Exhibit AC33

THE PUBLIC UTILITIES COMMISSION

OF THE STATE OF SOUTH DAKOTA

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IN THE MATTER OF THE APPLICATION BY CROWNED RIDGE WIND II, LLC FOR A PERMIT OF A WIND ENERGY FACILITY IN GRANT AND CODINGTON COUNTIES — EL19-003

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Transcript of Proceeding
June 12, 2019
8:30 a.m.
Volume III, Pages 328-585

= =

BEFORE THE PUBLIC UTILITIES COMMISSION,
GARY HANSON, CHAIRMAN
CHRIS NELSON, VICE CHAIRMAN
KRISTIE FIEGEN, COMMISSIONER

COMMISSION STAFF

Karen Cremer
Greg Rislov
Adam de Hueck
Darren Kearney
Kaitlyn Baucom

A P P E A R A N C E S

Miles Schumacher and Brian Murphy,
appearing on behalf of Crowned Ridge Wind II;

David Ganje,
appearing on behalf of the Intervenors;

Kristen Edwards and Mikal Hanson,
appearing on behalf of Staff.

Reported By Cheri McComsey Wittler, RPR, CRR
Precision Reporting, 213 S. Main, Onida, South Dakota
cwittler@venturecomm.net

The following transcript of proceedings was held in the above-entitled matter at the South Dakota State Capitol, 500 East Capitol Avenue, Pierre, South Dakota, on the 12th day of June, 2019, commencing at 8:30 a.m.

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I2	NARUC - 2011 - Assessing Sound Emissions from Proposed Wind Farms & Measuring the Performance
I3	Paul Schomer and Pranav Krishna Pamidighantam - A Possible Criterion for Wind Farms
I4	Research Gate - Health Effects from Wind Turbines Low-Frequency Noise & Infrasound: Do Wind Turbines Make People Sick? That is the Issue
I5	David Hessler and George Hessler, Jr. - Recommended Noise Level Design Goals and Limits at Residential Receptors for Wind Turbine Developments in the US
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MS. CREMER: Good morning, everyone. We are on day two, and I will call the hearing back to order in Docket EL19-003 in the matter of a permit for the Crowned Ridge Wind farm.

Just a couple of housekeeping things. The room is open over lunch so you can leave your things in here. It's being monitored by administrative staff. It will be locked 15 minutes after or at the close of the hearing at the end of the day. So get your stuff out of here quickly, what you need.

And the Capitol doors are locked at 7:00 p.m. So if you are loading and going in and out, make sure you have someone there to open the door for you.

Is there anything else?

When we went into recess last night we were in the middle of the direct case of Crowned Ridge Wind. At this time I will call upon CRW to call their next witness or take whatever action.

MR. SCHUMACHER: Thank you. Applicant calls Jay Haley.

(The oath is administered by the court reporter.)

DIRECT EXAMINATION

BY MR. SCHUMACHER:

Q. Please state your name, business title, and company for the record.

A. My name is Jay Haley. My business title is mechanical engineer and partner. And the company that I work for is EAPC Architects Engineers, doing business as EAPC Wind Energy.

Q. What is your role with the Crowned Ridge Wind Project?

A. I provided the noise and shadow flicker studies.

Q. Please provide a short overview of your education and experience.

A. I spent six years as the director of engineering for an aerospace firm called Ideal Aerosmith, then 10 years as a research engineer with EERC; that's the Energy and Environmental Research Center. I've since been with EAPC for 20 years, a little over 20 years.

I am a technical advisor for the U.S. national committee for the international standards group that is developing an international standard for wind resource and energy assessments and site suitability input conditions for wind farms.

And my company is also the sole sales and support agent for a software program called WindPRO, which is the world's leading software program that's used for the design of wind farms. And in that capacity I have trained well over 200 engineers, meteorologists, and others in the proper use of WindPRO to design wind farms,

including noise and shadow flicker studies.

Q. Describe your licensing status.

A. Excuse me. My licensing status is that I've been a registered, licensed engineer in the State of North Dakota and Minnesota for about 25 years. Back in 2016 I elected to let my registration lapse and not renew it because the continuing education requirements had been ramped up a little bit and I'm getting close to retiring and I just decided that I haven't stamped a drawing in 20 years -- it's not necessary for the design work I do with wind farms -- so I elected to let it expire.

Q. Did you file Prefiled Direct Testimony and exhibits on January 29, 2019, marked as Exhibit A2?

MR. GANJE: Excuse me. For the record, I'm going to object to the testimony and the evidence that is going to be or will be offered to be submitted by this Applicant.

I would like to make some objections to his credentials and would like the opportunity to ask him some questions and then make a record on my objections.

MS. CREMER: Certainly.

MR. GANJE: Thank you.

Mr. Haley, do I understand from the comments you just made that you're not currently licensed as a professional engineer?

THE WITNESS: That is correct.

MR. GANJE: But you previously were.

THE WITNESS: That's correct.

MR. GANJE: I take it that you're also then not licensed by reciprocity or otherwise in the State of South Dakota as a licensed engineer.

THE WITNESS: I've never been licensed in South Dakota.

MR. GANJE: By reciprocity or otherwise.

THE WITNESS: That's correct.

MR. GANJE: Okay. Isn't it true with regard to the flicker and the sound report that you did here that you identified yourself as a professional engineer by using the title with your name and then after your name P.E. following your name?

THE WITNESS: Yes, I did. That is correct. About two weeks ago I learned that when my license lapsed I was no longer able or supposed to be using the initials P.E. after my name, which I was not aware of. My understanding was that if my license had lapsed, I would no longer be able to stamp drawings, which as I indicated I haven't done for 20 years.

So in having a conversation with the registration board and understanding that I shouldn't be using the P.E. after my name, I have since dropped it.

MR. GANJE: And when did you learn that, please.

THE WITNESS: About two weeks ago after you inquired to the state board on my status.

MR. GANJE: So isn't it also true that on March 20 of this year at a public hearing on this matter in Waverly, South Dakota that you described yourself as a professional engineer?

THE WITNESS: Is that the question?

MR. GANJE: Yes.

THE WITNESS: Yes, I did. Someone had challenged why I had not stamped -- that I was not registered in the State of South Dakota and that I had not stamped my work.

