Sure, sure. The lower frequencies pass through a  
5 given construction much more easily than high  
6 frequencies.

7 Q And when you say low frequency, what is the kind of  
8 baseline low frequency that's going to make it  
9 through the wall?

10 A Any frequency down to 1 hertz.

11 Q But up to what hertz level?

12 A Well, let's say from 20 hertz down.

13 Q Okay. I'm almost done. Can you please turn to your  
14 rebuttal testimony, and pull out Exhibit 3 from that  
15 testimony, please.

16 Now, Exhibit 3 looks like it's a  
17 comparison between the model predictions and the  
18 actual noise levels measured; is that correct?

19 A Is it this figure, you mean?

20 Q Yeah.

21 A Okay. Yeah. What that's showing is the black  
22 figures in the middle of the chart are the sound  
23 level at 1,000 feet from an isolated wind turbine in  
24 three different directions measured over 14 days.

25 Q So there are actually three black lines in here?

1 A Yeah. They all kind of are similar.

2 Q And the -- I guess it would be the Y axis at the  
3 bottom, that represents a total of 14 days?

4 A That's right.

5 Q So my first question is we see some peaks, correct?

6 A Yes.

7 Q What length of time is one of those peaks? Is it an  
8 hour, a minute, a second?

9 A This data was measured in ten-minute increments, and  
10 there's a couple of -- well, there is a very  
11 prominent spike right in the middle of the survey,  
12 that was probably 20 to 30 minutes in duration.

13 Q That spike?

14 A Yeah.

15 Q Is every spike -- is every little point a ten-minute  
16 average or 30-minute average?

17 A Well, the sound level data appears as a continuous  
18 line; but it's actually made up of many, many  
19 thousands of ten-minute samples all strung together.

20 Q What I'm trying to figure out is for how long was it  
21 that loud when we see a peak? Does this graph give  
22 us that information?

23 A Well, from having looked at graphs like this a lot, I  
24 can tell there's -- this peak in the middle is, like  
25 I said, probably 20 to 30 minutes long.

1 Q And where was this measurement taken? What state?

2 A This is at a site in Minnesota that was in an  
3 extremely rural area, not near any roads or towns or  
4 anything. And it was just in a wide open field.

5 Q And near what wind farm?

6 A Prairie Star, I believe it's called.

7 Q And do you know the make and model of the turbine?

8 A I think it was a Vestas V90.

9 Q And do you know what the power output was?

10 A The electrical power output? It was 2 megawatt, I  
11 think.

12 Q And do you know how tall the turbine was?

13 A I think it was on a typical 80 meter mast. This is  
14 just taken as an example just to compare modeling  
15 versus what you measure.

16 Q So with an 80 meter mast it would be probably around  
17 400 -- 360, 370 feet?

18 A Right, right.

19 Q And this 14-day period was in August?

20 A That's correct.

21 Q Is there a certain month of the year where the winds  
22 are stronger?

23 A Well, it varies at every site. I don't know what the  
24 wind rose was at this particular site, I don't  
25 recall.

1 Q As a general matter in Minnesota, is it windier in  
2 the winter or in the summer?

3 A I think it's the wintertime there.

4 Q And you agree that in August there are generally more  
5 leaves on the trees, more grass on the ground, more  
6 birds?

7 A Yes.

8 Q Now, looking at this, we do see several points where  
9 there are exceedances over 40 decibels; is that  
10 correct?

11 A Yes. Remember, this is only a thousand feet away.

12 Q Right. But there are exceedances over 40 decibels?

13 A That's right.

14 Q Now, this bold red line looks like it is -- the first  
15 bold line at the top is using that 0.0 coefficient --

16 A Yes, that's right. Um-hmm.

17 Q -- modeling? And the second line down is using the  
18 .5 coefficient?

19 A Right.

20 Q And then there's a very, very faint red line down  
21 below and that's the 1.0 coefficient?

22 A Right.

23 Q Now, if the standard was you may not exceed 40  
24 decibels at night, looking at this graph, would you  
25 think that there are exceedances?

1 A Yeah. It does go over 40 for this particular  
2 measurement setup, these distances and so on.

3 Q On average it doesn't, but it does go up there, it  
4 goes above it?

5 A Right. Well, that's typical.

6 Q So it is typ -- are you saying that it's typical that  
7 there are -- that the actual sound does exceed the  
8 modeling at certain times? Would that be a correct  
9 assumption?

10 A Oh, most definitely, yes.

11 MS. BENSKY: That's all I have.

12 MR. REYNOLDS: Could we take a break?

13 EXAMINER NEWMARK: It will be short if we  
14 do it now. It will be longer if we wait 'til after  
15 he's done.

16 MR. REYNOLDS: I'd rather take a short  
17 break. It's going to be at least a half hour.

18 EXAMINER NEWMARK: All right. Let's take  
19 20 minutes.

20 (Recess taken from 12:15 to 12:43 p.m.)

21 (Change of reporters.)

22 EXAMINER NEWMARK: Okay. There's a motion  
23 to move Mr. Hessler's study that he footnoted in his  
24 testimony, and that would be --

25 MS. BENSKY: Footnote 3, page 11 of

1 direct.

2 EXAMINER NEWMARK: Okay. And his --  
3 Exhibit 5 it would be, we would mark it as 5.

4 Any objections to that?

5 MS. BRANT: I'm sorry, Your Honor, would  
6 it be 5 or 6? We have a pending with 4 that was  
7 denied, but potentially to be admitted later.

8 MS. NEKOLA: And then we have 5.

9 MS. BRANT: Exhibit 5, which is his pseudo  
10 notice.

11 MS. BENSKY: So 6. 4 was marked.

12 EXAMINER NEWMARK: So 5 is still pending.  
13 Let's go off the record.

14 (Discussion off the record.)

15 EXAMINER NEWMARK: So Hessler 6, any  
16 objections? No. Okay. It's in the record.

17 (Hessler Exhibit No. 6 marked and received.)

18 EXAMINER NEWMARK: All right. I think,  
19 Mr. Hessler, remember you're under oath, and you're  
20 available for cross.

21 CROSS-EXAMINATION

22 BY MR. REYNOLDS:

23 Q Mr. Hessler, I have a couple of questions for you.  
24 You testified that you were struck by the testimony  
25 of the Shirley Wind people.

1 A Yes. That's correct.

2 Q Why is that?

3 A Because of the -- because it's completely credible,  
4 and I don't doubt it at all.

5 Q And do you doubt -- is it significant to you that the  
6 residents testified that they had no problems before,  
7 and when they left the site, their symptoms  
8 disappeared?

9 A Yeah. That's very simple. It appears to be due to  
10 the project there.

11 Q And what -- was that one of the reasons you wanted to  
12 do some testing of Glacier Hills? Sorry, at Shirley.

13 A Yes. And I think what's needed is to get to the  
14 bottom of why that is.

15 Q And what -- is it fair to say that the symptoms that  
16 they complained of, such as headache, nausea, ear  
17 problems, are consistent with exposure to low  
18 frequency sound?

19 A Yeah, I think that's true. Of course it depends on  
20 the magnitude of the sound, whether you're affected  
21 or not, but because specifically one fellow said he  
22 lived one mile away, that means that it's the only  
23 possible sound that could travel that far would be  
24 low frequency noise.

25 Q And so what -- what has -- what's been the result of

1 your effort to test up there? What would you have to  
2 do and what request did you make, and what were the  
3 results?

4 A Well, we came up with a preliminary test plan where  
5 we had identified one or two units that were kind of  
6 isolated so we could kind of more or less  
7 scientifically measure them, and I think we submitted  
8 that to the project up there so they would know they  
9 were abound. But at first we didn't hear anything,  
10 and I think they finally said, well, they don't want  
11 to -- we're welcome to participate, but they don't  
12 want to do it.

13 Q And what were you planning to actually test for?

14 A Well, low frequency specifically. And what we had in  
15 mind was to test using a procedure that's outlined in  
16 IEC standard 61400, which is a procedure for  
17 measuring the sound power of wind turbines. It's  
18 what all manufacturers use. But the point is that  
19 that methodology uses a reflecting board that you put  
20 on the ground and then you lay the microphone right  
21 on the board, and the reason for that is that the  
22 wind speed is theoretically zero at the surface. So  
23 you're largely eliminating self-contamination from  
24 pseudo-noise that we talked about a bit earlier  
25 because it's very, very difficult to measure low

1 frequency noise because it's covered up by cell noise  
2 of wind. It's a real technical challenge.

3 Q And let me ask you this. You've noted that there are  
4 significant differences. There's -- there's a  
5 significant difference between, say, Mr. Bump's  
6 testimony and the three individuals who abandoned  
7 their homes at Shirley?

8 A Right.

9 Q Now, there are different machines at the farms,  
10 right?

11 A That's right.

12 Q What's at Glacier Hills?

13 A Those are Vestas V90.

14 Q And what's the output?

15 A I think they're 2 megawatt.

16 Q All right. And what are the ones at Shirley?

17 A They're the Nordex N100, and that's two and a half --  
18 I don't remember.

19 Q And the -- that's one of the machines that's proposed  
20 at this Highland project; is that right?

21 A One of the three that are being considered. It's  
22 prominent in these analyses I think just because it  
23 has a slightly higher sound power level, but that's  
24 the only reason it's really being looked at  
25 carefully.

1 Q All right. Are you aware of recent low frequency  
2 noise from large turbine literature that describes  
3 findings of higher low frequency noise from larger  
4 turbines, those in the 2.3 to 3.6 megawatt category?

5 A Yeah. I have heard that, but my sense is that --  
6 well, what strikes me is how remarkably similar the  
7 sound power level is of all the turbines that are in  
8 current use all the way from one-and-a-half-megawatt  
9 units up to 3-megawatt units. They're all remarkably  
10 similar in my view.

11 Q Well, are you familiar with a 2010 low frequency  
12 noise from large turbines work by Henrik Moller and  
13 Christian Pedersen on the subject?

14 A Yeah. Yeah, I've read that, but some time ago. And  
15 I think they do some sort of analysis, and it appears  
16 that it maybe is a little bit louder in the lower  
17 frequencies for larger turbines, but that may be true  
18 slightly.

19 Q So you would point to the potential cause of the  
20 Shirley complaints to the machine itself?

21 A Yeah. I think -- I think this sort of problem is  
22 related to the specific turbine. Now, before  
23 yesterday when I heard that testimony, my view is  
24 that those kinds of problems were principally  
25 associated with the Vestas V82 in its early form that

1 had stall-regulated blades instead of pitch-regulated  
2 blades. But this is the first I've heard of a  
3 problem with a N100 site. I've worked with project  
4 that put in N90s and N100s and there aren't any  
5 problems at that site, so it's puzzling.

6 Q Let me ask you this. You have -- you heard testimony  
7 about your recommended noise level design goals,  
8 right? That's a paper that you and your dad and --  
9 you and your dad put together?

10 A Yeah.

11 Q All right. And would you -- your findings indicate  
12 that a 40-decibel level in the A range, that's the  
13 audible range, is ideal?

14 A Yeah. And the reason for that is that we found that  
15 there are few, if any, complaints at houses where the  
16 outside level was 40 or less.

17 Q And so in an ideal world, if it would be possible to  
18 have a project where the maximum level is 40 --

19 A Uh-huh.

20 Q -- is it fair to say that we probably wouldn't see  
21 the citizens come in here and talk about the need to  
22 abandon their homes?

23 A I think what you would see is a lack of complaints  
24 about audible noise and amplitude modulation, things  
25 like that, but that 40 dBA level really is not

1 connected in any way to this infrasonic situation.

2 Q The dBA level would be connected with sleep  
3 disturbance?

4 A Yeah. It's the audible noise, the swishing sound  
5 that you can hear, you know, as Mr. Bump said  
6 yesterday.

7 Q Well, let me ask you this. There have been some  
8 references to the sound of these turbines being at 40  
9 dBA being like the sound of a refrigerator. Do you  
10 agree with that?

11 A No. There's no -- nothing that you can compare it  
12 to. It's not a constant sound. It's not  
13 particularly loud, but it does have a time variance  
14 to it that kind of calls attention to itself, and it  
15 depends on the specific wind conditions and how much  
16 turbulence there is and time of day. All kinds of  
17 factors go into it so, yeah, it's more noticeable  
18 than other things.

19 Q So that that you're referring to is the swishing  
20 sound or the noise amplitude?

21 A Yeah. And that -- that does occur, but that is not  
22 always the principal characteristic. In fact, I  
23 spent a lot of time at wind projects, and it's more  
24 or less a steady kind of -- I use the word churning  
25 sound. It's -- but there's not -- you don't always

1 or often see pronounced swishing or amplitude  
2 modulation.

3 Q Would you -- is it fair to say then that the sound  
4 from turbines combines three separate variables or  
5 parameters: one is audible sound in the dBA range;  
6 two is low frequency or infrasound in the very low to  
7 nonaudible range; and three would be the amplitude  
8 modulation from the -- from the pulsating action of  
9 the turbine blades?

10 A Yeah. I think the first and the third one are kind  
11 of related, but --

12 Q Well, is it fair to say that there's a difference in  
13 the ability of folks to sleep, for instance, if the  
14 sound is like white noise, just steady, as opposed to  
15 pulsating noise?

16 MR. SCRENOCK: I'm going to object, Your  
17 Honor. I'm not sure that Mr. Hessler's been  
18 qualified as an expert on sleep disorders.

19 EXAMINER NEWMARK: He has testified on  
20 people's reactions to sound, I think. Isn't that  
21 what he's been saying?

22 MS. NEKOLA: No, I don't think that's  
23 accurate.

24 EXAMINER NEWMARK: No? People complain,  
25 certain distances and --

1 MS. NEKOLA: Well, that's correct, but not  
2 specific health or sleep reactions, just complaints.

3 MR. REYNOLDS: Well, he's done  
4 investigation on complaints. He's analyzed ideal --  
5 I mean, it's a pretty simple question. I mean, I'm  
6 not calling him to ask him an opinion to a  
7 reasonable certainty, but just a correlation between  
8 this aspect of wind turbine noise and sleep  
9 disturbance.

10 EXAMINER NEWMARK: Yeah.

11 MR. SCRENOCK: I understood his question  
12 to be asking the witness whether a particular  
13 parameter as he described it, wind turbine noise,  
14 what would cause someone to have difficulty  
15 sleeping, and I don't believe that is within the  
16 realm of what Mr. Hessler's been testifying on.

17 EXAMINER NEWMARK: Well, I'm going to let  
18 him answer. He can say he doesn't know.

19 THE WITNESS: You know what I would say to  
20 that is, I think it's the highly variable nature of  
21 wind turbine noise that appears to lead to sleep  
22 disturbance because you can be standing next to a  
23 turbine and it makes -- it will be making a certain  
24 sound, and then the next minute it will suddenly get  
25 louder and then get quieter again. And I think

1           those changes, I think, may be associated with  
2           people waking up and having problems sleeping.

3       BY MR. REYNOLDS:

4       Q     How about the whistling sound that Mr. Bump talked  
5           about?

6       A     You know, that -- well, I think he said it was a  
7           foghorn sound. That's the way I would describe it.  
8           That's with a hydraulic pump that's in the nacelle of  
9           every one of those turbines, and it is a constant  
10          mechanical noise. He mentioned that it varied, but  
11          what he's really talking about is the yaw mechanism  
12          to move the nacelle back and forth, that's variable,  
13          that comes and goes, but the hydraulic noise is  
14          constant. That's just a feature of that particular  
15          model turbine.

16       Q     All right. You have made a recommendation -- well,  
17           let me ask you this first. With respect to the  
18           modeling, you took a look at the Applicant's model,  
19           which predicted using the N100 predicted 45 residents  
20           would be potentially over 45 dBA, right? You saw  
21           that info?

22       A     Yeah. That was with the -- I think the initial  
23           application where they were using a ground absorption  
24           coefficient of zero.

25       Q     That's right. And when you used a ground absorption

1 coefficient of .5, you found that it would be 45 --  
2 four houses above 45 dBA?

3 A Yes. That's correct.

4 Q And would you agree with me that if you're going to  
5 err on the side of public safety, that a more  
6 conservative model is probably a better way to plan a  
7 prospective wind farm?

8 A Well, when we first started analyzing wind projects  
9 10 years ago or more, and we didn't know if the model  
10 was accurate or not, they would put on a safety  
11 factor and so on. Now since that time, we've had the  
12 opportunity to do a lot of testing and compared  
13 what's actually measured to what's predicted, and we  
14 found the best agreement, the most realistic  
15 agreement, is when you use .5 ground absorption.  
16 That gives the closest correlation to what's actually  
17 found out there.

18 Q All right. But you agree with me that models -- your  
19 data shows that the models are generally consistent  
20 but not perfectly on track with reality?