And my response to that was that I have been a registered professional engineer for almost 30 years and that stamping the shadow flicker and noise studies was not required and, in fact, would have been inappropriate.

MR. GANJE: Well, isn't it true that on March 20 of this year you stated that you were at that time -- I'll use your words and I'll give you a copy of the transcript if you'd like to confirm this.

You stated, "To answer your first question, yes, I am a registered professional engineer." And that was a statement you made in South Dakota at one of the hearings on this Application.

THE WITNESS: If that's a quote, then that's what I said. But my understanding in my head at the time was the fact that I had passed the professional engineer's exam gave me the right to call myself a professional engineer.

MR. GANJE: And you would agree without my going through the documents, I suspect, which I can do, that you consistently signed letters to interested parties regarding this Application in which you indicated that you were a professional engineer?

THE WITNESS: Yes, I did.

MR. GANJE: And you signed the fundamental sound survey in this Application indicating you were a professional engineer.

THE WITNESS: I've had P.E. behind my name for 30 years on my business card on with my website on the signature line on all of the reports that I do. And as I stated, I did not understand that having no longer renewed my license that I needed to drop those initials from my title.

MR. GANJE: So in March when a question was asked of you about your status as a professional engineer in that hearing in Waverly, South Dakota did you then check about your status?

THE WITNESS: No, I did not. I knew my status,

that I had let my license expire. That was by choice.

MR. GANJE: But you didn't say at the hearing that you let it expire, did you?

THE WITNESS: That was never asked. That really wasn't the question.

MR. GANJE: Well, you did answer whatever question was asked by saying I am a registered professional engineer; correct?

THE WITNESS: I don't recall. But I remember saying that I had been a professional engineer for about 30 years.

MR. GANJE: If I could please mark this (indicating).

MR. SCHUMACHER: Yeah. I'm going to object to any further questions along this line. He's established what he's looking to establish, that his professional engineer status has lapsed. I don't see any point in pursuing this any further. The question has very much been asked and answered.

MS. CREMER: You can respond. Yes.

MR. GANJE: Yes. He seems to be vacillating a little bit about what he said at that hearing, and what he said was really quite clear. And I didn't want the record to indicate there was any vacillation. He indicated at that time, and this was in March, that he

was a --

MR. SCHUMACHER: And I would add to my objection that this isn't relevant to anything here. The witness has already established that professional engineer status and stamping of these reports is not only not required but inappropriate.

MR. GANJE: I think I've made my argument.

MS. CREMER: And were you going to pursue further lines other than this on the licensing?

MR. GANJE: Yes.

MS. CREMER: Okay. So as to this line of questioning, I think you -- I think you've established what you want to establish in terms of his licensing so I would sustain for that part.

And then you can move on to what your next objection is.

MR. GANJE: Yes. Thank you.

My objection is that this witness has represented very clearly on multiple documents which are the exhibits to which I did not stipulate in this proceeding and his report and testimony was referred to by others in the course of their testimony or reference because he's a principal witness and discussed matters of wind modeling survey and a flicker study.

Throughout all the work that he did in this

matter he represented that he was a professional engineer. That's a significant representation. That's a representation of a license.

This witness has acknowledged he does not have a license now. He does not have a license in Minnesota, South Dakota, or North Dakota. And a license is required for use of the term "professional engineer." South Dakota compiled laws 36-18A-1.1 requires this, and North Dakota Century Code 43-19.1-27(5) requires this.

The witness cannot make such a significant representation to this Commission and expect us just to give it a pass. I'm going to move that all of the proposed testimony of this witness and the exhibits of this witness and supplemental reports and principal reports of this witness, including the maps and other paperwork involved in his work for the Applicant, be stricken.

And I'm going to move that the admission of any of his testimony be denied because he's misrepresented his status to this Commission, the public, and to my clients as the Intervenors. And he's doing that throughout, even though it was brought to his attention in March, which would give a reasonable man at that point a time to look and make proper correction of what he's stated.

This is very serious. This is -- you can't do that. It's perpetrating a falsehood, and it has an effect on what he's done. It has an effect on his credibility. It has an effect on the competency of the evidence that he would present. And I believe that all of this should be stricken from the record and I believe that it should be inadmissible and I so move at this time.

MS. CREMER: Do you have a response?

MR. SCHUMACHER: Yes. Thank you very much.

The witness has established that not only has he been doing these studies and providing these reports for nearly 30 years, he has trained a couple hundred additional people in the use of this modeling software.

He's clearly established that he is not only competent but a leader in the field in providing sound and shadow flicker studies with this technology.

The objection of the Intervenors goes to weight and not admissibility. The witness readily admits that he did not renew his professional engineer license and that as soon as he learned it was inappropriate to continue to use that title, he ceased doing so. That does not eliminate his experience and credentials in doing these studies and providing these modeling reports.

I think the issue is a question of whether that

affects the weight that the Commission gives his testimony, but it certainly should not make it inadmissible.

MR. GANJE: With your permission, I would like to hand out a brief on this matter. I'll be sure that Applicant gets a copy.

MS. EDWARDS: Can I have five minutes to read this?

MS. CREMER: Yeah. Let's take five minutes here.

(A short recess is taken.)

MS. CREMER: Okay. So we've had an opportunity to glance at the brief.

Staff, did you have a position?

MR. MIKAL HANSON: In my experience that if they can establish by training, education, and experience that a witness is an expert, that's the determination that the Hearing Examiner should make. Whether they have a license or not certainly adds to that, but it isn't the end-all determination.

I do think that the fact that he's said he's a professional engineer goes to his credibility and something that the Commission should weigh and consider when they're considering his testimony, but I don't think -- our position is that it in and of itself does

not disqualify him as an expert witness if the Commission believes that he does have the training and experience and education.

MS. CREMER: Thank you.

I am prepared to rule, but did the Commission want to weigh in on anything?

CHAIRMAN HANSON: If I may, I just have a couple of questions.

Sir, you said that your licensed lapsed. It was not revoked?

THE WITNESS: No. It was a conscious decision on my part. Like I say, I've been doing this for over 20 years and never stamped a document involving my wind work.

They ramped up the requirements for renewal in 2016, and I looked into the future and knew that I was going to be retiring in a few years so I said, well, I haven't needed my license for 20 years. I think I'm not going to renew at this time, not realizing that I needed to drop the initials after my name.

CHAIRMAN HANSON: Okay. I can empathize with that.

You put in the first page of your information that you work as a wind engineer.

THE WITNESS: That's correct.

CHAIRMAN HANSON: So you don't think that's misleading to say that?

THE WITNESS: No. That's a common title that is used in our industry to describe the work we do because it's oftentimes confusing to people. If I say that I'm a mechanical engineer in a setting where I'm doing wind farm design, that tends to confuse people so I adopted the title wind engineer to make it easier for people. That's just a title.

CHAIRMAN HANSON: Okay. I appreciate that.

I agree with Staff on if you can establish credibility of an individual that they have that background information -- I looked through as quickly as I could on your testimony, having read it a couple of times. I was looking for any place that you might have said that you're an engineer or whatever other than on that other page, and I didn't find anything.

But I've been licensed in a number of different ways and I let mine go too and from that standpoint I don't represent that I'm a licensed auctioneer or appraiser or anything like that anymore. But I don't find that in your testimony that you did either.

Thank you.

MS. CREMER: Thank you. So I'm going to overrule your objection. The Commission can give it the

weight it deserves, and I will give you a standing objection if you would so like.

MR. GANJE: I'm sorry. I would ask if the Commission would kindly rule on my objection to the entrance of the evidence as I described it and my motion to strike any testimony or evidence that he might submit.

COMMISSIONER NELSON: Overruled.

CHAIRMAN HANSON: Overruled.

COMMISSIONER FIEGEN: Overruled.

MS. CREMER: You may proceed. Thank you.

MR. SCHUMACHER: Thank you.

Q. Mr. Haley, in your career starting with sound studies, how many sound study reports would you estimate that you have prepared?

A. I don't have an exact number, but it's over 100.

Q. And how many shadow flicker reports would you estimate that you have developed in your career?

A. The same.

Q. Did you file Prefiled Direct Testimony and exhibits on January 29, 2019, marked as Exhibit A2?

A. Yes, I did.

Q. Do you have any changes or corrections to your initial Prefiled Direct Testimony and exhibits?

A. No. However, much of the information in that original testimony has been superseded by -- changes in

the arrays and the information that follows is then covered in additional submittals.

Q. And did you, in fact, provide updates marked as Exhibit A8 and A9 on February 19?

A. Yes, I did.

Q. And additional updates marked as Exhibits A10 and A11 on February 26?

A. Yes.

Q. Did you also file prefiled Supplemental Testimony on April 9, 2019, that is marked as Exhibit A22 with exhibits marked A22-1, A22-2, and A22-3?

A. Yes, I did.

Q. And do you have changes or corrections to that testimony?

A. There are additional changes due to the latest array changes that occurred over the weekend.

Q. Did you also file Prefiled Rebuttal Testimony on May 24, 2019, that is marked as Exhibit A43 with accompanying exhibits marked A43-1, A43-2, A43-3, A43-4, and A43-5?

A. Yes, I did.

Q. Do you have changes or corrections to that testimony?

A. No. Other than what I stated previously.

Q. Would you provide a short summary of your prefiled

testimony, first with regard to sound studies?

A. Sure.

So with the sound study, there are a number of inputs that go into the model for the turbine locations and the turbine specifications, including the noise emission data. There's terrain elevation data, height contours. There's attenuation assumptions that go into the model, including ground and atmospheric attenuation.

We also put in the receptor locations and the landowner participation status.

There are a number of assumptions that need to be made in this model, and most of them are conservative, including the turbines are always operating at maximum sound output levels. An additional 2 decibels is added to that, to the turbine sound emission data, to make it more conservative.

We also assume that all of the receptors are downwind of all of the wind turbines at all times, which is a physical impossibility but it makes the results more conservative.

We also assume that the atmospheric conditions are most favorable for sound transmission so that there is a minimal amount of attenuation.

Also in Grant County where there is a requirement that the noise be measured 25 feet from the perimeter of

the structure we modeled it 50 feet from the perimeter of the structure, which means that it will be more conservative.

And we also included all of the alternate wind turbines in the model run so that even if they're not going to be there at the end of the day, we are assuming that they're there so their contributions are being added in.

In terms of noise limits in Codington County, we used 50 decibels at the nonparticipating property line as the criteria, the compliance criteria. In Grant County we used 45 decibels at nonparticipating occupied structures and 50 decibels at participating occupied structures.

In addition, we also applied the Grant County requirements to the Codington County structures, which is above and beyond Codington's ordinance requirements.

The results of the studies indicate that all of the receptors based on this latest array -- all receptors are in compliance with both Codington and Grant County's ordinances, and in addition Codington County structures are also in compliance with Grant County's ordinance, which is the more restrictive of the two.

Q. Can you provide a short summary of your prefiled testimony with regard to shadow flicker studies?

A. Sure. Well, for the shadow flicker model there are a number of inputs as well. We input the turbine locations and the turbine specifications and, in particular, the width of the turbine blades and the power curve.

We also in this case incorporate the wind data, which means that a joint wind speed and wind direction distributions. We also input sunshine probabilities to account for how many days are sunny and how many days are cloudy. Again, the receptor locations and the height contour terrain, elevation information.

We use a number of conservative assumptions in these models. The first assumption is that the shadow receptors are in what is called a greenhouse mode. You can think of that as a glass house, meaning that whether there's a window on the facade of the building or not, we're assuming that that facade of the building is actually all glass. So there will be flicker seen from shadows cast in that direction even though there may not be a window in that direction, which makes the results more conservative.

We also don't take any credit for any sort of blockage from trees or other outbuildings. We also assume that the wind turbines are operating 100 percent of the time, meaning that any time the wind is blowing,

there will be rotors turning. There's no such thing as a turbine being down for any reason if the wind is blowing.

Another is that the rotors are always facing the sun so that they're casting the maximum shadow width that is possible. If the turbine was not facing directly into the wind, that shadow would be narrow, and, therefore, it would register less hours of shadow flicker. We assume that it's facing directly into the sun casting the widest shadow possible at all times.