21 A Yeah. What the model gives you is the long-term  
22 average level from the project at a given point, and  
23 what we always made clear in our reports is that that  
24 is the average, and the actual level is going to vary  
25 commonly by plus or minus 5 dBA, sometimes by more.

1 It will get noise spikes like we were looking at a  
2 few minutes ago in that example. That's just the  
3 nature of a wind turbine.

4 Q So the 45 dBA which you're advocating for is not a  
5 maximum, it's an average?

6 A Yeah. That's a given. I'm glad you brought that up.  
7 Yeah. In this paper where we recommend that, we say  
8 what should be limited to 45 is the main long-term  
9 average level at each house. There's no practical  
10 way to maintain a level below a threshold like 45 or  
11 even 50 all of the time. That never happens.  
12 There's always spikes due to weather conditions and  
13 things. They're short-lived, but they're almost  
14 unavoidable.

15 Q All right. So then for a 45 dBA average, then you  
16 might have spikes up to, say, 45, but probably not  
17 over 50?

18 A I got mixed up in that. Can you --

19 Q All right. If you had the ideal target of 40 dBA, if  
20 that were -- if that were basically the target here  
21 measured by the model, and that would mean that there  
22 would be levels at the farm of up to 45 but probably  
23 not beyond 50 dBA?

24 A Yes. Yeah, it would go -- if you say designed to 40  
25 at a particular point, the actual level would vary

1 above and below that up to 45, within the 35-45  
2 range, and there would be probably rare spikes to 50,  
3 even more than 50.

4 Q So with respect to your ideal level, that's based  
5 upon your evaluation of various venues and examining  
6 available complaints from residents?

7 A Right, right. And those levels -- well, you know,  
8 those -- that phenomenon where the level varies  
9 happens at every site. So what we did was we  
10 measured the main long-term level at all of these  
11 houses, and that's what's tabulated there is how many  
12 people were complaining between 40 and 44. That's  
13 the main long-term level between that range. You  
14 know, so at any given house they might be exposed to,  
15 let's say, a level 43, but the actual level might  
16 have gone up to 50 at times and down to 35. That  
17 happens everywhere. So I'm trying to keep everything  
18 on a level playing field.

19 Q All right. Now, assuming that the project could be  
20 redesigned for a 40 dBA, making that assumption, that  
21 would be your preferred dBA limit, would it not?

22 A Well, it would be better for everyone if that were  
23 the actual performance of the project, but typically  
24 it's not practical or feasible to achieve that level  
25 at most projects. I would say 90 percent.

1 Q So are we talking about economic development versus  
2 the public interest to be free of noise complaints?

3 A I think it's just fundamental economics of the  
4 project. To make 40 at a given site, you may --  
5 oftentimes you have to remove so many turbines that  
6 the project just becomes not viable.

7 Q All right. But assuming for the sake of this  
8 question that this project could be redesigned for 40  
9 dBA.

10 A Uh-huh.

11 Q You would recommend that based upon your work, right?

12 A That would be a good thing if that were possible,  
13 yes.

14 Q And there are other jurisdictions such as New York  
15 that have 38 to 40 dBA; isn't that right? I think  
16 these are noticed in your paper. California, New  
17 York. Page 98.

18 A Yeah. Now there that's what we talked about a little  
19 while earlier. Those are relative limits that are,  
20 like, converted to an absolute number. In New York  
21 the methodology for years has been to measure the  
22 background and then you could go over that by 5. So  
23 I think the 38 is just based on a typical background  
24 level of 33, plus 5. That's where that number comes  
25 from.

1 Q All right. I think you testified to this earlier  
2 that there is a significant impact with respect to  
3 noise if the ambient level is very low and with wind  
4 turbines coming in with a higher noise threshold; is  
5 that right?

6 A Yeah. If you had a -- in the specific example there,  
7 if the project level were higher than 45 and the  
8 background level were 16 below that, that means that  
9 the project would be dominant, the only thing you  
10 could hear pretty much. That's that situation. But  
11 the absolute limits that we're putting forward of  
12 40-45 are based on the -- the typical setting that  
13 all of these projects normally are in. In other  
14 words, rural farm country. Those levels appear to be  
15 to our mind satisfactory given that sort of an  
16 environment.

17 Q This is -- is it fair to say that the Town of Forest  
18 is unique because of its very quiet background  
19 levels?

20 A No, I wouldn't agree with that at all. That project  
21 site is very similar to dozens and dozens of other  
22 ones that I could think of.

23 Q Well, but we're talking about -- what areas where  
24 people live in are quieter than these at the 20 dBA  
25 level for ambient noise?

1 A Well, those are the kind of levels we find in every  
2 one of these sites that's in rural farm country.  
3 When the wind is calm, the level is always 20, 25  
4 dBA, and that happens everywhere. It's really the  
5 wind. It's really the background level when the wind  
6 is blowing that has some relevance.

7 Q So with respect to -- back to the Shirley Wind  
8 Project. Given the fact that the applicant here is  
9 recommending the potential use of the same machines,  
10 of the same kind of configurations at the Highland  
11 Project as the Shirley Project, would you have  
12 concerns about potential impacts in the Town of  
13 Forest that have been reported in Shirley?

14 A Yeah. As I think I mentioned earlier, I think the  
15 issues there are related specifically to the -- to  
16 that model turbine, and I think until that's better  
17 understood, I don't see any reason why it wouldn't  
18 repeat itself if that same turbine were used  
19 somewhere else.

20 Q Do you -- now, with respect to the difficulty of you  
21 being able to test at Glenmore -- are you having the  
22 same problem at Glacier Hills?

23 A Yeah. We asked for permission, and same sort of no  
24 response thing. Went on for a long time, and then I  
25 think, oh, what was it, the other day they officially

1 said, no, we don't want to do that.

2 Q All right. And do you think that it's -- that the  
3 Applicants would be -- that it's in the nature of  
4 good science to prevent scientists like you from  
5 gathering data?

6 A Yeah. You know, I think what needs doing is -- is  
7 some field testing to understand this thing.

8 Q And we agree that it's not completely understood?

9 A That's correct. Yeah.

10 Q And do you agree with the environmental assessment  
11 here that a certain percentage of -- of Town of  
12 Forest residents will suffer a decrease in quality of  
13 their life if this project is approved?

14 MR. SCRENOCK: I object to that, Your  
15 Honor. I'm not sure that Mr. Hessler's been  
16 qualified as a quality of life expert.

17 EXAMINER NEWMARK: Yeah. I think it's too  
18 ambiguous of a question.

19 BY MR. REYNOLDS:

20 Q All right. Have you read the environmental  
21 assessment?

22 A Yes. Uh-huh.

23 Q All right. And you -- do you remember a part in  
24 there where the environmental assessment assumes that  
25 if this project goes forward, there will be a small

1 percentage of Town of Forest residents who will be  
2 adversely affected as designed?

3 A Yeah. I would say that's a very typical conclusion  
4 at least. I mean, there's hardly any site where you  
5 can sit back and comfortably say everybody's going to  
6 be fine. I don't -- there's hardly any situation  
7 that falls into that. I can only think of one  
8 project, and it was on an island and nobody lived  
9 there, but -- but for most projects, the norm is to  
10 conclude there will probably be some small impact.

11 Q And so especially if the same turbines are used at  
12 Shirley, you would expect the same result in the Town  
13 of Forest?

14 A Well, I don't have any reason to believe that it  
15 wouldn't -- that whatever is going on there would not  
16 repeat itself.

17 MR. REYNOLDS: That's all I have.

18 EXAMINER NEWMARK: Okay. Other cross?

19 MR. SCRENOCK: I do, Your Honor.

20 EXAMINER NEWMARK: Oh, go ahead.

21 MR. SCRENOCK: Just a few questions.

22 CROSS-EXAMINATION

23 BY MR. SCRENOCK:

24 Q Mr. Hessler, I note that in your testimony, I don't  
25 need to point to any specific points, but you refer

1 throughout, or at least at different points, about  
2 the incidence of complaints. And in response to one  
3 of Ms. Bensky's questions earlier, you used the  
4 phrase pretty significant adverse impact. By that  
5 were you referring to the same thing in terms of  
6 incidence of complaints?

7 A Yeah. I'm talking about complaints and that study we  
8 were talking about before.

9 Q Thank you. And you had a lengthy discussion about  
10 the wind speed monitor and the level from ground  
11 where those measurements were taken. You were  
12 talking about normalizing the wind speeds to 10  
13 meters. Was the purpose of that to essentially  
14 equate a -- excuse me -- that I'm assuming, and I  
15 guess I want to know if my assumption is correct,  
16 that the way that the model works or the reason that  
17 you normalize the time of year is that there's  
18 assumed sort of graduation of wind speed throughout  
19 the elevations and that a wind speed at 50 meters  
20 normalized to 10 meters will equate to a specific  
21 wind speed up at the hub height. Is that the purpose  
22 of the normalization?

23 A Yes. The -- the primary reason that I normalized it  
24 to 10 meters is because that's what we always do in  
25 these assessments. So I wanted to look at it in the

1 way that we normally look at field data.

2 Q Okay.

3 A I wanted to keep it consistent so I can tell what it  
4 meant relative to other sites and other situations.

5 Q Okay. Now, you had talked with Mr. Reynolds a little  
6 bit about the 0.0 ground absorption coefficient  
7 versus the 0.5, and I think you indicated that you  
8 used that process frequently; is that right, that  
9 type of modeling with those coefficients?

10 A Well, what we always do is assume .5 ground because,  
11 as I mentioned, we get the best agreement between  
12 modeled and measured results in a particular point.

13 Q So you don't do that for the purpose of skewing the  
14 results?

15 A Oh, no. No. What I'm after is, I want to know what  
16 it's really going to be at a given house.

17 Q And you had indicated that when you ran your model  
18 with the 0.5 ground absorption coefficient for the  
19 Highland Project, that you found that there were four  
20 houses that you identified that would be within --  
21 above the 45 decibels. Do you know whether those  
22 houses represent participating or nonparticipating  
23 landowners?

24 A I didn't at the time. I have heard recently that  
25 they are all participants.

1 Q Okay.

2 A Not sure about that, though.

3 Q And with -- Mr. Reynolds asked you about the use of  
4 the similar model turbines from the Shirley Project,  
5 I believe that's the N100 here, and you indicated  
6 that you don't have any reason to think that the  
7 problems -- the experiences of folks wouldn't  
8 reoccur. Do you have any reason to believe that they  
9 would?

10 A Well, I would say we don't fully understand why  
11 there's problems at Shirley, but my belief is that  
12 it's associated with a specific turbine model and  
13 possibly the blade regulation, whether it's pitch or  
14 stall regulated. I think I would be leery about  
15 using that turbine again before more is known about  
16 it.

17 Q If one of the other two turbine models that were  
18 discussed being used for this project were being  
19 used, what would be your perception?

20 A I would be more comfortable with that because I think  
21 the other ones are the Siemens. I don't know of any  
22 other model, Siemens and one other one, but I  
23 don't -- I've never noticed any problems with those.

24 Q So based on whatever is going on at Shirley that  
25 we're not sure what it is, you wouldn't have reason

1 to expect those issues to reoccur with either of the  
2 other two models?

3 A That's right.

4 MR. SCRENOCK: Thank you. I have nothing  
5 further.

6 EXAMINER NEWMARK: Okay. Other questions?  
7 I believe staff goes first.

8 CROSS-EXAMINATION

9 BY MR. LORENCE:

10 Q Mr. Hessler, are you familiar with the PSC noise  
11 measurement protocol?

12 A Yes.

13 Q Is any part of that protocol oriented towards  
14 infrasound?

15 A Well, I believe the intent of it was to try to  
16 quantify low frequency sounds by involving the  
17 C-weighted sound level and pre-construction  
18 measurements and post-construction measurements.  
19 That sounds good on paper, but the problem with  
20 C-weighted levels is that they're extremely sensitive  
21 to wind induced pseudo-noise that we talked about  
22 earlier. That wind blowing over the microphone  
23 affects only the lower -- the low end of the  
24 frequency spectrum, and the C-weighted level is  
25 directly dependent on what's going on in the low end

1 of the frequency spectrum. So any little breeze  
2 blowing over the microphone gives you a very high  
3 obstensible C-weighted sound level.

4 So to answer your question, the protocol  
5 has -- calls for C-weighted measurements, but -- and  
6 we've taken that data, and what we found is that the  
7 levels before the project and after the project are  
8 identical because they're purely a function of how  
9 fast the wind was blowing.

10 Q So the pre-construction measurements of the protocol  
11 are you saying are not capable of measuring  
12 infrasound?

13 A Yeah. That's right. That you get a result from  
14 taking those measurements, but it has no actual  
15 meaning. It's a false signal that's almost purely a  
16 function of the wind speed of the microphone.

17 MR. LORENCE: No further questions. Thank  
18 you.

19 EXAMINER NEWMARK: Go ahead.

20 MS. BENSKY: I have a follow-up.

21 RE-CROSS-EXAMINATION

22 BY MS. BENSKY:

23 Q How do you solve that problem? How should the  
24 protocol be different to account for that?

25 EXAMINER NEWMARK: I think he answered

1 that. You lay the microphone down on the ground  
2 with a board, is that --

3 THE WITNESS: Can I answer?

4 EXAMINER NEWMARK: Well, did you answer  
5 that already?

6 THE WITNESS: Not exactly.

7 EXAMINER NEWMARK: Okay.

8 THE WITNESS: No. You could use that  
9 technique that I referred to, but the problem with  
10 it is a practical nature. These surveys last -- or  
11 need to last for a period of weeks to get -- catch  
12 all kinds of wind speeds and times of day, and you  
13 can't leave a microphone sitting on the ground. You  
14 know, if it rains or snows, it destroys the  
15 equipment. So those kinds of measurements have to  
16 be attended. So to -- I suppose if you wanted to  
17 document the pre-existing conditions, you would take  
18 much shorter term measurements using -- perhaps  
19 using that technique and taking short band sample,  
20 but it's very -- it's a very challenging thing to  
21 measure.

22 BY MS. BENSKY:

23 Q And are you aware of any -- switching gears a little  
24 bit. Are you aware of any study that correlates wind  
25 turbine make and model with a particular number of

1 complaints? Is there anything that the Commission  
2 can look at that would be helpful in deciding the  
3 turbine model that would likely produce the least  
4 amount of complaints?

5 A No. Most turbine models have no known noise issues  
6 associated with them. The only ones -- there's only  
7 one or two that I'm aware of that have -- that are  
8 kind of special cases and have issues. I mentioned  
9 the Vestas V82, or at least in the format what used  
10 to be built five years ago. That -- I think that  
11 one's a problem. But -- but of the ones being  
12 considered here, only the Nordex appears to have  
13 possibly something going on with it.

14 Q So is the answer that you're not aware that that has  
15 been studied?

16 A No, it hasn't been specifically studied.

17 Q And one last question. To maintain absolute limit of  
18 45 dBA that is never exceeded, what would -- what  
19 should the project be designed at?

20 A Yeah, that's a good question. It has to be  
21 substantially lower than that to allow for temporary  
22 noise spikes, up to 10 dBA below. Now, that issue  
23 has been around for a while of these temporary  
24 exceedances. What I suggested, and I wrote some  
25 siting guidelines for Minnesota Public Utilities

1 Commission, and what I say in there is that, well, if  
2 the measured level is in compliance 95 percent of the  
3 time or more, then I would consider it in compliance.  
4 So there has to be some allowance for these temporary  
5 excursions because they're essentially unavoidable.

6 Q But that -- but that 10 decibel drop is consistent  
7 with your recommendation in your paper that 35 dBA at  
8 night should be the limit ideally, correct?

9 A Well, that wasn't the conclusion of the paper, but --

10 Q Are those two consistent?

11 A Yeah.

12 MS. BENSKY: Thank you.

13 MR. REYNOLDS: Have one follow-up  
14 question.

15 EXAMINER NEWMARK: One. All right.

16 RECROSS-EXAMINATION

17 BY MR. REYNOLDS:

18 Q I wanted to show you, and I just want to identify  
19 this. I marked it as Hessler A. I don't have  
20 copies, but I just want to know if this is the paper  
21 that shows that -- that you referred to that shows  
22 that larger turbines above .2 -- .23 have higher low  
23 frequency levels than less than 2? Is that the paper  
24 you were referring to?

25 A Yes, I believe that's what this paper says. As I

1 said, I haven't read it for years.

2 MR. REYNOLDS: Okay. And -- yeah, it's  
3 Hessler Exhibit No. 8. I just wrote on it.

4 MS. NEKOLA: Your Honor, we object. We  
5 haven't seen this.

6 MR. REYNOLDS: Yeah, I understand. I am  
7 just marking it so that he can identify it.

8 EXAMINER NEWMARK: What's his next  
9 exhibit?

10 MS. NEKOLA: It would be 7.

11 MR. REYNOLDS: Okay.

12 EXAMINER NEWMARK: It would be 7 anyway.  
13 Okay. Are you trying to move it in now at this  
14 point?

15 MR. REYNOLDS: I don't have to move it in  
16 now. I just wanted him to identify it and then I  
17 have one follow-up question.

18 EXAMINER NEWMARK: Well, based on this  
19 exhibit?

20 MR. REYNOLDS: Well, okay. Let me do a  
21 backup question.

22 BY MR. REYNOLDS:

23 Q What is the title of the exhibit that you're looking  
24 at?

25 A Low frequency noise from large wind turbines.

1 Q And is the premise of that article that large wind  
2 turbines above point -- 2.3 megawatts tend to have  
3 more low frequency sound than turbines less than 2  
4 megawatts?

5 EXAMINER NEWMARK: He's already answered  
6 that. No. He's already answered.

7 MR. REYNOLDS: Okay.

8 BY MR. REYNOLDS:

9 Q Do you know, the other turbines that are proposed  
10 here are above 2.3 megawatts, are they not?

11 A There's been so much focus on the N100 that I don't  
12 even remember what the other two models were.

13 Q Well, if -- if I told you that they were above 2.3  
14 megawatts, then they would -- those turbines would  
15 fall within the definition of larger turbines as  
16 outlined in that paper, right?

17 A Yeah, I suppose so, but I would point to a figure in  
18 that paper --

19 EXAMINER NEWMARK: Okay. Let's hold on,  
20 though. We're really running far afield if we're  
21 going to be digging into this exhibit since there's  
22 an objection already based on entering it in the  
23 record. Any response to that objection? You want  
24 to move it?

25 MR. REYNOLDS: Well, yeah. I think it's

1 relevant because the testimony about low frequency  
2 noise, I think this witness has talked about that  
3 it's not a big deal, and here we may have an answer  
4 with respect to why there's a difference between the  
5 wind turbines at Shirley, which are 2.5, and the  
6 lack of low frequency symptoms at Glacier Hills,  
7 which are less than 2, and the fact that this  
8 witness thinks there are low frequency problems at  
9 Shirley. So that the question is, well, we could  
10 use the other turbine, but there's still within the  
11 gamut of these larger turbines. So I think it's  
12 relevant to that, and I -- I'm certainly willing to  
13 give the -- my colleagues a chance to look at this.  
14 I only had one copy. It came up, you know.

15 EXAMINER NEWMARK: Timing has been an  
16 issue here. Do you guys have a response? Clean?

17 MS. NEKOLA: Just -- it's the same  
18 response. We haven't had a chance to look at this.  
19 Mr. Hessler hasn't seen it for a long time, and I  
20 don't see the relevance. I'm confused really what  
21 you're trying to do here.

22 MR. REYNOLDS: Difference between Glacier  
23 Hills and Shirley is --

24 EXAMINER NEWMARK: I'm going to leave it  
25 out.

1 MR. REYNOLDS: Okay.

2 EXAMINER NEWMARK: We're not going to put  
3 it in, and I think he's actually answered these  
4 questions anyway. It's already on the record, so it  
5 would be repetitive at this point. And let's move  
6 on.

7 MS. NEKOLA: Can we go off the record a  
8 minute?

9 (Discussion off the record.)

10 EXAMINER NEWMARK: All right. Back on the  
11 record. Do you have anything else?

12 MR. SCRENOCK: No.

13 EXAMINER NEWMARK: All right. I had some  
14 questions, but at the risk of opening up another  
15 whole round of cross, I'll forgo it.

16 Any redirect?

17 MS. BRANT: Yeah, we have some redirect.

18 REDIRECT EXAMINATION

19 BY MS. BRANT:

20 Q Mr. Hessler, you talked with Ms. Bensky about your  
21 Exhibit 3 in this proceeding?

22 A Yes. Uh-huh.

23 Q Can you just clarify for us the purpose of Exhibit 3?

24 A Yeah. It was just to give a generic example of  
25 actual measurements of wind turbine sound compared to

1 EXAMINER NEWMARK: Okay.

2 DIRECT EXAMINATION

3 BY MR. REYNOLDS:

4 Q Could you state your name, please.

5 A Wes Slaymaker, S-L-A-Y-M-A-K-E-R.

6 Q And Mr. Slaymaker, you filed some direct testimony in  
7 this case?

8 A That's correct.

9 Q Is it true and correct to the best of your knowledge?

10 A It is.

11 MR. REYNOLDS: All right. That's it.

12 EXAMINER NEWMARK: Okay. You're excused.

13 (Witness excused.)

14 EXAMINER NEWMARK: All right. Who's next?

15 MR. REYNOLDS: Dr. SCHOMER.

16 PAUL SCHOMER, TOWN OF FOREST WITNESS, DULY SWORN

17 EXAMINER NEWMARK: Okay.

18 DIRECT EXAMINATION

19 BY MR. REYNOLDS:

20 Q Can you state your name, please.

21 A Paul Schomer.

22 Q All right. And have you filed testimony in this  
23 case?

24 A Yes.

25 Q All right. In the form of direct?

1 A Yes.

2 Q And rebuttal?

3 A Surrebuttal.

4 Q Yeah, whatever.

5 A Yes.

6 Q Did you bring that testimony with you?

7 A I did not.

8 Q All right. And since giving that testimony, have you  
9 received other information such as Roberts  
10 surrebuttal or listening to the testimony of  
11 Mr. Hessler? Do you have anything to add to that  
12 testimony that you've already given in written form?

13 A I would have comment on what Mr. Hessler said this  
14 morning.

15 Q All right.

16 A That would be all.

17 Q Go ahead.

18 A There's two points I would make very briefly and very  
19 simply. One has to do with the pseudo-noise, and  
20 he's talked about it. We've talked about it a lot.  
21 It's a very important issue in terms of being able to  
22 measure things around a wind farm, and Mr. Hessler's  
23 introduced it. He and his father did a study which  
24 was published in NCEJ, which he referred to this  
25 morning.

1           And when you're dealing with wind noise --  
2           I'm going to try to make this very simple -- there's  
3           two kinds of turbulence. Turbulence is the air  
4           moving around for one reason or another. One kind of  
5           turbulence is just like the -- if you put a stick in  
6           water, a stream, and you see the line go out behind  
7           the stick, and that's called wake turbulence because  
8           it's just like a wake from a boat.

9           And there's another kind of turbulence  
10          called intrinsic turbulence. This is the air moving  
11          around on its own, heating the air against the ground  
12          or being turned over by buildings nearby or stones or  
13          shrubbery or whatever makes the air mixed up and not  
14          steady. So there's these two kinds of turbulence  
15          that is pseudo-noise, and this is what we're trying  
16          to get rid of so that we can make measurements that  
17          are accurate.

18        Q     Okay. So what's your comment on Mr. Hessler's  
19              comment?

20        A     The comment is that Mr. Hessler and his father  
21              measured only the wake turbulence in the wind tunnel  
22              because it was very smooth flow. It didn't have  
23              intrinsic turbulence, and the intrinsic turbulence is  
24              the much more dominating factor. And so the numbers  
25              he quotes for -- for what turbulence causes are quite

1 low compared to what you measure in reality.

2 Q All right. And how is that relevant to what we're  
3 considering here?

4 A That's relevant in the difference between the level  
5 of the turbine noise and the level of the background,  
6 that the level of the turbine compared to the level  
7 of the background exceeds 10 dBA. It's not less than  
8 10 dBA.

9 Q And why is that important?

10 A That is -- 10 dBA is thought of when you start to  
11 have serious problems with a new noise source  
12 compared to what was existing. And so this  
13 exceedance is significant, and the numbers presented  
14 by Mr. Hessler are identical to what has been  
15 published for just the total pseudo-noise.

16 Q All right. Do you have any comments on the issue of  
17 low frequency sound emanated from large turbines  
18 defined as above 2.3 megawatts versus low turbines,  
19 smaller turbines, less than 2 megawatts?

20 A I would expect in just about any machine, as the  
21 machine gets bigger, the dimensions get bigger. It's  
22 how it couples energy out of it. As the sound  
23 radiated will get bigger, which means the wavelength  
24 is longer. The fundamental dimension to the sound  
25 gets bigger, which means it's lower frequency. This

1 would -- I would expect from any machine, and I'm not  
2 surprised to see the data for this machine go that  
3 way.

4 Q And would that explain the wide or rather consistent  
5 complaints of health effects from the residents at  
6 Shirley that have 2.5 megawatt machines as opposed to  
7 other wind farms?

8 MR. WILSON: I'm going to object to that  
9 question to the extent that it goes to health  
10 impact. I don't think he's qualified as a health  
11 expert.

12 EXAMINER NEWMARK: Okay. I'll sustain  
13 that.

14 BY MR. REYNOLDS:

15 Q You have given testimony on the -- do you have  
16 information about the relative impacts of low  
17 frequency sound on health?

18 A Yes.

19 MR. WILSON: Objection.

20 MR. REYNOLDS: This has been the part of  
21 it. He's testified to this. We've had Mr. Hankard  
22 who testified about annoyance versus health.

23 EXAMINER NEWMARK: The first question, did  
24 you say complaints or did you say health?

25 MS. BENSKY: That was just a foundational

1 question.

2 MR. REYNOLDS: Yes. Exactly.

3 EXAMINER NEWMARK: That's fine. Let him  
4 answer.

5 THE WITNESS: What question am I answering  
6 now?

7 EXAMINER NEWMARK: None. Let him think.

8 BY MR. REYNOLDS:

9 Q All right. There has been testimony about -- from  
10 the Shirley Wind residents who have machines that are  
11 2.5 megawatts, and then we've had testimony about --  
12 from complaints that -- that are more of the sleep  
13 category as opposed to the nausea, headache, earache  
14 category, okay? You've given testimony that the  
15 infrasound impacts to human health focus on those  
16 kinds of symptoms like headache, nausea, vertigo,  
17 feeling of ill at ease, right?

18 A Yes.

19 Q Would the size of the turbines at Shirley and its  
20 likely higher production of low frequency noise have  
21 a potential explanation for why the folks at Shirley  
22 are having such difficulty?

23 A I think it's a potential explanation, but I think I  
24 could come up with -- there's other explanations  
25 maybe. But that's certainly a potential explanation.

1 Q All right. Well, the whole -- the point of this  
2 hearing is to try to determine whether the project as  
3 designed for the Town of Forest is -- is appropriate.

4 A Yes.

5 Q And size of turbines is one factor?

6 A It is a factor.

7 Q What else?

8 A I think that -- that the -- to me, one of the  
9 important factors has been the nature of the  
10 community being somewhat unique. This is -- the  
11 basic things that have been talked about here are  
12 most important. The testimony you had yesterday,  
13 although I was not here, I've heard that kind of  
14 thing before, and I think that the issue before us is  
15 whether that's going to continue. The people are  
16 being taken out of their homes by the sound. This is  
17 not new. As I've pointed out in my testimony, this  
18 has been going on for 30 years, not with wind farms  
19 but with low frequency noise, and especially  
20 pulsating noise.

21 The notion that wind farms is somehow  
22 different is just not -- makes sense. And that we  
23 know and we've known for years that these same  
24 symptoms have occurred over time with different kinds  
25 of sources of low frequency sound, and the result is

1 always the same. There's a fraction of the  
2 population, we don't think it's a large fraction,  
3 that has these symptoms to the point where some are  
4 driven out of their homes.

5 EXAMINER NEWMARK: Okay. Sir, I think  
6 wasn't the question what -- what was your question,  
7 what things can be done to prevent this, to reduce  
8 this?

9 MR. REYNOLDS: Yes.

10 BY MR. REYNOLDS:

11 Q Okay. So there are -- in your view, you've made a  
12 recommendation that if this project is -- is -- is  
13 approved, that the -- that the noise limits be  
14 reduced?

15 A I have made a recommendation that the noise limits be  
16 reduced and that the -- I have made a recommendation  
17 that the prediction based upon the average is not  
18 consistent with what's been put together as the  
19 procedures in Wisconsin.

20 Q All right. Explain that.

21 EXAMINER NEWMARK: Well, is this in his  
22 testimony already? He said he explained this.

23 MR. REYNOLDS: All right. Yeah.

24 EXAMINER NEWMARK: Okay.

25 BY MR. REYNOLDS:

1 Q Well, let me ask you this. We've been talking about  
2 average noise limits and maximum noise limits.

3 A Correct.

4 Q What are the limits that we should be shooting for  
5 here?

6 A Well, what I think about always is are things  
7 logical, is this what was meant. And as I understand  
8 it in Wisconsin and in this proceeding, people have  
9 said there's a 45 dB nighttime limit, and it has to  
10 be designed for 100 percent of the houses, the homes  
11 of nonparticipating residents meet 45 dB. It  
12 wouldn't be acceptable for 50 percent of the homes to  
13 meet 45 dB.

14 And then I ask the question, if 100  
15 percent of the homes have to meet 45 dB, how can you  
16 have 100 percent of the homes meeting it half the  
17 time is somehow different than half the homes meeting  
18 it all the time. To me the two are the very same  
19 thing, just on a basis of logic that if you have a  
20 rule of 45 dB, it should be that way. You can't have  
21 it -- it's met half the time at all the houses but  
22 it -- the two are the same.

23 Q So is that the -- is your recommendation for a 39 dB  
24 limit designed then to make sure that the maximum  
25 doesn't exceed 45?

1 A No. I was saying that we should model using zero at  
2 a minimum, model using zero as the modeling rather  
3 than .5.

4 Q Okay.

5 A So that there is -- you get closer to this  
6 realization that you have a limit met all the time at  
7 all the houses and not -- well, all the time at some  
8 of the houses you wouldn't permit, but some of the  
9 time at all the houses is permitted. And the two are  
10 identical, so it's difficult to understand the  
11 distinction.

12 Q So when you first looked at this, the model that you  
13 looked at in the application was based upon a zero  
14 coefficient?

15 A The original material presented, I think it was  
16 called Appendix V as I recall, had zero for the  
17 modeling.

18 Q And you thought that was an appropriate number?

19 A I believe that is an appropriate number.

20 Q And why be conservative in modeling?

21 A Well, one of the reasons I came to this -- two  
22 reasons I come to this. One is the one I've just  
23 illuminated, that if you have a rule that all the  
24 houses meet it and then you say half the time, and  
25 then you say but you can't have -- it's met 100

1 percent of the time at half the houses, there's no  
2 logic there.

3 The other reason is that this is supposed  
4 to be done in terms of the ISO standard. People say  
5 we're applying ISO 9613, and ISO 9613 calls for --  
6 if you follow it, it says we're making a  
7 conservative prediction and that the only  
8 permissible way and to say you're using 9613 is to  
9 make the prediction, and then if you want to have a  
10 time average according to ISO 9613, there's a  
11 specific procedure in the standard for doing that,  
12 and that's not being followed.

13 So I do it on the basis of logic, of what  
14 the rule is, and I've come to that conclusion on the  
15 basis of following the standards, which have not  
16 been followed.

17 Q So is it -- is it fair to say that a conservative  
18 model will err, if at all, on the side of public  
19 safety?

20 A I wouldn't call it erring, but it will certainly be  
21 on the side of public safety.

22 MR. REYNOLDS: Okay. That's all I have.

23 EXAMINER NEWMARK: Okay. Other questions?

24 CROSS-EXAMINATION

25 BY MR. WILSON:

1 Q Mr. Schomer, have you visited the site?

2 A No.

3 Q So that means you haven't taken any data at the site?

4 A No.

5 Q You testified in response to some questions from  
6 Mr. Reynolds that the nature of this community was  
7 very unique. If you haven't been to the site, how  
8 can you understand whether this community is unique  
9 or not?

10 A I find the unique factor in the activities this  
11 community has engaged in in terms of trying to  
12 maintain the quiet, rural nature of the community,  
13 and I find that to be similar to situations I've seen  
14 in other parts of the country where that kind of  
15 community existed, and I've seen very unique  
16 reactions when that exists.

17 Q So if I understood your testimony, what's unique  
18 about this community is that they're -- at least some  
19 people in the community are fighting the project?

20 A No. I said that in the testimony I've read that's  
21 been put in place in this, that this community has a  
22 land use plan of some kind. I don't profess to be a  
23 planner and get all the terms right, but that this  
24 community has gone out and said we want to maintain  
25 the quiet, rural nature of this community, we don't

1 want to plan for industry, we want a plan for  
2 five-acre homes and the maintenance of farms. That's  
3 where they're unique.

4 And the similarity I find that was I --  
5 plans that the FAA tried to implement some probably  
6 25 or 30 years ago, and probably the one example I  
7 can think of where the FAA was eventually stopped by  
8 Congress because of the uproar. And I find this --  
9 the dynamics of this community to be along those  
10 lines.