And, once again, we also included all of the alternate turbines in this model, whether they're actually going to be there at the end of the day or not.

There are also a couple of realistic assumptions that we factor in in the shadow model. And one of them is that we don't start counting shadow until the sun is at least three degrees above the horizon. If the sun is lower than that, the shadow that is cast has to pass through so much atmosphere that the diffusion -- there basically is no shadow.

We factor in the sunshine probabilities. We look at weather data to know how many sunshine hours there are per month, and we reduce the hours by that to make it a more realistic number. And we also factor in the operational time of the wind turbines, which is based on the wind speed data that we put in. If the wind speed is

zero, there will be no rotation of the rotor so, therefore, there will be no shadow flicker.

The limit that we applied in this case was 30 hours of shadow flicker per year maximum for all receptors, whether they're participating or nonparticipating. And the results of the study are that all receptors were below 30 hours with one exception, which is a participating receptor with 36 hours and 59 minutes. So 37 hours of shadow flicker per year.

Q. With regard to the one receptor over 30 hours of shadow flicker per year, are you aware of the mitigation plan with regard to that receptor?

A. I don't know exactly what the plan would be, but I would say the two likely options would be either to curtail it for seven hours a year or to get the participating landowner to sign a waiver that he doesn't care about those seven hours.

Q. In both your sound studies and shadow studies did you take into account impacts from neighboring wind projects?

A. Yes, I did. We included the impacts of both Crowned Ridge and Crowned Ridge II and Dakota Range I and Dakota Range II.

Q. And would that have changed the outcome of your studies in any respect?

A. I don't understand your --
Q. Do the sound and shadow flicker studies still indicate that the receptors are still within the confines of the county ordinances?
A. Yes. The adjacent wind farms were included in the analysis so any results that I talked about are with the cumulative impacts of the adjacent wind farms.
Q. Mr. Haley, did you prepare additional exhibits as a result of the most recent change in the turbine layout?
A. Yes, I did.
Q. And would those have been Exhibits A55, A56, A57, A58, A59, and A60?
A. Yes.
Q. And what do those exhibits show with regard to sound and shadow flicker impacts following the latest change in the turbine layout?
A. They basically demonstrate the results that I just -- that I mentioned earlier in my testimony here, that everything is within the county ordinance, and above and beyond that, both counties comply with the more restrictive Grant County ordinance. I'm sorry. That was talking about the noise study.

But with regard to the shadow study, the results are what I discussed. You have the one receptor that's over 30.

Q. And throughout the course of your studies and modeling did you include what initially have been identified as alternate turbine sites?
A. Yes. All alternates were included in all model runs for both noise and foreshadow.
MR. SCHUMACHER: If I may approach.
MS. CREMER: Yes.
MR. GANJE: Excuse me, counsel. The exhibits that you referred to were new ones. Would you be kind enough to -- I think you started with 56. Would you recite those again for my benefit.
MR. SCHUMACHER: Yeah. Those are Exhibits 56 through 60. Excuse me. 55 through 60.
MR. GANJE: Just for the record, the Staff counsel this morning provided me an updated exhibit list, and I am not -- it's not following that identification of labelling.
MS. CREMER: Could you just -- because I was a little confused myself, could you just tell us what 55 -- the name on it or something.
MR. SCHUMACHER: Yep. I'll do that.
MS. CREMER: Okay.
MR. SCHUMACHER: Exhibit 55 is the proposed turbine drops and moves that was indicated by the map that we displayed yesterday. Exhibit 56 is the sound ISO

lines map showing the movement of the Hessler seven as we've identified them.

Exhibit 57 is the table showing the sound results after relocating those turbines. Exhibit 58 is final land status on the Hessler seven and on the Intervenors showing the impact. 59 shows the actual turbine moves.

MR. GANJE: Counsel, for your information -- for your information, that isn't what I'm showing here so I suspect that Staff and myself do not have that.

I show -- I do show an A58, which is a final land status. And then I show what appears to be a duplication at 59 of the same document. In other words, my 59 says also final land status. Although it does say moves.

MR. SCHUMACHER: I'll help you with that. 58 is the exhibit that lists each of the Intervenors and shows the change in impacts after moving the turbines nearest to them.

59 is the exhibit that shows and lists each of the specific turbines that were relocated. And Exhibit 60 shows the impacts on nonparticipant receptors after adopting the Hessler seven turbine moves.

MR. GANJE: Thank you.

Now when you provided me copies of your exhibits

were these included?

MR. SCHUMACHER: Yes. I believe we provided you copies of these yesterday.

MR. GANJE: Thank you.

Thank you.

MS. CREMER: Thank you. You may proceed.

MR. SCHUMACHER: Thank you.

Q. Mr. Haley, I've handed you an exhibit marked as A58. Can you identify that?

A. Yes. Yes, I can.

Q. And what is that?

A. It's a table that lists the sound and shadow flicker impacts on the Intervenors and the Waverly school.

Q. And what does that show with respect to the impact of relocating the turbines identified on this exhibit?

A. Well, I'd say that most of the impacts are way below the ordinance requirements. They've all changed and been reduced by some amount due to the changes with the Hessler seven being removed.

Q. And with respect to the second exhibit I've provided you, would you identify what exhibit that is?

A. This is a list that just shows the noise impacts on the -- adopting -- on nonparticipants as a result of dropping the seven Hessler turbines. So these are not necessarily the Intervenors. These are just a select

group of the more significant changes as a result of the Hessler turbine drops.

Q. And would that have been marked as Exhibit A60?

A. That's correct.

MR. SCHUMACHER: That concludes our questions.

At this time we would offer Exhibits A2, A8, A9, A10, A11, A22, A22-1, A22-2, A22-3, A43, A43-1, A43-2, A43-3, A43-4, A43-5, A55, A56, A57, A58, A59, and A60.

MS. CREMER: Mr. Ganje.

MR. GANJE: If I may ask questions with regard to an objection to the offer.

MS. CREMER: Certainly.

MR. GANJE: Mr. Hessler, if you could -- sorry, Mr. Haley.

Mr. Haley, if you would be kind enough to put in front of you -- I think you might have it there on your laptop -- Applicant's Exhibit A1-H.

THE WITNESS: Applicant Exhibit A1-H.

Okay.