11 Q So you've reviewed the comprehensive plan for the  
12 Town of Forest?

13 A I've reviewed the testimony.

14 Q But you haven't reviewed the plan?

15 A I've not reviewed the document, no.

16 Q Are you familiar with the fact that in Wisconsin,  
17 most local communities have to do some type of  
18 comprehensive plan by law?

19 A Yes.

20 Q Okay. So they're not unique from that perspective?

21 A No.

22 Q Okay. You don't have any medical training; is that  
23 right?

24 A That's correct.

25 Q You have an engineering degree?

1 A Correct.

2 Q So if you take a look at page 2 of your direct  
3 testimony. You have a copy of your testimony with  
4 you?

5 A I wasn't asked to bring them, so I am at the mercy of  
6 somebody to give me a copy.

7 MR. REYNOLDS: What do you want, direct?

8 MR. WILSON: For the time being, yes.

9 MR. REYNOLDS: All right.

10 MR. WILSON: He'll need sur, too.

11 MR. REYNOLDS: He is on direct.

12 THE WITNESS: All right. Page 2.

13 BY MR. WILSON:

14 Q Line 17 and 18, I find within a reasonable degree of  
15 engineering certainty that there will be significant  
16 health impacts. Can you explain to me the  
17 relationship between engineering and health impacts?

18 A I think that we've heard Mr. Hessler testify, and I  
19 think that on the same basis we have been observing  
20 and learning about these problems for many years.  
21 And, no, we're not going to give prescriptions out  
22 and -- but we understand better the acoustics and the  
23 physics, and I think that there's a shared burden to  
24 do these things properly, but we are part of the  
25 team.

1 Q Okay. Are you saying that -- you've already  
2 testified you're not a health expert; is that  
3 correct?

4 A I have testified, and I'm certainly not trained as a  
5 health expert.

6 Q Are you a health expert?

7 A I think I understand something about the health  
8 effects of noise from the literature that I follow.  
9 Does that say I'm a doctor, no.

10 MR. WILSON: Did you give him his sur?

11 MR. REYNOLDS: He's got it.

12 BY MR. WILSON:

13 Q So at page 11 of your sur, you're talking about your  
14 conclusion that the 0.00 contour is appropriate?

15 THE WITNESS: I have to ask for page 11 of  
16 the sur.

17 MR. REYNOLDS: I'm sorry?

18 THE WITNESS: The surrebuttal.

19 MR. REYNOLDS: It's right there.

20 THE WITNESS: It is?

21 MR. REYNOLDS: Yeah. It's all tabbed  
22 together.

23 THE WITNESS: Oh, right behind that?

24 MR. REYNOLDS: Yep.

25 THE WITNESS: Okay. That should be easy.

1 Page 11.

2 MR. WILSON: Yes.

3 BY MR. WILSON:

4 Q So at 11 there, you are testifying at line 15 about  
5 the appropriateness of the zero contour, correct?

6 A Correct.

7 Q And you would agree that that contour is the most  
8 conservative possible?

9 A It's the most conservative possible using 9613.

10 Q Okay. Now, if we could go back to your direct  
11 testimony on page 9. On page 9 in the middle of the  
12 page there you're describing your Exhibit 2, which  
13 is, you know, the results of you running a model, and  
14 in this case you used -- you used both zero and .5;  
15 is that correct --

16 A Yes.

17 Q -- to produce Exhibit 2?

18 A That is true.

19 Q Okay. And reviewing your testimony here on page 9,  
20 there's nowhere where you indicate in your direct  
21 testimony here that using the .5 is inappropriate?

22 A At that point in time, we had not received the  
23 operation of the source levels from proponent as  
24 perhaps you recall, and I was trying to make sense  
25 out of this with data that we had been able to

1 collect off the internet, which were apparently  
2 precursor data to the real data. And my whole  
3 original testimony is somewhat screwed up because we  
4 didn't have the source data that should have been a  
5 part of the application.

6 Q Are you done?

7 A I'm saying I did the best I could given the data we  
8 did and didn't have.

9 Q Fair enough.

10 A And I did analysis of .5, but the analysis I did of  
11 .5 was equal to the zero case because the source data  
12 that I found were that much higher.

13 Q Okay. But you used a ground factor of .5 in your  
14 initial creation of Exhibit 2, correct?

15 A That was one of the numbers I looked at.

16 Q Okay. And why did you not at that time use zero for  
17 the entire run to create Exhibit 2?

18 A As I just told you, I was trying to figure out what  
19 was going on because I could not understand even what  
20 was being recommended by proponent, whether it was  
21 zero or .5, what the data were that were to be used.  
22 When I made my .5 predictions, they came out zero.  
23 The zero predictions of the report, I didn't know if  
24 the report was labeled wrong, whether there was 141  
25 houses as Mr. Hessler criticized my report for. It

1 was just -- would have been much better if we had the  
2 source data.

3 Q Okay. You have a fundamental belief that these  
4 models should be run using the zero contour, correct?

5 A I think that that's something that I thought about.  
6 I've not articulated it.

7 Q But you articulated it in your testimony?

8 A In this. Not up until here. I have -- I've come to  
9 that conclusion for Wisconsin for two reasons. One  
10 is because the standard that you say is being used  
11 calls for it. And the second is, when I read the  
12 rule, or as I understand the rule, and I have read  
13 the rule, there just doesn't seem to be a difference  
14 between the application two different ways. I have  
15 made predictions using the annual average for sources  
16 that call for that specifically. When you make  
17 predictions for an airport, it calls for the annual  
18 average. When you make predictions for a highway,  
19 these are called for. I didn't see that they were  
20 called for here. I saw a different kind of thing.

21 Q Okay. So you testified that you just recently came  
22 to the conclusion that zero is appropriate only here  
23 in Wisconsin; is that correct?

24 A No. I think it's probably a good idea all over, but  
25 it's something that we haven't done in this country

1 in transportation noise sources.

2 Q Okay. But this was a recent revelation that you've  
3 had; is that correct?

4 A This actually occurred serendipitously. I was asked  
5 to give a lecture this coming November on ISO 9613.  
6 And when I started to put the lecture together, I  
7 realized that it was calling for this conservative  
8 prediction and that indeed I had been misusing the  
9 standard, and I was on the committee that wrote it  
10 when it was written.

11 Q So does this revelation occur between the time that  
12 you submitted your direct testimony and the time you  
13 submitted your surrebuttal testimony?

14 A That part of it does, yes.

15 Q Yeah. So that explains why you were willing to use a  
16 .5 in your direct testimony but not in your  
17 surrebuttal testimony?

18 A No. The .5, as I've tried to say, is lots of reasons  
19 for it being there. Part of it is I tried to  
20 understand what was going on.

21 MR. WILSON: I think that's all we have.

22 EXAMINER NEWMARK: May or may not be. I  
23 want to let you know before you stop, I've decided  
24 to allow that Schomer page 6 on surrebuttal in.  
25 Basically we have so many standards at this point in

1 the record, and the studies we let in refer to WHO  
2 and all kinds of European standards, day and night  
3 standards. Let's just put it all in, and I'll give  
4 you a chance to cross him on that if you need to.  
5 None?

6 MR. WILSON: We're just fine with your  
7 ruling.

8 EXAMINER NEWMARK: All right. Any other  
9 questions?

10 MS. BENSKY: I have a few.

11 CROSS-EXAMINATION

12 BY MS. BENSKY:

13 Q We've talked a lot about this ISO 9613 standard. You  
14 said you were on the committee that wrote it?

15 A Correct.

16 Q Mr. McKeever is passing them out to everyone so I  
17 think it will be helpful to --

18 A I can't hear so well at my -- you have to speak up a  
19 little bit.

20 Q You spent too much time around wind turbines? Sorry.  
21 That was a joke. It was funny.

22 So you've just been handed a piece of  
23 paper. Is this the international standard 9613-2  
24 that you helped create?

25 A Yes.

1 Q And this was designed in 1996, correct?

2 A This was first edition it says 1996, December 15th.

3 Q And has it been revised since then?

4 A No.

5 Q Was this standard designed specifically for wind  
6 turbine noise?

7 A No.

8 Q And if you turn to page -- I don't know what page it  
9 is -- the pages don't appear to be numbered. If you  
10 turn five pages in, it says acoustics.

11 A Okay. Maybe you have a clause number.

12 Q Part 2, acoustics attenuation of sound during  
13 propagation outdoors. It's the fifth page in.

14 A I'm not sure I know what -- there's Clause 2 is the  
15 following -- there's normative references. Are you  
16 in the --

17 EXAMINER NEWMARK: I think you have it  
18 right in front there.

19 THE WITNESS: Part 2, yes. That's all  
20 dealing with Part 2. Part 1 is air absorption,  
21 tables of air absorption.

22 EXAMINER NEWMARK: Can I have that back,  
23 please? I'm going to follow along.

24 THE WITNESS: Okay. Part 2.

25 BY MS. BENSKY:

1 Q And there are two columns on this page, and the  
2 right-hand column, the second paragraph beginning  
3 with the word, this method is applicable. Do you see  
4 where I am? That's on the right-hand column near the  
5 top.

6 A This method is applicable, yes.

7 Q Uh-huh. And it says, it is applicable directly or  
8 indirectly to most situations concerning road or rail  
9 traffic, industrial noise sources, construction  
10 activities, and many other ground-based noise  
11 sources. Is a wind turbine a ground-based noise  
12 source?

13 A Probably not. There's no other standard to use.

14 Q So this is the best standard, but it's not quite  
15 right?

16 A It's not going to be quite right.

17 Q But this standard specifically does not apply to  
18 sound from aircraft and flight or blast waves from  
19 mining, right?

20 A Okay. That was probably inserted by me.

21 Q Is one of the reasons why you are calling for using  
22 this very conservative absorption coefficient because  
23 of this limitation?

24 A That would be one of the reasons. We have -- we  
25 studied in my laboratory air to ground versus ground

1 to ground propagation by having one experiment where  
2 we had 100-foot-high tower that we did sound  
3 propagation measurements for, and then we had a  
4 source on the ground that we did the propagation  
5 measurements for, and the difference of 100-foot-high  
6 tower versus on the ground was -- oh, I've got  
7 published papers on it. I don't know that I remember  
8 the exact numbers. The levels -- the higher levels  
9 are about the same, but they're three times more  
10 often, then you're up 100 feet.

11 Q What happens if you're up 100 meters?

12 A It's going to possibly be even more frequent.  
13 Possibly be the same. I guess that didn't answer  
14 much, but that's the best I can do.

15 Q Well, the point is that we just don't know?

16 A Well, I know it won't be less, but I don't know  
17 that -- I haven't reached the saturation or that it's  
18 going to continue to grow.

19 Q Having this in your hand, and if you can do it very  
20 quickly, can you point to other paragraphs that  
21 encourage the model to be used in a conservative  
22 manner?

23 A Say that again, please.

24 Q Well, you talked about after looking through this,  
25 you realized that the intention was to obtain

1 conservative results; is that correct?

2 A Yes.

3 Q And I'm asking you where in the document we should  
4 look to get that information.

5 A Okay. That is one place. When it talks about the  
6 cement, and I just have to find where it talks about  
7 that. Well, in 3.2 in definitions it gives  
8 equivalent continuous downwind octave band sound  
9 pressure level, and downwind is a shorthand name for  
10 sound -- propagated sound where it travels in the  
11 louder manner. Because as everybody knows, you're  
12 downwind outdoors, it's louder than if you're upwind,  
13 and that's what the downwind means here, that you're  
14 getting a prediction that's hearing-enhanced  
15 propagation. So in 3.2, the definition of downwind  
16 indicates this. And then it talks about predicting  
17 the downwind. Let's see. I think on Equation 5 and  
18 6 -- in 5 it talks about the downwind again.

19 EXAMINER NEWMARK: That's meteorological  
20 conditions, number five? Is that where you're at?

21 THE WITNESS: No. I'm on Equation 5 on  
22 the unknown page, but it's in the end of Clause 6.

23 EXAMINER NEWMARK: Oh.

24 THE WITNESS: And this is the basic  
25 equation for using ISO 9613, and it talks about

1 downwind. And as I said, if one wants to calculate  
2 the long-term -- the long-term averages, if you look  
3 at the bottom of just before you get to 7,  
4 there's -- you go up two paragraphs, it says the  
5 long-term average weighted sound pressure LAT,  
6 paren, LT for long-term, shall be calculated  
7 according to the equation there, and that's not been  
8 done.

9 BY MS. BENSKY:

10 Q In this project?

11 A In this project.

12 Q And what's the significance of that?

13 A Well, this is the procedure that was designed in the  
14 standard for going from downwind to long-term if  
15 long-term wanted to be used. What this does is it  
16 says that if you're up in the air, which is what I  
17 just -- we know we are, they recognized when this was  
18 written, they being -- this was really based upon a  
19 German standard initially -- that when you have an  
20 elevated source, you're going to get this high level  
21 more of the time, as I said, three times as often,  
22 which was a whole lot of the time from 100-foot high.  
23 When you look at this case, this standard says that  
24 you never have anything but the high levels from an  
25 elevated source and that the -- the average that's

1 used for other sources shouldn't be used for this  
2 because it is elevated, and I think that's the  
3 difference that comes in here.

4 MS. BENSKY: Thank you.

5 EXAMINER NEWMARK: Anything else?

6 MS. BENSKY: Briefly.

7 BY MS. BENSKY:

8 Q Is it necessary for you to visit a site to be able to  
9 analyze data that was taken at that site?

10 A No.

11 Q Is this something that you do all the time in your  
12 professional work?

13 A Well, I like to judge the people that have made the  
14 measurements and have some feel for things, but I  
15 would say that things that are done by Mr. Hankard or  
16 Mr. Hessler, I believe the measurements in general.  
17 Now, I've said that I thought he was wrong on the  
18 empty pseudo-noise, but that's a separate thing.

19 Q And even though that you -- so, is your own  
20 experimentation necessary to be able to reach the  
21 opinions that you've reached in this case? Is it  
22 necessary for you personally to conduct experiments  
23 in order for you to reach the opinions that you have  
24 reached in this case?

25 A No. As I've said, even if I had done studies that

1 would be part of the team, that I think that nothing  
2 is done by one person alone.

3 Q And in fact, whoever uses this model is to some  
4 extent relying on your work, right?

5 A They're relying on my work. They're relying on the  
6 Deutsches In -- DIN, Deutsches Institut fur Normung.

7 Q So even though you've not been to the site, and even  
8 though you haven't done your own experimentation, can  
9 you still state the opinions that you stated in this  
10 case to a reasonable degree of scientific certainty?

11 A Yes, I do.

12 MS.

13 MS. BENSKY: Thank you.

14 EXAMINER NEWMARK: Okay. Other questions?

15 RECROSS-EXAMINATION

16 BY MR. WILSON:

17 Q Just a couple questions following up on ISO 9613-2.  
18 When you testified earlier that you were implementing  
19 a method incorrectly, was it this method that you  
20 were --

21 A I'm sorry? I don't quite follow the question.

22 Q Well, you told me -- you told me before when I was  
23 asking you questions that you had this recent  
24 epiphany which is the result now of using -- you're  
25 saying you use the zero ground contour, and you told

1 me that up until recently something had been -- had  
2 been implemented improperly by yourself as well.

3 A Yes. I had forgotten. I don't -- you know, I don't  
4 use 9613 that often. It's used for this, but it's  
5 not used -- I use 9613 for this, and I use it for  
6 small arms ranges occasionally.

7 Q Okay.

8 A But when you're doing airports or highways or other  
9 things, there's models put out by the DOT for those  
10 kinds of sources. So if you do general work, which I  
11 do in all kinds of noise areas, you use different  
12 things at different times. What I was saying is  
13 until I had looked over this to prepare this lecture  
14 for Brazil when I'll be there, I remembered that this  
15 was for the downwind situation, which is also called  
16 for in ISO 1996, which I do know because I'm chairman  
17 of that committee.

18 Q Okay. I just have one other question for you. Have  
19 you done any studies that implement this standard  
20 with your new recollection against actual sound  
21 measurements to be able to tell whether it's a good  
22 fit?

23 A Well, you're not looking for a good fit. When  
24 you're --

25 Q That's not my -- my question is this, have you

1 compared your calculations using this method against  
2 actual sound measurements with your recent  
3 recollection that you've got to do in a certain way?