MR. GANJE: Does A1-H show itself to be a sound pressure ISO lines map?

THE WITNESS: It's a report, a final report.

MR. GANJE: Okay. Would you look at the -- I think the ISO map is at the end of the report.

THE WITNESS: Uh-huh.

MR. GANJE: I'm referring to the particular -- the Crowned Ridge Wind farm sound pressure ISO lines overview map that was a part of that exhibit and is the actual map of the project area with color coding.

THE WITNESS: Yes. I have it in front of me.

MR. GANJE: Thank you. I know there's been many of them so I wanted to make sure you had that one. Thank you.

Now I note in the right-hand column it shows that it was checked by JH. Are those your initials?

THE WITNESS: Yes, they are.

MR. GANJE: Does that stand for the fact that you approved this map?

THE WITNESS: Yes.

MR. GANJE: In fact, you were the supervising party on this -- on this whole -- on Applicant's work, weren't you?

THE WITNESS: Yes, I am.

MR. GANJE: Okay. And EAPC is the company you referred to in your earlier testimony?

THE WITNESS: That's correct.

MR. GANJE: Okay. Mr. Haley, for ease of reading, at least the ease of my reading and perhaps yours, I'll claim a difficulty of nearsightedness, but I'm going to hand you a blowup of some language found at

the bottom of that exhibit, and I'll also distribute a copy of the language to the parties in interest here.

If I may approach the witness.

(The documents are distributed.)

MR. GANJE: Does the document that I show you correctly indicate the language found in the lower right-hand area of the exhibit we're now referring to?

THE WITNESS: Yes, it does.

MR. GANJE: Thank you.

This language, sir, seems to indicate that your company, the one that provided this report, makes no warranty with respect to any -- to the use of any of the information in this drawing; is that correct?

THE WITNESS: I'm not a lawyer so I don't know that I can accurately interpret this disclaimer language.

MR. GANJE: Uh-huh. But you don't dispute that that language appears there?

THE WITNESS: No. I don't dispute that.

MR. GANJE: And the language also at the second part says that your company in preparing this map does not assume any liability with respect to the use of the information.

Is that a correct or fair statement of the language?

THE WITNESS: Yeah. That's what it says. Yes.

MR. GANJE: And does this language also state that any recipient of the document releases your company from any liability regarding the map itself or the work of the map? Is that correct?

THE WITNESS: That's what it says, yes.

MR. GANJE: And does it also state that the responsibilities for the applications and use of the material contained in the document remain solely with the client? Is that correct?

THE WITNESS: Yes. It says that.

MR. GANJE: And it is a true statement, is it, that this language appears on all of the maps that you prepared in the course of this project?

THE WITNESS: Yes. It's a standard part of the title block.

MR. GANJE: I see. Okay.

On the grounds of this very powerful disclaimer of any responsibility by this company that's providing a very serious study that this Commission has to consider in deciding whether to grant a permit and the fact that this language in this disclaimer says we're not going to stand behind -- we're not going to stand behind it at all, anybody that uses it, uses it at their own risk, this is extraordinary. And I think that this means that nobody can rely on this.

What recommendations they make and what analysis they provided is something that the Commission can't rely on, the Intervenors can't rely on, the public can't rely on, the Applicant can't rely on, and I think that that taints the legitimacy, the efficacy, the reliability of these maps.

And I, therefore, object on those additional grounds to the admission of the submitted exhibits my honorable opposition has now offered into evidence.

MS. CREMER: Crowned Ridge.

MR. SCHUMACHER: The fact that the work product contains very standard disclaimer language does nothing to change the work and the experience that went behind the data included in the documents on here.

Disclaimers are a standard part of life and show up on just about everything we use from our e-mails to phones and computers, and it's a normal part of life to include disclaimer language in documents. And it doesn't change the fact that the work product presented here is the result of considerable expertise and work and study on the part of this witness.

MS. CREMER: Staff.

MR. MIKAL HANSON: Civil disclaimer appears to be going towards a civil lawsuit, and it really doesn't have any relevance in a permitting process. We don't

think it disqualifies the document.

MR. GANJE: If I may reply.

MS. CREMER: Yes.

MR. GANJE: This disclaimer, Madam Examiner, goes to everything and everybody. It says the responsibilities of the applications and use of the material contained in this document remain solely with the client.

This provider is not -- this is not what was my -- a standard part of life or a normal part of life? We're not talking about a normal part of life here. We're talking about an Application for a very sophisticated wind farm facility.

And these people are the people that are telling the Commission, the Intervenors, and the public that we did it right; you're good on the sound, you're good on the flicker, you can rely on what we said.

But now we're learning, no, we can't rely on anything because they won't stand behind it. They're not going to be liable for it, and people are using it at their own risk. This is extraordinary.

I think, as I said before, it taints it. And to pass this off as something -- the same thing you get when you sign up some other kind of consumer contract is highly irrelevant to the argument that this is saying we

won't tell you this is good and we won't stand behind it. And those are the reasons for my objection -- additional objection.

MS. CREMER: And I'm going to overrule your objection and just ask to bear in mind that I just need a couple of words as to your objection. And really a lot of what you're doing is closing argument.

So they would be admitted. The list that you ran through, Crowned Ridge, were the same ones I had marked, and so those exhibits are admitted.

MR. SCHUMACHER: We would pass this witness for cross-examination then. Thank you.

MS. CREMER: Thank you.

Mr. Ganje.

CROSS-EXAMINATION

BY MR. GANJE:

Q. I believe the Chairman indicated that he -- I'm not sure that this is exactly what he said, but it concerned me a bit that he didn't really find any place in the papers and reports and so forth that you submitted where you represented that you were a P.E.

But you would agree with my prior questions, but I'll clarify them, that on the cover of the initial and important report for modeling of sound, on the cover of the flicker study you represented yourself as a P.E. On

all of the letters that you sent supporting any supplemental information you also signed as a professional engineer. Is that correct?

A. As I stated about five times already, that's been a standard part of my signature for 30 years, and I overlooked the fact that the initials needed to be dropped. So, yes, they were on every signature line that I put on there.

Q. And that would also be true for the applications that you put in front of the counties of Codington and the counties of Grant when you submitted paperwork to them; is that correct?

A. Yes, it is.

Q. That is in this proceeding, to make that clear. In this proceeding?

A. What's your question?

Q. I want to make -- when you put the paperwork in front of Codington County and Grant County my question was going to the work that affected the Crowned Ridge Project.

I don't know what you've said in other instances or other projects, but when I asked you whether you also represented -- let me restate the question. I'm not trying to confuse you.

CHAIRMAN HANSON: Excuse me. May I interrupt

here.

Appreciate you asking questions apparently on my behalf. However, the framework of the questions that you are working towards regarding county presentations and things of that nature, what we're concerned with is presentations here, not what presentations he may have made before the county as he went. That's a county affair.

And as far as my research quickly looking through, I quickly looked through the written testimony that has been presented to us. The packages that you are referring to, I did check just now, and on January 22, he did follow the P.E., which he has already testified to and we've already gone through that process.

So if you have something new pertaining to misrepresentation that would affect his ability to provide information to us, that might be germane. But we've ruled that he has the experience. Not withstanding what may have been written down as a post-signature line that it was P.E.

We've ruled that he does possess the experience -- that the fact that P.E. does or doesn't follow his name does not negate the fact that he does have the experience to present the information to us.

MR. GANJE: Yes, sir.

The point of my questions regarding the counties of Codington and the counties of Grant are they're the framework that was used by the Applicant to get to the point of coming before this Commission. So all along the history of the Application, this witness has represented himself as being a professional engineer. That was the point and line of my questioning.

But I think he did acknowledge that he did sign as P.E. on Grant and Codington so that is -- I'm satisfied that he answered that honestly.

Thank you.

No further questions.

MS. CREMER: Thank you.

Staff.

CROSS-EXAMINATION

BY MR. MIKAL HANSON:

Q. Thank you, Mr. Haley.

Can you identify either which table or which map is the final sound map that the Commission should focus on?

A. It's Exhibit A56.

Q. And that's the map; correct?

A. That's the sound ISO line maps, yes.

Q. Okay. And, do you know, is there a table, a final table, also that goes with that?

A. There is a Table C-3 which shows the results and

comparison of with and without the Hessler turbine drops.
Q. C-3 does?
A. Yes. But --
Q. That's every receptor?
A. Yes, it is.
Q. Okay. So that's important --
A. Correction. Sir, it's all of the structures. Because the Hessler -- the Hessler proposal had -- was dealing with the impacts at occupy structures. So what I'm saying is it does not include Codington property boundaries.
Q. That's not clear to me. Maybe I'm not listening very well.
A. Okay. So Hessler's proposal was to drop a number of turbines so that we would lower the impact at houses.
Q. Correct.
A. Okay. In Codington County we're concerned about the noise levels at occupied parcel boundaries, not structure.
Q. Correct.
A. So to address the Hessler -- the Hessler suggestion, we modeled his 16 turbine drops and then our seven turbine drops and focused on the impact on structures.
So this table does not include the impacts, the changes of lower sound levels that would occur at

Codington property boundaries. That would have to be a different table.

Q. All right. To me a table that does all 16 is not relevant since we didn't move 16. We only moved seven; correct?

A. Right. But this table shows the comparison of if you -- no. I'm sorry. That's not correct.

This table shows the impact of the final turbine drops that we made, that Crowned Ridge made.

Q. And that's exhibit -- C --

A. That's C-3.

Q. C-3.

A. And that's compared to not making the drops.

Q. Okay. I don't think C -- shouldn't it have an A? A57? Is that --

MR. SCHUMACHER: Yes. That's correct.

MR. GANJE: Excuse me, counsel.

Staff counsel indicated there was a "we" involved in these moves. I just want the record to reflect that my clients haven't consented to any of this relocation. So that's kind of misled the record in the "we" because there are three parties here.

Would counsel agree?

MR. MIKAL HANSON: I'm not agreeing to anything.

MR. GANJE: Well, I'll have the record reflect

that when Staff counsel said that we were working on such and such and we were moving them, that does not include the Intervenors.

Thank you.

MS. CREMER: Thank you for that clarification.

Staff.

Q. Now with regard to shadow flicker, is there a final map that the Commission should focus on for shadow flicker?

A. To my knowledge, that hasn't been submitted at this time. The shadow flicker impacts were not really involved in all of the dropping of any -- the impacts of shadow weren't a consideration when looking at the impacts of dropping the Hessler turbines. That was a focus on noise.

So the results that we've provided in this last minute were focused on the noise. And then we also did the shadow calculations but did not produce maps at this time to show the impacts of those.

Q. And, to your knowledge, that isn't going to be done or no plans to do that.

A. It could be done if you would like. I mean, we just -- there wasn't time in the eleventh hour to produce all those maps so we produced the ones that were pertinent to noise.

Q. Was a table done on shadow flickering?
A. The tables exist, but the appendix like this was not produced, again, due to the time constraints.
Q. Okay. But that would not be difficult to do if they're already in existence?
A. That's correct.
Q. Now I think just this morning we had a letter from an attorney involving the Lindgrens who used to be part of the project.
Are you aware of any letter that their attorney sent?
A. No, I'm not.
Q. They're concerned about -- it appears they're concerned about the shadow flicker on their property. Do you know if there will be some shadow flicker on their property?
A. I may have that in my notes here. Let me check.
Q. But if there was a table on shadow flicker after the changes, people could look that up, could they not?
A. Yes. Like I say, the appendices that would represent that have not been produced due to time constraints, but the information is available.
Q. All right.
Now you have testified on direct that the other wind farms in the area -- the Dakota Range I and II, is

that --
A. That's correct.
Q. And the other Crowned Ridge II is a proposed wind farm; correct?
A. Yes. And those turbines were included.
Q. To be fair, initially they were not. Is that fair? Initially --
A. No. That's not correct. Initially Dakota Range I and II were not included. But Crowned Ridge II has always been included.
Q. I apologize. Okay.
But a Staff Data Request kind of triggered you folks to include that?
A. That's correct.
Q. Did that trigger movement then? The cumulative effect of not only your turbines on this project but the neighboring project, did that trigger some people over the limit of sound or shadow?
A. Yes, it did. I don't recall the exact effects but they were minimal, but it did trigger the one receptor C-61 that ended up being well over 30 hours because about 22 hours of that was being contributed by Dakota Range.
Q. Okay.
A. And since that time with the latest turbine drops the Crowned Ridge offending turbine in that case was

dropped so now that receptor is well below the limit.