4 A Well, of course I haven't.

5 MR. WILSON: Thank you. That's all.

6 EXAMINER NEWMARK: Okay. Redirect?

7 MR. REYNOLDS: Just a couple questions.

8 MR. LORENCE: Your Honor --

9 EXAMINER NEWMARK: Oh.

10 MR. LORENCE: -- I may have a question  
11 before we get to redirect.

12 MR. REYNOLDS: Sorry. Go ahead.

13 EXAMINER NEWMARK: While you're doing  
14 that, I was going to take a minute. Did we verify  
15 his testimony?

16 MR. REYNOLDS: If I didn't -- I thought I  
17 did.

18 EXAMINER NEWMARK: Did you? You know  
19 what, just do it again just in case because I don't  
20 remember.

21 FURTHER DIRECT EXAMINATION

22 BY MR. REYNOLDS:

23 Q Dr. Schomer, do you verify that the rebuttal or  
24 surrebuttal that you've given, or direct and  
25 surrebuttal, is true and correct?

1 A Yes.

2 MR. REYNOLDS: Okay.

3 EXAMINER NEWMARK: And these Exhibits 1  
4 through 4 as well?

5 MR. WILSON: Your Honor, I think given the  
6 discussion of this document, it probably ought to go  
7 in as an exhibit.

8 MR. McKEEVER: Yes.

9 MR. LORENCE: I'm going to ask a couple  
10 questions on it, so you may want to hold off on  
11 that.

12 EXAMINER NEWMARK: Okay. Let me just have  
13 him answer. Are Exhibits 1 through 4 -- sir?  
14 Mr. Schomer, Exhibits 1 through 4, were they  
15 filed -- are they correct to the best of your  
16 knowledge?

17 THE WITNESS: I'm sorry?

18 EXAMINER NEWMARK: Your Exhibits 1 through  
19 4, are they correct to the best of your knowledge?

20 THE WITNESS: Yes.

21 EXAMINER NEWMARK: Okay. Thanks.

22 All right. Commission staff.

23 CROSS-EXAMINATION

24 BY MR. LORENCE:

25 Q Dr. Schomer, on page 12 of your surrebuttal

1 testimony, and I'm looking on lines 6 through 8.

2 A Uh-huh. I guess I'm not fast enough. All right. I  
3 got to page 12.

4 Q On lines 6 through 8 you say, ISO 1996 requires what  
5 is termed "downwind" or weather-enhanced propagation  
6 conditions so that model predictions are only  
7 infrequently exceeded. Do you see that sentence?

8 A Yes.

9 Q I have never seen ISO 9613-2 before today. Could you  
10 tell me where that's required in this -- in this ISO  
11 9613?

12 A Those are the questions we just answered, but I can  
13 go through it again.

14 Q Well, you talked about the downwind stuff, but you  
15 say it says that it's only infrequently exceeded, and  
16 I'm wondering if it says that in here anywhere?

17 A That's what the downwind nomenclature means, and I  
18 believe it's in either 9613 -- I know it's in either  
19 9613 or in 1996, which 9613 incorporates by  
20 reference.

21 Q I have one more question, and again this shows my  
22 complete ignorance on this standard. In Section 7.3,  
23 that's called ground effects, and again there's not a  
24 page number here, but if you could turn to that.

25 A Okay. 7.3. 7.3, ground effects, yes.

1 Q Is this section equivalent of the ground factor that  
2 we've been talking about the last two days?

3 A This section is -- makes use of the ground factor.  
4 It's not equivalent. This is where the ground factor  
5 comes in. What you have is on the next page there's  
6 graphs showing the -- what the sound propagation is  
7 in different octave bands. And then in the  
8 implementation there's a table on the next page,  
9 Table 3, and in Table 3 if you look in there, there's  
10 A sub S or A sub R in the middle column at the top,  
11 and that's for the source or receiver region. We've  
12 been talking about there's really three factors, the  
13 .5 or the zero whatever. You have a factor for the  
14 source region, a factor for the middle, and a factor  
15 for the receiver region. And if you look at the  
16 formulas under A sub R of the middle column, you'll  
17 see a G. That's the ground factor that goes between  
18 zero and 1.

19 Q And that's the ground factor we have been talking  
20 about for two days?

21 A There's three of them technically: one for the  
22 source, one for the receiver, and one for the middle.

23 Q So if we turn back one page where it begins with the  
24 letter A, then it says hard ground.

25 A Hard ground, yes.

1 Q That first paragraph ends -- it says, for hard ground  
2 G equals zero. So this is the ground factor zero  
3 that we've been talking about, correct?

4 A Correct.

5 Q And then for porous ground in B, it's G equals 1?

6 A Correct.

7 Q And then for mixed ground, it says it's someplace in  
8 between zero and 1. Do you see that?

9 A I see that.

10 Q So this is the ground factor we've been talking about  
11 here?

12 A Yes. But to understand that is a question that was  
13 earlier. You've got a source up in the air and not  
14 on the ground, so does this standard really apply.  
15 And my answer was, it's the best we have, but you  
16 can't apply it exactly the way you would if it was on  
17 the ground because the source is as high in the air,  
18 it changes what the propagation is. So that the  
19 definition of what is hard and what is soft, you have  
20 a source that's 100 meters in the air on average.  
21 That's not on the ground as one of the other  
22 counsel's pointed out.

23 Q But it has to get to the ground -- the sound has to  
24 get to the ground eventually, doesn't it?

25 A It has to get to the ground eventually.

1 Q And once it's on the ground, won't it travel along  
2 the ground?

3 A No. It's only -- the only thing you have is an  
4 effect of the microphone height at your receiver.  
5 The other -- it doesn't -- it doesn't come down to  
6 the ground and then travel across the ground like  
7 this. It doesn't do that. What you're interested in  
8 is the path that goes straight from this up in the  
9 air source to your receiver, which may be near the  
10 ground, but you don't have any other path. If you  
11 do, it's because you don't have good propagation.  
12 Then it's poor propagation conditions.

13 MR. LORENCE: Thank you. I have no  
14 further questions.

15 MS. BENSKY: Your Honor, can I follow up  
16 on that? This is really important, and I want to  
17 make sure I understand.

18 RECROSS-EXAMINATION

19 BY MS. BENSKY:

20 Q So are you saying that if we have a flat -- if we  
21 have a flat ground, if there's a source that's close  
22 to the ground emanating sound, that sound can just go  
23 and be absorbed in the ground, correct?

24 A Ground absorption -- what happens, and this is more  
25 related to people's experience. You know, if we went

1 through all the details, it would be complicated, but  
2 I think people's experience is useful here. First of  
3 all, the first rule is that if you're downwind, it's  
4 louder than if you're upwind, and there's -- the  
5 reason is the downwind, and this is going to seem  
6 strange, we think of sound almost as rays, sound rays  
7 rather than waves.

8 And let's put it this way. Let's say you  
9 were behind the barrier. You expect it to be  
10 quieter. It's quieter because there's no direct path  
11 from the sound to you. It has to come around the  
12 corner just like if you had a -- something to stop  
13 the sun or a reflector of light. You go behind it,  
14 it's not as light as in front of it. Sound is the  
15 same thing. If you have a barrier or something that  
16 prevents the sound from getting to you, it's quieter  
17 than if you don't have that. Well, on a sunny day  
18 and you're upwind, you don't hear things. But if  
19 you're downwind, you do.

20 Another thing -- example, if you're out in  
21 a boat, do you hear things far away out in a boat?  
22 You've seen that? This is the hard surface of the  
23 water, and frequently above the water there's a  
24 temperature inversion because of the cooling and  
25 heating of the water. And those two can form two

1 layers that the sound gets trapped in, and then you  
2 have very -- you hear the people whispering on the  
3 shore, and it's like they're 10 feet away from you.  
4 I'm sure many of you have experienced this. This has  
5 to do with the propagation downwind versus upwind,  
6 has to do with the propagation.

7 The physics is complicated, but the  
8 effects -- same thing. Ever hear sources very early  
9 in the morning? You wake up at 5:00 a.m. and you  
10 hear a distant train or horns or the wheels? Have  
11 you experienced that? That again has -- at that time  
12 of day, you've got a direct path from the source,  
13 which is -- you don't hear the rest of the day to  
14 you. It has to do with the physics of the situation.

15 I'm not going to attempt to go into the  
16 physics, but I'm trying to give you different  
17 examples out of your daily life that show you this is  
18 what goes on. We don't want to really go into the  
19 details of what's going on.

20 Q So if there's a source up in the air that's emitting  
21 sound, the sound's going to come down and it's going  
22 to hit the receptor before it hits the ground and  
23 absorbs; is that correct?

24 A It's going to hit the receptor directly. There will  
25 be -- it gets confusing.

1 Q That's for sure.

2 A The ground is important only that it gives a  
3 reflection that can enhance or interfere with the  
4 direct path. But it does hit the microphone, that's  
5 the first thing it hits in time. The sound will  
6 arrive at the microphone before -- it comes directly  
7 from the source, so it will arrive first.

8 Q So somebody standing outside near a wind turbine or  
9 any source up in the air, that sound wave is going to  
10 travel down, and it's going to hit that person's ear  
11 before it goes down to the ground and gets absorbed?

12 A Well, won't be totally absorbed but, yes, it does hit  
13 you before it's absorbed. And I think your point is  
14 good, that as you're traveling along the ground, from  
15 ground to ground it will be absorbing some of the  
16 sounds, and that alone is -- that's part of the  
17 reason that the air-to-ground path is louder.

18 Q And so do you think it's proper to assume no  
19 absorption and use that 0.0 coefficient for this  
20 reason?

21 A That's part of the reason. Part of the reason is  
22 the -- in order to have a prediction that is what is  
23 called for in the standard, which is a prediction  
24 that is -- if you like the term conservative, a  
25 prediction that predicts what's going to happen 90

1 percent of the time or 95 percent of the time or some  
2 percentage of the time, I actually think that from  
3 the data that I know of, the prediction is probably  
4 the -- about 85 percent of the time would be  
5 included, and 15 percent of the time you would be  
6 above what's being predicted with the 0.00  
7 prediction. It's not the most conservative  
8 prediction in the world by any means.

9 Q But considering we have to use this model because we  
10 don't have anything better, the best way to use this  
11 model for a source that's 100 meters in the air is to  
12 use that 0.0 coefficient?

13 A 0.00 is the best you can do with this.

14 MS. BENSKY: Great. That's very helpful.  
15 Thank you.

16 MR. REYNOLDS: Couple questions on  
17 redirect.

18 REDIRECT EXAMINATION

19 BY MR. REYNOLDS:

20 Q Dr. Schomer, is it the heart of it that the challenge  
21 of creating a model to reflect what the citizens of  
22 Forest will actually experience, is that the heart of  
23 why it's better to have conservative estimates than  
24 not conservative estimates of sound? Because we're  
25 trying to figure out what's going to happen to the

1 citizens in Forest.

2 A I think there's probably lots of reasons I can think  
3 of for doing this. Again, we're dealing with a low  
4 frequency sound primarily. The A-weighted sound is  
5 going to correlate with it as it does with nearly all  
6 noise sources.

7 I think it's important to understand how  
8 the ear hears because that's all a part of this, and  
9 the ear doesn't hear all frequencies equally. It  
10 doesn't process all frequencies equally, and it gets  
11 very different at low frequencies. The ear gets very  
12 different at low frequencies, and this is one of the  
13 reasons I would say this is important. We -- I think  
14 Mr. Hessler testified that the threshold of hearing  
15 changes, or maybe it was in that paper that was  
16 passed out, but the threshold of hearing is very  
17 different from one person to another.

18 But what's even more important is that at  
19 the middle frequencies, like 1,000 hertz, a change of  
20 10 decibels is a doubling or a cutting in half of  
21 loudness. At these low frequencies, like let's say  
22 10 hertz, at 10 hertz, about a 2 dB change is a  
23 doubling of loudness. So at low frequencies,  
24 anything that you're off gets magnified by the ear.  
25 If you're off by 5 dB at low frequencies, that's a

1 factor of four in loudness. Whereas if you're off by  
2 5 dB at a middle frequency in a prediction, that's  
3 not even a factor of two in loudness. So errors get  
4 magnified at the low frequencies just because of how  
5 we hear.

6 Q That was one of the reasons for looking at the more  
7 conservative model. Are there any others?

8 A Well, let's see. I've talked about the standard  
9 calling for it. I've talked about it makes sense  
10 from the -- from the way the rule is written.  
11 Certainly it makes sense from being conservative from  
12 just the standpoint of how the ear hears. I think  
13 that just what we've talked about, the health effects  
14 and the fact that there's people that may be affected  
15 just like in one other community, somehow it seems  
16 like it calls for us to be cautious.

17 I think that if -- if it were some other  
18 area where government was involved directly, let's  
19 say, we're going to install -- we're going to license  
20 fire detectors that only work 90 percent of the time  
21 and 10 percent of the time people aren't warned about  
22 the fire protector, but that's good enough. People  
23 wouldn't say that's good enough, so the fire  
24 protection has to work all the time. And I think  
25 when we're talking about people literally being

1 driven out of their homes, we have to be a little bit  
2 cautious.

3 MR. REYNOLDS: Thank you. I don't have  
4 anything else.

5 EXAMINER NEWMARK: Highland?

6 MR. WILSON: No.

7 EXAMINER NEWMARK: All right. What are we  
8 doing with our ISO 9613-2?

9 MS. BENSKY: I'd like to move it into  
10 evidence.

11 EXAMINER NEWMARK: All right. Any  
12 objections?

13 MR. LORENCE: I guess I'd like to talk  
14 about that for a second.

15 EXAMINER NEWMARK: Okay.

16 MR. LORENCE: We've kept out all kinds of  
17 reports and exhibits today because they didn't come  
18 in at the proper time. Professor Schomer could have  
19 put it in at any time with his exhibits. I  
20 recognize that counsel here is not -- is not -- his  
21 witness is not asking this. But I guess I would ask  
22 the ALJ that under the theory that, you know, we've  
23 been keeping out late-filed things and this is  
24 awfully dense information, whether this should go in  
25 the record.

1 EXAMINER NEWMARK: Okay.

2 MR. LORENCE: And I just as a second aside  
3 for counsel, I'm not positive, but I think that  
4 these are usually under copyright, and is this  
5 something that we would be able to place on our  
6 website and make available to the world if -- I  
7 don't want to get you in any kind of copyright  
8 trouble if that's the case.

9 MR. McKEEVER: I'll just say I got it on  
10 the internet.

11 MR. LORENCE: Yeah.

12 MR. REYNOLDS: And this is the standard  
13 that has been used by all the measurers of sound, so  
14 this is -- this is kind of the bible of sound  
15 measurement.

16 MR. LORENCE: And I guess that reinforces  
17 my question then. Anybody could have put it in.  
18 Any of the experts could have put it in from direct  
19 testimony on it. So whether we get it here at this  
20 late hour or not, I'll defer to the decision, but  
21 I'm -- given what we've done today with other  
22 things, I just wanted to raise that point.

23 MS. BENSKY: I guess the nature of this  
24 exhibit is totally different. This exhibit doesn't  
25 give any opinions. It's just a standard that

1 everybody -- all the sound people in this case have  
2 used and relied upon. So I think it would be  
3 helpful to have it in. And even if it wasn't in, I  
4 think it's the type of material that could be quoted  
5 and briefed anyway, so --

6 EXAMINER NEWMARK: Let's not get into  
7 that.

8 MR. WILSON: I think at the risk of making  
9 it look like Ms. Bensky and I are on the same  
10 team --

11 EXAMINER NEWMARK: We would like to see  
12 that.

13 MR. WILSON: I agree.

14 EXAMINER NEWMARK: Okay.

15 MR. WILSON: It should come in.

16 EXAMINER NEWMARK: I understand.

17 MR. WILSON: There's a lot of testimony on  
18 it.

19 EXAMINER NEWMARK: Let me say the  
20 overarching concern I have or rationale for letting  
21 it in is we've cited to equations and all kinds of  
22 portions of this document which I think can only be  
23 correctly or adequately explained or referenced by  
24 having the document. So for the abundance of  
25 caution for making the record even larger, I think

1 it would enhance the Commissioner's review of the  
2 testimony we've just heard. So what's the number  
3 for this one? It's 9, Schomer 9, is that --

4 MR. REYNOLDS: I thought it was 5.

5 EXAMINER NEWMARK: Well, I don't know if  
6 we ever marked your other ones. I might have  
7 mentioned on the record because Mr. Schomer, I was  
8 not accepting his Exhibits 5 through 8, and I am  
9 pretty sure I referenced that at the beginning of  
10 the hearing. So we're just going to call this 9.

11 MS. BENSKY: Okay.

12 (Schomer Exhibit No. 9 marked and received.)

13 EXAMINER NEWMARK: All right. I think  
14 you're done.

15 THE WITNESS: Thanks.

16 EXAMINER NEWMARK: You're excused.

17 (Witness excused.)

18 EXAMINER NEWMARK: 3 o'clock. Let's take  
19 15 minutes.

20 (Break taken from 3:05 p.m. to 3:20 p.m.)

21 EXAMINER NEWMARK: Well, got enough people  
22 back, I guess. You want to start off the record?

23 MR. MCKEEVER: Yeah.

24 (Discussion held off the record.)

25 EXAMINER NEWMARK: All right. Next?

# Exhibit C

Freeborn Wind Hearing Exhibit AFCL 35  
p. 15 of Wayne Brandt's lease with Invenergy  
([20183-140948-08](#))

Wayne Brent

I have many reasons why these windmills are of great concern. After reading the easement, I have many reservations about what is stated. Without reading the entire easement, I will quote a few troubling statements. With respect for time, I will only read my comments and, hopefully, you will read the Easement at a later time.

**Refer to 7-B. Acquisition of Interest** (page 10 of Easement): “The acquisition of all or any portion of Grantee's interest in the Property or the Windpower Facilities or the Easement by another person shall not require the advance consent of Owner or constitute a breach of any provision or a default under this Agreement, and Owner shall recognize the person as Grantee's proper successor.”

**COMMENT:** It appears that any person or company may purchase this wind farm, whether it be from the United States, Russia, Iran, China, or anywhere else. Wouldn't that be nice.

**Refer to 9-C. New Easement to Mortgagee** (page 13 of Easement): “If the Easement or this Agreement terminates because of Grantee's default, or if the Easement is foreclosed, or if the Easement or this Agreement is rejected or dis-affirmed pursuant to bankruptcy law or other law affecting creditors' rights – the Owner shall, upon written request from any Easement Mortgagee within 90 days after such event, enter into a new Easement for the Property on the following terms and conditions.

Refer to 9-C (iii) At the option of the Easement Mortgagee, the new easement may be executed by a designee of such Easement Mortgagee without the Easement Mortgagee assuming the burdens and obligations of Grantee.”

**COMMENT:** It appears there is no guarantee that a new Mortgagee, if found, would be required to purchase the old Mortgage Easement. It also appears that, under



9-C (section 3), if a new Easement Mortgagee is found, they would not have to assume the burdens and obligations of the Grantee.

**On another subject,** will Grantee ever fulfill their so-called promise to remove these eyesores upon termination? The Easement states that if Grantee fails to fulfill their obligation within one year, then the Owner may do so, and the Owner will be reimbursed for reasonable and documented costs.

Even if the Owner was to take these wind turbines down, they should not have to be responsible for finding cranes and equipment to do so. The astronomical costs to remove the towers and access roads could be more than \$100,000 per turbine, probably more than what farmers could afford.

If this wind project can be built in a year, why can't the turbines be taken down in a year? It should be much easier to take down than to build for the Grantees. In my opinion, I firmly believe Grantees have no intention of taking these wind turbines down. I believe that about a year from their final termination, they will deed the wind turbines back to the Owner, relieving the Grantee of all obligations to do so. The Grantee will be long gone shortly thereafter with no address or phone number to be found and no one to be held accountable.

If there are any removal costs, and I quote, "they will be determined by the Grantee acting in good faith," as stated in section 10-D of the easement. This doesn't sound very promising for the Owners or those who have to look at these turbines.

**Refer to 11-B. Confidentiality** (page 16 of Easement): "To the fullest extent allowed by law, Owner shall maintain and shall cause its Related Persons to maintain, in the strictest confidence, for the sole benefit of Grantee, all information pertaining to

the financial terms of or payments under this Agreement, the Grantee's site or product design, methods of operation, methods of construction, power production or availability of the Windpower Facilities, and the like, whether disclosed by Grantee or discovered by Owner, unless such information either (i) is in the public domain by reason of prior publication through no act or omission of Owner or its employees or agents, or (ii) was already known to Owner, at the time of disclosure and which Owner is free to use or disclose without breach of any obligation to any person or entity. To the full extent permitted by law, Owner shall not use such information for its own benefit, publish or otherwise disclose it to others, or permit its use by others for their benefit or to the detriment of Grantee."

**COMMENT:** Could it be that the Grantee has a lot to hide, and they are willing to prosecute any person who talks about their easement and how much one Owner received that the other Owners did not. Isn't it a shame that they can, to the fullest extent of the law, prosecute a person who talks about what he or she signed?

In closing, I would like to know how our townships are going to be protected from all the damage that will be incurred during the reverse procedure of removing these eyesores. We will have to contend with considerable damage to our roads because the huge cranes and trucks will cause great damage once again. Another issue not mentioned in this Easement was the miles of gravel roads that will be left in the fields for our future farmers to contend with. They didn't address this issue anywhere, I'm sure, because they have no intention of removing these roads or even being around at that point in time.

I would ask the Public Utilities Commission to take a good look into the R-E-S wind project in the Waltham-Sargent area where many people are very upset with promises made by RES and not kept.

Also, I don't understand why the energy produced by these wind projects in Minnesota is allowed to go to other states and doesn't stay here where we can benefit from it. If they want to send the energy out of state, then let those states look at the wind turbines – not us. Sad – Sad – Sad.

There are hundreds, maybe thousands, of these towers sitting idle, rusting across the sunsets of our planet. It's a shame that this is allowed to happen, and it is happening.

Every morning and evening in early spring, summer and fall, my wife and I enjoy sitting on our porch looking out at the rich and productive soil and beautiful countryside surrounding our home. It is really sad that will be an enjoyment of the past because these eyesores could consume our once beautiful countryside.

Finally, there's one more thing I would miss, and that is watching the migration of the geese in the early spring and late fall. Their path is directly over our farm, but no more if the wind turbines take over the landscape. I'm sure there could be many dead geese before they finally realize the danger and change their course.

In addition to the geese, we have witnessed eagles flying through our farmyard and have seen them on wires, in the trees and on the roads in our area, which is 3/4 of a mile from the nearest proposed wind turbine. I have pictures of an eagle sitting on a nest about 6 miles from our home. Environmentalists should be encouraged to take action to help these protected species. Wind turbines should be prohibited from being constructed in the habitat of our national birds.

These are my opinions as I see it. Please consider what I've said, and I thank you for your time.

7. Assignment.

a. Assignments. Grantee shall have the right, without obtaining the consent of Owner, to do any of the following with respect to all or any portion of the Property: finance Windpower Facilities; grant co-easements, separate easements, subeasements, licenses or similar rights (however denominated) to one or more persons (an "Assignee"); or sell, convey, lease, assign, mortgage, encumber or transfer to one or more Assignees the Easement, or any or all right or interest in the Easement or in this Agreement, or any or all right or interest of Grantee in the Property or in any or all of the Windpower Facilities that Grantee or any Assignee party may now or hereafter install on the Property. Grantee shall notify Owner in writing of any such assignment, and any such Assignee shall assume in writing the obligations of Grantee under this Agreement which Grantee will no longer be fulfilling pursuant to the terms and conditions of such assignment with respect to the Property assigned. To the extent provided for in each conveyance document, an Assignee shall have all of the rights and benefits of Grantee under and pursuant to this Agreement. Grantee shall be relieved of all of its obligations under this Agreement upon the sale, conveyance, lease, assignment or transfer ("Transfer") of its entire interest hereunder or, if only a partial interest is Transferred and such Transfer is to an affiliate of Grantee, Grantee shall be relieved of only those obligations under this Agreement relating to the partial interest Transferred to its affiliate.

# 7 b. Successor Interest. The acquisition of all or any portion of Grantee's interest in the Property or the Windpower Facilities or the Easement by another person shall not require the advance consent of Owner or constitute a breach of any provision or a default under this Agreement, and Owner shall recognize the person as Grantee's proper successor.

c. Assignment by Owner. This Agreement shall not be construed to limit Owner's right to sell, transfer or convey, lease, mortgage, grant easements, licenses or similar rights or otherwise encumber the Property (each, a "Owner Transfer"); provided, however, in each case, any such Owner Transfer shall be subject and subordinate to the rights of Grantee hereunder and under the Easement.

8. Collection/Transmission Facilities.

a. Grant of Collection/Transmission Facilities Easement. Upon the request of Grantee during the term of the Easement, Owner shall grant to Grantee one or more easements for the construction, laying down, installation, use, replacement, relocation, removal, operation and maintenance of underground and aboveground electric collection and transmission facilities including electric transmission and distribution lines, communication lines, interconnections and switching stations on, under, over and across designated portions of the Property ("Collection/Transmission Facilities Easement"). Any such Collection/Transmission Facilities Easement shall contain all of the rights and privileges for Windpower Facilities as are set forth in this Agreement.

b. Access. Any Collection/Transmission Facilities Easement shall also include the right of ingress to and egress from the Collection/Transmission Facilities (whether located on the Property, on adjacent property or elsewhere) over and along the Property by means

Easement Mortgagee or other party has ownership of the easement estate or possession of the Property.

(v) Neither the bankruptcy nor the insolvency of Grantee shall be grounds for terminating the Easement as long as all material obligations of Grantee under the terms of the Easement and this Agreement are performed by the Easement Mortgagee in accordance with the terms of the Easement and this Agreement.

(vi) Nothing herein shall be construed to extend the Easement beyond the Term or to require an Easement Mortgagee to continue foreclosure proceedings after the default has been cured. If the default is cured and the Easement Mortgagee discontinues foreclosure proceedings, the Easement shall continue in full force and effect.

# 9 c. New Easement to Mortgagee. If the Easement or this Agreement terminates because of Grantee's default or if the Easement is foreclosed, or if the Easement or this Agreement is rejected or disaffirmed pursuant to bankruptcy law or other law affecting creditors' rights, the Owner shall, upon written request from any Easement Mortgagee within ninety (90) days after such event, enter into a new easement for the Property, on the following terms and conditions:

(i) The terms of the new easement shall commence on the date of termination, foreclosure, rejection or disaffirmance and shall continue for the remainder of the terms of the Easement, at the same rent and subject to the same terms and conditions set forth in this Agreement.

(ii) The new easement shall be executed within thirty (30) days after receipt by Owner of written notice of the Easement Mortgagee's election to enter a new easement, provided said Easement Mortgagee: (i) pays to Owner all rent and other monetary charges payable by Grantee under the terms of the Easement and this Agreement up to the date of execution of the new easement, as if the Easement had not been terminated, foreclosed, rejected or disaffirmed; (ii) performs all other obligations of Grantee under the terms of the Easement and this Agreement, to the extent performance is then due and susceptible of being cured and performed by the Easement Mortgagee; and (iii) agrees in writing to perform, or cause to be performed, all non-monetary obligations which have not been performed by Grantee and would have accrued under the Easement and this Agreement up to the date of commencement of the new easement, except those obligations which constitute non-curable defaults as defined above. Any new easement granted to the mortgagee shall enjoy the same priority as the Easement over any lien, encumbrances or other interest created by Owner.

# 9 c (iii) At the option of the Easement Mortgagee, the new easement may be executed by a designee of such Easement Mortgagee without the Easement Mortgagee assuming the burdens and obligations of Grantee thereunder.

(iv) If more than one Easement Mortgagee makes a written request for a new easement pursuant hereto, the new easement shall be delivered to the Easement

delivered to Owner by Grantee after wind turbines have been installed on the Property, such notice shall be accompanied by a statement by Grantee setting forth how Grantee shall comply with the provisions of Section 10(c).

b. Owner's Right to Terminate. Except as qualified by Section 9, Section 10(e) and Section 10(f) below, Owner shall have the right to terminate the Easement if all or any portion of its rights in this Agreement and the easements granted hereunder if (i) Grantee has not commenced construction of Windpower Facilities for the Project on or near the Property within seven (7) years of the Effective Date or (ii) a material default in the performance of Grantee's obligations under this Agreement shall have occurred and remains uncured following the applicable notice and cure periods provided herein.

c. Effect of Termination. Upon termination of the Easement, Grantee shall, as soon as practicable thereafter, remove above-ground and below-ground (to a depth of four (4) feet below grade) Windpower Facilities from the Property. All Property disturbed by Grantee shall be restored to a condition reasonably similar to its original condition. Reclamation shall include, as reasonably required, leveling, terracing, mulching and other reasonably necessary steps to prevent soil erosion. If Grantee fails to remove such Windpower Facilities within twelve (12) months of termination of the Easement, or such longer period as Owner may provide by extension, Owner may do so, in which case Grantee shall reimburse Owner for reasonable and documented costs of removal and restoration incurred by Owner.

# 10 d. Security for Removal of Windpower Facilities. On or by the fifteenth (15<sup>th</sup>) anniversary of the Operation Date, Grantee shall obtain and deliver to Owner a letter of credit, or similar financial assurance, in form and substance reasonably satisfactory to Owner securing performance of Grantee's obligation to remove the Windpower Facilities located on the Property (the "Removal Security"). The Removal Security shall be equal to the estimated amount, if any, (the "Net Removal Costs") by which the cost of removing the Windpower Facilities exceeds the salvage value of such Windpower Facilities. To the extent that the Net Removal Costs are zero (or negative), the Removal Security shall not be required on the part of the Grantee, provided, however that Grantee shall re-evaluate the need for the Removal Security at least annually after the fifteenth (15<sup>th</sup>) anniversary of the Operations Date. Grantee shall not be required to deliver such Removal Security to Owner if Grantee (i) is in the process of repowering or otherwise redeveloping the power generating units on the Property with new power generating units (or commits in writing with notice to Owner to do so within two (2) years after the fifteenth (15<sup>th</sup>) anniversary of the Operations Date), or (ii) has delivered such Removal Security, or similar financial assurance, in connection with the permitting of the Property or any other portion of the Windpower Facilities for Grantee's Wind Turbines. Once in place, Grantee shall keep such Removal Security, or similar financial assurance, in force throughout the remainder of the Operations Term and Extended Term, as applicable. ~~The Net Removal Costs shall be determined by the Grantee acting in good faith.~~ If any requirement or right provided in this Section contradicts or opposes any state or local laws, such state or local laws shall take precedence over this provision and such requirement or right shall be invalidated.

e. Default. If a Party (the "Defaulting Party") fails to perform an obligation under this Agreement the other Party (the "Non-Defaulting Party") shall not have the right to exercise any remedies hereunder if the default is cured within sixty (60) days of the Defaulting

Party receiving written notice of such default specifying in detail the default and the required remedy from the Non-Defaulting Party; provided, that if the nature of the default requires, in the exercise of commercially reasonable diligence, more than sixty (60) days to cure, then the Defaulting Party shall not be in default as long as it commences performance of the cure within sixty (60) days and thereafter completes such cure with commercially reasonable diligence. Further, if the Parties have a good faith dispute as to whether a payment is due hereunder, the alleged Defaulting Party may deposit the amount in controversy (not including claimed consequential, special, exemplary or punitive damages) in escrow with any reputable third party escrow, or by interpleading the same, which amount shall remain undistributed and shall not accrue interest penalties, and no default shall be deemed to have occurred, until final decision by a court of competent jurisdiction or upon agreement by the Parties. No such deposit shall constitute a waiver of the Non-Defaulting Party's right to institute legal action for recovery of such amounts.

f. Remedies. Except as qualified by Section 9 regarding Mortgagee Protections, should a default remain uncured by the Defaulting Party beyond the applicable cure periods, the Non-Defaulting Party shall have and shall be entitled to exercise any and all remedies available to it at law or in equity, all of which remedies shall be cumulative, including the right to enforce this Agreement by injunction, specific performance or other equitable relief. Notwithstanding anything in this Agreement to the contrary or any rights or remedies Owner might have at law or in equity, if any of Grantee's Windpower Facilities are then located on the Property and Grantee fails to perform any of its non-monetary obligations hereunder, then Owner shall be limited to pursuing damages and Owner shall not commence any action to terminate or cancel this Agreement.

## 11. Miscellaneous.

a. Force Majeure. If performance of the Easement or of any obligation hereunder is prevented or substantially restricted or interfered with by reason of an event of Force Majeure (defined below), the affected Party, upon giving notice to the other Party, shall be excused from such performance to the extent of and for the duration of such prevention, restriction or interference. The affected Party shall use its reasonable efforts to avoid or remove such causes of nonperformance and shall continue performance hereunder whenever such causes are removed. "Force Majeure" means fire, earthquake, flood, or other casualty, condemnation or accident; strikes or labor disputes; war, civil strife or other violence; any law, order, proclamation, regulation, ordinance, action, demand or requirement of any government agency or utility; or any other act or condition beyond the reasonable control of a Party hereto.