MR. MIKAL HANSON: May I approach the witness, your Honor?

MS. CREMER: Yes.

MR. MIKAL HANSON: Or Hearing Examiner.

MS. CREMER: Queen.

Q. I'm going to show you what's been marked as Staff Exhibit 1A. Can you take a peek at that?

Are you familiar with that document? I'm sorry. Are you familiar with that document?

A. Which Data Request was this?

Q. I think it says on it.

A. Would that be -- no. I mean, I am familiar with all the Data Requests. I just -- I'm trying to figure out at what point in time in the project this information was current.

Q. Now if you look at the -- if you look at the turbines, we're going to take some of those out, seven of those out, are we not? This is Hessler's proposed 16, which you're going to take seven of them?

A. Okay. That's correct.

Q. All right.

MR. MIKAL HANSON: It's our exhibit. I think we can mark it, can't we, or have a witness mark it, as long as it's done on the record?

MS. CREMER: Yes.
Q. All right. I'm going to give you a red pen. The turbines that are taken out have been identified as 16.
Can you put a red mark through there.
(Witness complies.)
Q. 19.
Okay. You're circling them?
A. Yep.
Q. All right. 22?
A. 23?
Q. 23. Yes.
68 down -- and 67 and 68?
A. 67, 68.
Q. Okay.
A. There should be two more.
Q. Pardon?
A. I think there should be two more, shouldn't there?
Q. I think they're not related --
A. There were seven.
Q. Yeah.
A. We've got five circled.
Q. All right. Do you know which other ones they are? Would you have a document that would say that?
A. I do.
MR. GANJE: Just so the record is clear, would

you ask the witness if he would read all of them at once so I could follow what's happening here.

MR. MIKAL HANSON: He's going to find the other two, and then we'll do that.

Is that fair?

A. So the turbines that we dropped were 16, 19, 23, 49, which I don't see on this list.

Q. All right. So why don't you just write it on the side. Yeah.

A. 60, 67, and 68. 60 is on here.

Q. All right.

A. 49 I don't see.

Q. All right. Now if you look at the sound reduction, all of those are fairly significant, are they not?

A. If I remember, the reason that these receptors ended up on this table was looking at receptors that were above 42 that due to these changes ended up below 42.

Q. Correct. All right. And they're estimated amounts, but you actually did a sound study, did you not, based on this?

A. Yes. That's what the results in Table C-3 represent.

Q. C-3. But it's really some other number. It's A --

MS. CREMER: A57.

A. Yeah. The exhibit number.

MR. SCHUMACHER: A57 is the table that's otherwise marked as C-3.

Q. And if the Commission went to that table, they would see the actual amount of sound reduction if they looked at those turbines, would they not?

A. Yes. That's in one of the columns, yes.

Q. I'm sorry. They looked at the receptors.

A. Well, we have the receptors listed as well as the reduction.

Q. All right.

Are you the witness that would talk about postconstruction noise studies, or is there someone else?

A. No. That is our -- a later witness.

Q. Can you identify him by name?

A. Rich Lampeter.

MR. MIKAL HANSON: We have no further cross-examination.

MS. CREMER: Thank you. That would take us to Commissioners.

Chairman Hanson.

CHAIRMAN HANSON: Good morning, Mr. Haley.

THE WITNESS: Good morning.

CHAIRMAN HANSON: When you were speaking when I read your mini bio, I'll say that you participated with the working group of the technical advisors as -- for the

U.S. national committee. Just as long as I have you here, I'd like to ask you a couple of questions on that quickly.

Because we've been -- obviously I think all entities that are working through these processes would love to have some additional information of this sort via a group that would be researching it. I'm curious on the time frame for which standards would be introduced.

Do you know when they are likely to have their conclusions?

THE WITNESS: What kind of standard? Which standard are you referring to?

CHAIRMAN HANSON: Well, apparently this is for the purpose of assessment of wind resources, energy yields.

THE WITNESS: Okay.

CHAIRMAN HANSON: Wind sound and flicker.

THE WITNESS: Yeah. So the standard that I'm working on, the committee that I'm on, we're developing an international standard that would show or -- show what's required to do and report in a wind assessment -- wind energy assessment study so that everyone produces a product that's the same so that it can be compared so consultant A, their work can be compared to consultant B. But that does not cover shadow or noise.

CHAIRMAN HANSON: Okay. I misunderstood then what your role was in it. Appreciate that.

There's been quite a bit of discussion about the changes of the numbers or the locations of the wind turbines. And certainly with the changes there's obviously the potential change for the flicker and the sound, et cetera.

With the discussions that we've been having here, it's my understanding that some of the locations have not been absolutely specified that there's potential for additional movement of those. And with the potential of changing the flicker and sound onto receptors.

And you testified that there's another gentleman apparently to testify posthearing. Will you be involved in that at all?

THE WITNESS: No.

CHAIRMAN HANSON: Okay. Well, then I shan't ask you the questions on it. Okay.

I will ask you, though, you and Mr. Hessler disagree on whether or not there should be a test on the ambient atmosphere of the receptor, at least some receptors, prior to -- I don't mean to say prior to installation but without considering the noise from the sound levels from wind turbines.

Why not do that? Why not have an ambient test

of the -- from the sound standpoint so that you would have an idea what it is?

THE WITNESS: Well, typically, from my experience, the reason that they would do a preconstruction survey would be to find out what the ambient levels are so that there would be a requirement in those cases that they would be required to do postconstruction monitoring and you'd want to have a preconstruction baseline.

And in cases where there was no requirement for postconstruction measurement it wouldn't be done preconstruction. That's been the general approach.

CHAIRMAN HANSON: Okay. That doesn't seem to -- I know that's the approach, but I don't know why it wouldn't be done. It would just seem intuitive that you'd want to know that. If there are shelter belts or something of that nature where there's wind coming through and particularly loud sounds, I would think that you'd want to have that.

Your answers seem to be ambiguous on that as well previously. I'm just -- I'd like an answer to it if you can -- other than to say that, well, that's the way we do it.