# 11. b. Confidentiality. To the fullest extent allowed by law, Owner shall maintain, and shall cause its Related Persons to maintain, in the strictest confidence, for the sole benefit of Grantee, all information pertaining to the financial terms of or payments under this Agreement, Grantee's site or product design, methods of operation, methods of construction, power production or availability of the Windpower Facilities, and the like, whether disclosed by Grantee or discovered by Owner, unless such information either (i) is in the public domain by reason of prior publication through no act or omission of Owner or its employees or agents, or (ii) was already known to Owner, at the time of disclosure and which Owner is free to use or disclose without breach of any obligation to any person or entity. To the full extent permitted by law, Owner shall

not use such information for its own benefit, publish or otherwise disclose it to others, or permit its use by others for their benefit or to the detriment of Grantee.

c. Successors and Assigns. The Easement and the terms of this Agreement shall inure to the benefit of and be binding upon Owner and Grantee and, to the extent provided in any assignment or other transfer under Section 7 hereof, any Assignee, and their respective heirs, transferees, successors and assigns, and all persons claiming under them. References to Grantee in this Agreement shall be deemed to include Assignees that hold a direct ownership interest in the Easement or this Agreement and actually are exercising rights under the Easement or this Agreement to the extent consistent with such interest.

d. Grant of Easements. Owner and Grantee agree and acknowledge that the terms and conditions of this Agreement are in addition to the terms and conditions of the Grant of Easements, which terms and conditions are incorporated herein by reference.

e. Notices. All notices or other communications required or permitted by this Agreement, including payments to Owner, shall be in writing and shall be deemed given when personally delivered to Owner or Grantee, or in lieu of such personal delivery services, five (5) days after deposit in the United States mail, first class, postage prepaid, certified, addressed as follows:

If to Owner:

<Landowner Name>  
<Address 1>  
<Address 2>  
Phone: <Insert>  
Email: <Insert>

If to Grantee:

Invenergy Wind Development LLC  
One South Wacker Drive  
Suite 1800  
Chicago, Illinois 60606  
Attn: General Counsel

Any Party may change its address for purposes of this paragraph by giving written notice of such change to the other parties in the manner provided in this paragraph.

f. Entire Agreement; Amendments. This Agreement, together with all exhibits attached hereto, constitutes the entire agreement between Owner and Grantee respecting its subject matter, and supersedes any and all oral or written agreements. Any agreement, understanding or representation respecting the Property, the Easement, or any other matter referenced herein not expressly set forth in this Agreement or a subsequent writing signed by both parties is null and void. This Agreement shall not be modified or amended except in a writing signed by both parties. No purported modifications or amendments, including without limitation any oral agreement (even if supported by new consideration), course of conduct or absence of a response to a unilateral communication, shall be binding on either Party. Provided that no material default in the performance of Grantee's obligations under this Agreement shall have occurred and remain uncured, Owner shall cooperate with Grantee in amending this Agreement from time to time to include any provision that may be reasonably requested by Grantee for the purpose of implementing the provisions contained in this Agreement or for the purpose of preserving the security interest of any Assignee or Easement Mortgagee.

# Exhibit D

AFCL IR-9 to Xcel Energy

Xcel's Response

- Not Public Document – Not For Public Disclosure
- Public Document – Not Public Data Has Been Excised
- Public Document

Xcel Energy Information Request No. 9  
Docket No.: IP-6946/WS-17-410  
Response To: Association of Freeborn County Landowners  
Requestor: Carol A. Overland  
Date Received: August 29, 2019

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Question:

Referring to Site Permit Amendment Application, Attachment J, p. 4 of 8, Freeborn Wind/Xcel states:

As owner and operator of Project facilities, Xcel Energy will bear the financial responsibility for decommissioning activities and Project area restoration...

- a. Is Xcel Energy amenable to permit condition requiring Xcel Energy to bear the financial responsibility for decommissioning activities and Project area restoration?
- b. If no, why not?

Response:

Although the Company does not oppose including such a permit condition in principle, adding the quoted language from the Company's Decommissioning Plan as a permit condition is unnecessary. Section 11.2 of the Site Permit already requires the Company "to dismantle and remove from the site all towers, turbine generators, transformers, overhead and underground cables and lines, foundations, buildings, and ancillary equipment to a depth of four feet" and, "to the extent feasible," to "restore and reclaim the site to its pre-project topography and topsoil quality."

---

Preparer: Matt Harris  
Title: Principal Attorney  
Department: General Counsel  
Telephone: 612-330-7641  
Date: September 9, 2019

# Exhibit E

AFCL IR-10 to Xcel Energy

Xcel's Response

- Not Public Document – Not For Public Disclosure
- Public Document – Not Public Data Has Been Excised
- Public Document

Xcel Energy Information Request No. 10  
Docket No.: IP-6946/WS-17-410  
Response To: Association of Freeborn County Landowners  
Requestor: Carol A. Overland  
Date Received: August 29, 2019

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Question:

Referring to AFCL-35, Wayne Brant Public Comment (p. 15 of lease), see also hearing testimony of Wayne Brandt, Tr. Public Hearing, p. 133-139, and lease's "Effect of Termination" clause:

*If Grantee fails to remove such Windpower Facilities within twelve (12) months of termination of the Easement, or such longer period as Owner may provide by extension, Owner may do so, in which case grantee shall reimburse Owner for reasonable and documented costs of removal and restoration incurred by Owner.*

- a. Is Xcel willing to amend participant leases to remove the lease paragraph above?
- b. Is Xcel willing to amend participant leases to add the statement that "*As owner and operator of Project facilities, Xcel Energy will bear the financial responsibility for decommissioning activities and Project area restoration.*"
- c. Is Xcel Energy amenable to a permit condition requiring Xcel Energy amend participant leases to release participants from financial responsibility for decommissioning activities and Project area restoration?
- d. If no, why not?

Response:

- a. No. This is a standard term of easement agreements with landowners, and we believe this is an important protection for landowners.
- b. No. This proposed statement is unnecessary. Section 10.c. of the Easement Agreement requires the Company to, "remove above-ground and below-ground (to a depth of four (4) feet below grade) Windpower Facilities from the Property," and if the Company fails to do so within a year of terminating the easement, provides the landowner with the option to remove the same facilities and seek reimbursement from the Company. Additionally, Section 10.d of the

Easement requires the Company to provide “a letter of credit, or similar financial assurance” that “secur[es] performance” of the Company’s “obligation to remove the Windpower Facilities located on the Property,” in an amount “equal to the estimated amount” by which “the cost of removing the Windpower Facilities exceeds the salvage value of such Windpower Facilities.”

- c. No. This is unnecessary for the reasons set forth above in part b.
- d. See parts b and c above.

---

Preparer: Matt Harris  
Title: Principal Attorney  
Department: General Counsel  
Telephone: 612-330-7641  
Date: September 9, 2019

# Exhibit F

Decommissioning cost estimate

Palmers Creek wind project, \$7,355,822 for 18 turbines

(IP-6979/WS-17-265)

#### 9.7.4 Construction Financing

The Applicant has already secured both construction financing through its balance sheet and parent company equity investment.

#### 9.7.5 Permanent Financing

The Applicant has already secured both construction and permanent financing.

#### 9.7.6 Expected Commercial Operation Date

The anticipated commercial operation date (COD) is March 2018 following installation of the permanent tap.

### 9.8 ENERGY PROJECTIONS

When built, the Project will have a nameplate capacity of 44.6 MW. Assuming net capacity factors of approximately 39.2 percent, projected average annual output will be approximately 153,400 MWh. Net calculations take into account, among other factors, energy losses in the gathering system, mechanical availability, array losses and system losses.

#### 9.8.1 Proposed Array Spacing for Wind Turbines

The turbines and associated facilities will be sited on agricultural land in Chippewa County, **Minnesota. The Applicant's proposed siting layout (included) optimizes wind and land** resources at the site while minimizing Project impacts. The turbines will have a rotor diameter (RD) of 116 meters (380 ft.), and the Project will have, on average, east-west spacing between individual turbines of 6 RD and north-south spacing of 10 RD. A final as-built siting layout and site plan will be provided for approval prior to the pre-construction meeting.

#### 9.8.2 Base Energy Projections

When built, the Project will have a nameplate capacity of 44.6 MW. Assuming net capacity factors of approximately 39.2 percent, projected average annual output will be approximately 153,400 MWh. Net calculations consider, among other factors, energy losses in the gathering system, mechanical availability, array losses and system losses.

### 9.9 DECOMMISSIONING AND RESTORATION

Decommissioning will occur at the end of the project life or facility abandonment. For the **purposes of this section, "facility abandonment" shall mean the ceasing of electricity** generation for a period of not less than 12 continuous months, unless the company produces evidence of mitigating circumstances. Such evidence may include long delays in spare part procurement or a force majeure event that interrupts the generation of **electricity. As used here, a "force majeure" event means an instance such as fire,** earthquake, flood, tornado, or other act of God and natural disasters; strikes or labor disputes; war; any law, order, proclamation, regulation, ordinance, action, demand or requirement of any government agency; suspension of operations of all or a portion of the project for overhaul, upgrade, or reconditioning; or any other act or condition beyond the reasonable control of the Project Sponsor.

All decommissioning and restoration activities will adhere to requirements of appropriate governing authorities and will be in accordance with all applicable federal, state, and local laws.

The decommissioning plan and anticipated costs shall be reviewed and updated every five years by the Applicant.

#### 9.9.1 Anticipated Life of the Project

The expected life of the Project is approximately 30 years (leases for the Project are for the life of the PPA, with an option to upgrade turbines and extend leases for an additional 20 years).

#### 9.9.2 Cost to Decommission

The estimated cost to decommission **Palmer's Creek** Wind Farm was provided by Fagen, Inc., construction contractor, in a letter dated November 16, 2016. The estimate is considered to be the current dollar value (at time of approval) of salvage value and removal costs.

The estimated salvage value of each turbine will be based upon the worst-case scenario assuming the only salvage value of the turbine is from scrapping the steel. The estimate was based upon the total weight of one turbine, which is 275 tons consisting primarily of steel. Because it does not separate the scrap value of all the constituent materials, the estimate is very conservative. Also, it is highly likely that there would be opportunities for re-sale for reuse of all or some of the turbines or turbine components.

Based on the current estimate, the cost of decommissioning is \$7,385,822 with a potential scrap return value of \$445,500. These anticipated costs shall be reviewed and updated every five years by the Applicant.

#### 9.9.3 List of Decommissioning and Restoration Activities

The decommissioning and restoration process includes the removal of above-ground structures (turbines); removal of below-ground structures (foundations and underground cables); and topsoil restoration.

##### 9.9.3.1 Wind Turbines

Dismantling the wind turbines will require the use of cranes and heavy equipment. Electronic components, controls and internal cables will be disconnected and removed. The rotor and nacelle will be lowered to the ground for disassembly. The tower sections will be lowered to the ground where they will be further disassembled for transporting. The Applicant will attempt to identify a purchaser of the intact wind turbine components. If a buyer cannot be found, the rotor, nacelle, and tower sections will be reduced to shipping dimensions for transport to an offsite facility for reconditioning, salvage, recycling, or disposal.

If resold and not scrapped, tower sections and rotors will be transported in the same manner as their delivery to the site. It is assumed that transportation costs will be the responsibility of the purchaser of the scrap material.

##### 9.9.3.2 Transformers

Transformer removal will consist of disconnecting the electrical connection system from the base transformer. Any sellable components will be removed and transported offsite.

##### 9.9.3.3 Turbine foundations

Turbine foundations will be excavated to a depth of 48 inches below grade to sufficiently expose and remove all anchor bolts, rebar, conduits and pedestal concrete. The excavation will be filled with clean sub-grade material, compacted to a density similar to surrounding sub-grade material, and finished with topsoil.

#### 9.9.3.4 Substation

The Applicant does not intend to decommission the substation.

#### 9.9.3.5 Underground Cables

All underground cables at depths less than 36 inches below finished grade will be removed. All underground cables at depths greater than 48 inches below finished grade will be abandoned in place if it is determined that their presence does not adversely impact land use and they do not pose a safety hazard.

#### 9.9.3.6 Road Materials

All road materials will be allowed to remain on-site. All township, county, or state roads, impacted by Project decommissioning activity, if any, will be restored to original condition upon completion of decommissioning.

#### 9.9.3.7 Soil Restoration

Soil decompaction in agricultural production areas will also occur by salvaging topsoil prior to construction and tilling soils during restoration. Once all of the above and below ground components designated for disposal or salvage have been removed, the remaining decommissioning work will consist of regrading and reseeding disturbed areas. All disturbed areas will be restored to pre-existing conditions and contours. All construction clean-up work and permanent erosion control measures will be done in accordance with the formal SWPPP for the Project.

#### 9.9.3.8 Access

During decommissioning activities, appropriate agencies, such as Chippewa County, Department of Commerce, and other appropriate agency staff, shall have access to the site, pursuant to reasonable notice, to inspect the results of complete decommissioning. All decommissioning and restoration activities will be in accordance with all applicable federal, state, and local permits and requirements.

# Exhibit G

Decommissioning cost estimate

Nobles Wind Project decommissioning cost

IP-6646/WS-09-584



414 Nicollet Mall  
Minneapolis, MN 55401

February 8, 2011

—VIA ELECTRONIC FILING—

Burl W. Haar  
Executive Secretary  
Minnesota Public Utilities Commission  
121 Seventh Place East, Suite 350  
St. Paul, MN 55101

RE: COMPLIANCE FILING  
201 MW NOBLES WIND ENERGY PROJECT  
DOCKET NO. IP-6646/WS-09-584

Dear Dr. Haar:

Northern States Power Company, a Minnesota corporation (“Xcel Energy” or “the Company”), submits to the Minnesota Public Utilities Commission (the “Commission”) this compliance filing in the above-referenced matter. This filing is being made pursuant to Section G.1 of the Site Permit transferred to Xcel Energy by Commission Order dated August 25, 2010. As specified by the Commission’s Order at Section G.1:

*“...Permittee shall submit to the Commission a Decommissioning Plan documenting the manner in which the Permittee anticipates decommissioning the Project in accordance with the requirement of Minnesota Rules part 7836.0500, subp. 13...”*

### **DECOMMISSIONING/RESTORATION/ABANDONMENT**

The Nobles Wind Energy Project (“the project”) is an important part of Xcel Energy’s renewable energy generation portfolio and our continued commitment to the State’s and the Commission’s policies of promoting renewable generation and reducing carbon emissions. The project was placed in service in December 2010 with an estimated useful project life of 25 years, resulting in an estimated decommissioning date of December 2035. However, as with all capital projects, the remaining life of

the project will be periodically reassessed in the subsequent Annual Remaining Lives Filings and the possibility exists that the project will continue to operate beyond 2035.

When the Company decommissions the project site, Xcel Energy will be responsible for all costs associated with decommissioning and shall restore and reclaim the site to its pre-project topography pursuant to the terms and conditions specified in Section 11.0 of the individual landowners' Easement Agreement. Restoration activities will include and not be limited to removal of all physical material and equipment related to the project to a depth of 48 inches. The land will be restored to the condition it was in at the time the easement was granted, including returning the land to the same grade and filling the land with topsoil comparable to the topsoil that existed as of the date of signing of the landowner Easement Agreements.

To ensure that adequate recovery is made to cover future decommissioning and restoration costs, an adjustment is made to the depreciation expense calculated for the project. As part of the decommissioning process, the Company will likely salvage and recycle most of the generation equipment, material and cables, which will go toward off-setting the costs associated with decommissioning the project. The salvage value of the equipment is factored into the net salvage rate.

In the 2010 Remaining Lives Filing, E002-D-10-173, the Commission approved a net salvage rate of -8.7% to be used for the project. This means that an additional 8.7% of the value of all the project's assets will be recovered as part of the ratepayers' service rate. These funds collected for removal and restoration are included in the accumulated reserve for the project, but tracked separately from the reserve for the asset itself. A conservative estimate for a decommissioning expense is approximately four-hundred forty-five thousand dollars (\$445,000) per turbine (2009 dollars).<sup>1</sup>

Xcel Energy is a regulated utility governed by the laws of the State of Minnesota and will observe all regulatory requirements with respect to decommissioning the project including removal of all facilities and restoration of the land.

We have served a copy on the Minnesota Attorney General's Office- Residential Utilities Division and all parties on the attached service list.

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<sup>1</sup> Includes allowance for salvage value and based on total dismantling cost estimate for the project of 8.7% of the total plant balance of \$510,965,406, equaling an estimated dismantling cost \$44.5 million or \$445,000 per turbine.

Burl W. Haar  
February 8, 2011  
Page 3

We have served a copy on the Minnesota Attorney General's Office- Residential Utilities Division and all parties on the attached service list.

If you have any questions or concerns regarding this matter, please contact me at (612) 330-5641 or [brian.r.zelenak@xcelenergy.com](mailto:brian.r.zelenak@xcelenergy.com).

SINCERELY,

/s/

BRIAN R. ZELENAK  
MANAGER, REGULATORY ADMINISTRATION

cc: Service Lists  
- IP-6646/WS-09-584  
- E002/CN-08-1437

# Exhibit H

Decommissioning cost estimate

Lake Benton Decommissioning Plan

IP-6903/WS-18-179

# Lake Benton Power Partners II, LLC

September 11, 2019

## VIA ELECTRONIC FILING

Daniel P. Wolf  
Executive Secretary  
Minnesota Public Utilities Commission  
121 7th Place E, Suite 350  
St. Paul, MN 55101

**Re: *In the Matter of the Application of Lake Benton Power Partners II, LLC for a Site Permit Amendment for the up to 100.2 MW Lake Benton II Wind Farm in Pipestone County, Minnesota, Docket No. IP-6903/WS-18-179***

### **Compliance filing – Section 11.1 – Decommissioning Plan**

Dear Mr. Wolf:

In compliance with Section 11.1 of Lake Benton Power Partners II, LLC's ("LBII") Site Permit, LBII hereby submits its Decommissioning Plan for the repowered facility as Attachment 1. Consistent with Section 11.1, LBII is also providing the Decommissioning Plan to Pipestone County.

Section 11.1 of the LBII Site Permit states as follows:

The Permittee shall refile the July 26, 2018 decommission plan, as revised at least forty-five 45 days prior to the start of decommissioning of the existing project.

With regard to the repowered project, the Permittee shall submit a decommissioning plan to the Commission at least fourteen 14 days prior to the pre-operation meeting, and provide updates to the plan every five years thereafter.

The plan shall provide information identifying all surety and financial securities established for decommissioning and site restoration of the project in accordance with the requirements of Minn. R. 7854.0500, subp. 13. The decommissioning plan shall provide an itemized breakdown of costs of decommissioning all project components, which shall include labor and equipment. The plan shall identify cost estimates for the removal of turbines, turbine foundations, underground collection cables, access roads, crane pads, substations, and other project components. The plan may also include anticipated costs for the replacement of turbines or repowering the project by upgrading equipment.

The Permittee shall also submit the decommissioning plan to the local unit of government having direct zoning authority over the area in which the project is located. The Permittee shall ensure that it carries out its obligations to provide for the resources necessary to fulfill its requirements to properly decommission the project at the appropriate time. The Commission may at any time request the Permittee to file a report with the Commission describing how the Permittee is fulfilling this obligation.

Respectfully submitted,

/s/ Brian J. Murphy

Brian J. Murphy

Managing Attorney

NextEra, Energy Resources, LLC

700 Universe Blvd.

Juno Beach, FL 33408

(561) 694-3814

Brian.J.Murphy@nee.com

**ATTACHMENT 1**  
**LBII DECOMMISSIONING PLAN**

# **DECOMMISSIONING PLAN**

**Lake Benton II Wind Energy Facility**

**Lake Benton Power Partners II, LLC**

**September 11, 2019**

# **Decommissioning Plan for the Lake Benton II Wind Energy Facility**

## **1.0 INTRODUCTION**

### **1.1 Background**

Lake Benton Power Partners II, LLC (“LBII”) has prepared this Decommissioning Plan (“Plan”) to provide documentation of activities necessary to decommission the Lake Benton II Wind Energy Facility (Project) and restore the Project area in accordance with the requirements of Minn. R7854.0500, subp.13.

On May 3, 2018, LBII filed an application with the Minnesota Public Utilities Commission (“Commission”) to construct and operate the repowered 100.2 megawatt (“MW”) wind energy facility (MPUC Docket Number: IP-6903/WS-18-179). The proposed Project includes the installation of up to 44 wind turbines, associated access roads, underground collection system, an operations and maintenance facility, and associated facilities. A Site Permit for the repowered facility was granted by the Commission on May 30, 2019.

### **1.2 Anticipated Life of the Project**

LBII expects the Project to be in service for 25 years. This estimate is based on LBII’s experience operating projects, turbine models, and technology.

## **2.0 DECOMMISSIONING AND RESTORATION**

### **2.1 Decommissioning Preparation Activities**

The wind farm will be disconnected from the grid to allow for the safe dismantling of the Project.

### **2.2 Removal of Facilities**

#### **2.2.1 Turbines and MET Towers**

The disassembly and removal of this equipment will essentially be the same as its installation, but in reverse order. For turbines, the rotor (hub and blades) are removed from the nacelle and, with the help of a smaller crane, turned horizontally and set on the ground. Next, the nacelle will be removed from the top of the tower, followed by each portion of the tower. Once the turbine rotor has been removed, a crew and small crane will disassemble it into the hub and three loose turbine blades. When the rotor is disassembled, the blades will be placed into a carrying frame, which can then be loaded onto a truck for removal from the site. The hub can also be removed once it is disassembled from the blades. Turbine foundations will be removed to a depth of four feet. LBII

will work with landowners regarding whether the landowner prefers to keep extracted concrete on their property. If landowners prefer to keep extracted concrete, the concrete will be crushed and provided to the landowner.

MET towers will also be removed in a similar fashion to the turbines. A small crane will be used to dismantle the structures from the top down and will be loaded onto trucks to be removed from the site.

### 2.2.2 Access Roads

LBII will work with landowners regarding whether the landowner prefers to keep the access road in place. In the event landowners do not want to keep the access road, or portions thereof, the access roads will be removed and the land will be restored.

### 2.2.3 Underground Collection and Pad Mounted Transformers

Where feasible, all underground collection lines buried above four feet below the surface will be removed. Underground collection buried greater than four feet below the surface will be abandoned in place unless requested by the landowner or other entity. LBII will work with landowners or applicable entities to determine if underground collection lines may be abandoned in place when located above four feet below the surface to minimize impacts to the environment. If the cables are to be removed, a trench will be opened and the cables pulled out. The cables will be cut into manageable sections and removed from the site.

Pad mounted transformers will be disconnected from the collection system and wind turbine generators once the electrical system has been shut off and hauled offsite. The concrete pads will be crushed and either hauled offsite or provided to the landowner, if requested.

### 2.2.4 Collection Substation and O&M

All above ground structures at the collection substation including the conductors, switches, transformers, fencing, and other components will be dismantled and removed from the site. Additionally, the structures at the Project O&M facilities will be removed. All concrete foundations will be crushed and either hauled offsite or provided to the landowner, if requested. Where feasible, all underground infrastructure associated with the substation or O&M, including underground conduits and grounding wires, will also be removed to a depth of four feet, unless it has been negotiated with the landowner that this infrastructure may be abandoned in place.

## **2.3 Salvage and Disposal**

After dismantling the Project, high value components will be removed for scrap value. The remaining materials will be left on the landowner property where expressly requested by the

landowner, or will be reduced to transportable size and removed from the site for disposal. Materials will be disposed where disposal is permitted and where there is capacity for the disposal. Generally, turbines, transformers, electrical components, and towers are refurbished and resold or are recycled for scrap. All unsalvageable materials will be disposed of at authorized sites in accordance with applicable regulations. Decommissioning of the existing turbines will include removal and transport of generators and towers offsite to disposal facilities and/or sale of towers and generators.

## **2.4 Restoration**

Following the dismantling and removal of Project infrastructure, LBII will return the Project Area as close to preconstruction conditions as reasonable. LBII will implement the following:

- All areas where existing infrastructure has been removed will be graded and reseeded, as Appropriate.
  - LBII will coordinate with local NRCS staff to revegetate non-cropland and pasture areas disturbed during decommissioning with native seed mixes appropriate to the region. Reseeding with native seed mixtures will be used on restoration areas except in cropland areas and in areas where landowners indicate preference for other seeding plans. Reseeding of cropland areas will be conducted in coordination with the landowner.
  - After removal of all foundation materials, the areas will be filled with clean compatible sub-grade material compacted to a density similar to the surrounding sub-grade material.
- Topsoil will be removed prior to removal of structures from all work areas and stockpiled and separated from other excavated material. The topsoil will be replaced to original depth and original surface contours reestablished where possible. Any topsoil deficiency and trench settling shall be mitigated with imported topsoil consistent with the quality of the affected site
- Areas compacted by equipment used in the decommissioning may be tilled in a manner adequate to restore the topsoil and subgrade material to a density consistent with the surrounding areas and then will be reseeded. The depth of compaction relief will depend on site-specific conditions.

### 3.0 COST ESTIMATE

<b>1.0 Turbines and Towers</b>		<b>Cost Estimate</b>
	1.1 Dismantle Turbine & Towers	\$ 5,000,000
	1.2 Removal of Transformers	\$ 200,000
<b>2.0 Tower Foundations</b>		
	2.1 Foundation Removal, Disposal and Grading	\$ 1,200,000
	2.2 Transformer Pad Removal and Disposal	\$ 125,000
<b>3.0 Other Structures</b>		
	3.1 MET Towers, O&M Building Salvage, Fence Removal	\$ 50,000
	3.2 Grading	\$ 100,000
<b>4.0 Tower Access and Site Roads</b>		
	4.1 Remove Access Roads	\$ 1,000,000
<b>5.0 Collection System</b>		
	5.1 Remove Collection System Terminations	\$ 200,000
<b>6.0 Substation</b>		
	6.1 Substation Foundations, Fence, Steel and Grading	\$ 300,000
	6.2 Substation Equipment	\$ 200,000
<b>7.0 Mobilization/Demobilization</b>		
	7.1 Mobilization/Demobilize	\$ 300,000
<b>8.0 Project Salvage Value</b>		
	8.1 Project Steel Salvage Value	(\$ 2,200,000)
	<b>TOTAL:</b>	<b>\$ 6,475,000</b>

### 4.0 DECOMMISSIONING SECURITY

LBII will establish performance bonds with Pipestone County for the total amount of infrastructure located within those communities.



# Exhibit I

Decommissioning cost estimate

Pleasant Valley decommission cost estimate

IP-6828/WS-09-1197



414 Nicollet Mall  
Minneapolis, MN 55401

October 16, 2015

—VIA ELECTRONIC FILING—

Daniel P. Wolf  
Executive Secretary  
Minnesota Public Utilities Commission  
121 Seventh Place East, Suite 350  
St. Paul, MN 55101

RE: COMPLIANCE FILING  
PLEASANT VALLEY WIND, LLC  
DOCKET NO. IP-6828/WS-09-1197

Dear Mr. Wolf:

Northern States Power Company, a Minnesota corporation (“Xcel Energy” or “the Company”), submits to the Minnesota Public Utilities Commission (the “Commission”) this compliance filing in the above-referenced matter. This filing is being made pursuant to Section 9.1 of the Large Wind Energy Conversion System (LWECS) Site Permit (as amended) for Pleasant Valley Wind, LLC (PVW) which requires a decommissioning plan be prepared and submitted to the Commission documenting the manner in which PVW anticipates decommissioning the Pleasant Valley Wind Project (the project.)

Xcel Energy is under contract to purchase PVW, and will own and operate the project at the commencement of commercial operations.<sup>1</sup> Xcel Energy has shared this filing with RES Americas, the developer of PVW; to ensure that all parties agree that the plan being filed is consistent with discussions they had during the development of the plan.

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<sup>1</sup> See *In the Matter of the Petition of Xcel Energy for Approval of the Acquisition of 600 MW of Wind Generation*, Docket No. E-002/M-13-603, Order Approving Acquisition with Conditions (December 13, 2013)

## **DECOMMISSIONING/RESTORATION/ABANDONMENT**

The Pleasant Valley Wind Project (“the project”) is an important part of Xcel Energy’s renewable energy generation portfolio and our continued commitment to the State’s and the Commission’s policies of promoting renewable generation and reducing carbon emissions. The project is expected to be placed in service in late fall 2015 with an estimated useful project life of 25 years<sup>2</sup>, resulting in an estimated decommissioning date of October 2040. However, as with all capital projects, the remaining life of the project will be periodically reassessed in the subsequent Annual Remaining Lives filings; the possibility exists that the project will continue to operate beyond 2040.

When the Company decommissions the project site, Xcel Energy will be responsible for all costs associated with decommissioning and shall restore and reclaim the site to its pre-project topography pursuant to the terms and conditions specified in the individual landowners’ Easement Agreement. Restoration activities will include and not be limited to removal of all physical material and equipment related to the project to a depth of 48 inches. The land will be restored to the condition it was in at the time the easement was granted, including returning the land to the same grade and filling the land with topsoil comparable to the topsoil that existed as of the date of signing of the landowner Easement Agreements.

To ensure that adequate recovery is made to cover future decommissioning and restoration costs, an adjustment is made to the depreciation expense calculated for the project. As part of the decommissioning process, the Company will likely salvage and recycle most of the generation equipment, material and cables, which will go toward off-setting the costs associated with decommissioning the project. The salvage value of the equipment is factored into the net salvage rate.

In the 2015 Remaining Lives Filing, E002-D-15-0046, the Company requested that the Commission approve a net salvage rate of -8.5 percent to be used for the Project. This means that an additional 8.5 percent of the value of all the project’s assets will be recovered as part of the ratepayers’ service rate. These funds collected for removal and restoration are included in the accumulated reserve for the project, but tracked separately from the reserve for the asset itself. There are currently no site-specific

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<sup>2</sup> See *In the Matter of the Application of Northern States Power Company for Authority to Increase Rates for Electric Service in Minnesota*, Docket No. E002/GR-13-868, DIRECT TESTIMONY AND SCHEDULES OF LISA H. PERKETT, Page 28, Lines 9-12 (November 4, 2013)

Daniel P. Wolf  
October 16, 2015  
Page 3

studies to rely on for the Project since it remains under construction, but the net salvage rates of other wind facilities owned by Xcel Energy were used as a guideline for the 2015 Annual Review of the Remaining Lives filing. A conservative estimate for a decommissioning expense is approximately two-hundred ninety thousand dollars (\$290,000) per turbine (2015 dollars)<sup>3</sup>.

Xcel Energy is a regulated utility governed by the laws of the State of Minnesota and will observe all regulatory requirements with respect to decommissioning the project including removal of all facilities and restoration of the land.

We have served a copy on the Minnesota Attorney General's Office- Residential Utilities Division and all parties on the attached service list.

If you have any questions or concerns regarding this matter, please contact me at [amy.s.fredregill@xcelenergy.com](mailto:amy.s.fredregill@xcelenergy.com) or (612) 215-5367.

SINCERELY,

/s/

Amy S. Fredregill  
Manager Resource Planning & Strategy

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<sup>3</sup> Includes allowance for salvage value and based on total dismantling cost estimate for the project of 8.5% of the total plant balance of \$341,505,777, equaling an estimated dismantling cost \$29.0 million or \$290,000 per turbine.

# Exhibit J

Freeborn Wind Hearing Exhibit AFCL 21, IR 16, Dan Litchfield response

January 12, 2018

**LEGALECTRIC**  
1110 WEST AVENUE  
RED WING, MN 55066  
(612) 227-8638  
OVERLAND@LEGALECTRIC.ORG

**Freeborn Wind Project - Information Request #16 to Freeborn Wind**

Docket Number: PUC Docket No.: IP-6946/WS-17-410      Request Date: January 2, 2018  
OAH Docket No.: 80-2500-34633      NonPublic Public

Requested From: Freeborn Wind, Christina Brusven & Lisa Agrimonti, Attorneys for Freeborn Wind

Party Requesting Information: Carol A. Overland for Assoc. of Freeborn Co. Landowners

*If you feel your responses are trade secret or privileged, please indicate this on your response.*

Request No.	Freeborn Wind Project
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16. Referring to Freeborn Application, p. 110:

**10.10.2 Cost to Decommission**

Project decommissioning has not yet been determined. The Applicant will create a thorough decommissioning cost estimate prior to construction begins as part of a decommissioning plan.

**10.10.3 Method of Ensuring Funds Will Be Available for Decommissioning and Restoration**

Sufficient funds will be set aside to fund Project decommissioning and site restoration efforts following the cessation of Project operation. These funds will be supplemental to the extent that the salvage value of Project facilities do not cover final decommissioning costs. Availability of funds will be discussed in the decommissioning plans.

Please produce decommissioning plan, complete with estimate of funds needed, in addition to salvage value, for decommissioning.

How will funds be set aside? Held by what entity? A bond, insurance, deposit with Commission, or some other means?



What assurance does applicant provide that if LLC should go bankrupt, be sold or transferred, or dissolve, that decommissioning fund would be available?

How would spending of decommissioning fund be authorized?

If "The Project" re-evaluates and/or updates decommissioning alternatives, costs, and/or funding, what efforts will be made to notify the Commission, participants, interested parties, and the public?

These requests are continuing, and if new or additional information is discovered, please supplement your responses as soon as possible.

Electronic format preferred, via email or CD/flash drive.

**Response:**

Freeborn Wind will comply with the terms of the Site Permit as it relates to the preparation, content and distribution of a decommissioning plan. See Section 11.0 of the Draft Site Permit.

Response Date: January 12, 2018

Response by: Dan Litchfield