THE WITNESS: I could try to elaborate further if you'd like.

CHAIRMAN HANSON: Sure.

THE WITNESS: The ordinances are concerned about the noise emissions from the turbines. They don't -- they don't require that you add the ambient noise to the turbine emission noise to determine what compliance is. So there's no need to figure out what the ambient is so you know what to add to the turbine to figure out what the total noise is.

And we generally know that the ambient noise in most windy places is, you know, approximately 35 decibels or maybe a little higher. So I guess from my experience and perspective there really wasn't much of a need or a reason to spend the money and the time on a preconstruction survey, unless you knew that you were going to be asked to do postconstruction monitoring.

CHAIRMAN HANSON: So if there's a challenge later on by one of the receptors and they claim that the noise is greater than that, then you have to go out and you can't -- it just seems to your disadvantage. But I know that there's testing that you can do and arguments you can make on that. It just -- it doesn't seem to make sense to me.

THE WITNESS: If they do go out to do postconstruction monitoring -- and Rich Lampeter can speak to this better than I can, but they would typically

do ambient measurements at that time and consider those to be more reliable and valuable than if they would have taken those ambient measurements preconstruction.

CHAIRMAN HANSON: So they turn off the turbines in order to do that?

THE WITNESS: I'm not sure how they do it, but I know that they would rather take the ambient readings as a part of the postconstruction measurement campaign.

CHAIRMAN HANSON: I believe -- and I hope I'm not misrepresenting what Mr. Hessler said. But in answering one of my questions regarding what's the ambient noise level at night without wind turbines at some farms and he said it's from 40 to 43 with wind, and occasionally it can be above 50.

Well, obviously it can be above 50 anywhere depending upon a storm or something of that nature. Would you agree with that? Without considering storms and such, what would your estimate be of what the ambient noise level would be?

THE WITNESS: Well, if you're talking about the ambient noise contributions from high wind and so forth, yes, I would agree that it could easily be 40 decibels or more. Yeah. And at that point you're drowning out the noise from the wind turbines.

CHAIRMAN HANSON: All right. Thank you very

much.

COMMISSIONER NELSON: Good morning, Mr. Haley.

THE WITNESS: Good morning.

COMMISSIONER NELSON: In Mr. Hessler's questions last week he indicated in your modeling you use a 2 decibel adjustment to ensure that your results are on the conservative side. First of all, is that correct? And, secondly, explain how that figures into your calculations.

THE WITNESS: Yes. It is correct. And what it does is it adds a layer of conservatism onto all of the modeling results because we're assuming that the turbines are emitting noise that's a full 2 decibels louder than what the manufacturers say it will be.

COMMISSIONER NELSON: So you do your model run, and then on the table you simply take 2 off of each of your calculations?

THE WITNESS: No. We add 2. We get the turbine manufacturer's noise emission data, and we add 2 decibels to every value across the board.

COMMISSIONER NELSON: Okay. Thank you.

Could you go to Exhibit A58, please.

THE WITNESS: Okay.

COMMISSIONER NELSON: So this represents if the Hessler seven turbines are dropped, the changes in sound

level at the Intervenors. And I fully understand the changes for the Christenson property and Lynch property. We see some significant reduction in sound for those properties.

What puzzles me is we see an increase in the Robish and the Mogen properties. Can you explain that to me? If we are simply dropping turbines, how do we see an increase in those properties?

THE WITNESS: That's a very good question. I had the same question when I looked at the results. So I looked back into the modeling and traced back through my data responses and such.

The reason is that the original numbers in those two cases did not include the Dakota Range turbines because at that time they hadn't been put in the model yet, but yet those are the data points that I had to plug into this table.

COMMISSIONER NELSON: So you're telling me the Dakota Range turbines would impact Mr. Robish's property?

THE WITNESS: That's what it looks like, yes.

COMMISSIONER NELSON: He's got to be a good 20 miles, 25 miles from the Dakota Range turbines.

THE WITNESS: That's the only difference that I could find between the models.

COMMISSIONER NELSON: Well, obviously I don't

find that answer satisfying.

I understand the addition of perhaps why that may be some impact on the Mogen property. And even that's a good 10 miles.

Now in either case --

THE WITNESS: No. Mr. Robish is 2.4 miles away.

COMMISSIONER NELSON: Okay. I show Mr. Robish's property just to the northeast of Strandburg. Is that where you're showing his location?

THE WITNESS: I would need a map to point it out, I guess.

This will just take me a minute.

COMMISSIONER NELSON: Certainly.

MS. CREMER: Would it work if we took about a 15-minute break?

THE WITNESS: That might be a good idea.

MS. CREMER: Okay. 10:15.

(A short recess is taken.)

MS. CREMER: Okay. Mr. Haley, you are going to answer a question by Commissioner Nelson.

THE WITNESS: So we were wondering about the exact location of the property; right?

So I have a map here that indicates it. So are we in -- do you want to see this?

COMMISSIONER NELSON: No. I know where it's at,

but would you agree it's probably 25 miles from the Dakota Range projects?

THE WITNESS: Oh. It is a distance from Dakota Range, yes.

But what I did in the break is I looked at the difference from Mogen's property to this one, and just looking at the difference in their distances, to me that looks plausible.

COMMISSIONER NELSON: Okay. And so there would be some remnant of sound that would, in fact, go 25 miles. Is that what you're telling me?

THE WITNESS: Yeah.

COMMISSIONER NELSON: The last question I think I've got, Mr. Ganje asked you a series of questions about the disclaimer on your work product and calling into question the reliability of your work project -- product.

So my question is have you done sound modeling for projects that have subsequently had postconstruction sound surveys done of the actual sound production?

THE WITNESS: I looked into that last week in anticipation of a question like this. So I checked back with a lot of my previous clients. The only place where I thought that that may have occurred was in Minnesota, and based on what I learned, none of those have had postconstruction monitoring performed.

But I can also say that of all of the studies that I have done, I have never received one complaint or feedback that the numbers were high or wrong.

COMMISSIONER NELSON: Thank you. That is all the questions I've got.

COMMISSIONER FIEGEN: Thank you, Mr. Haley.

You can probably see how the time constraint is tough on a wind docket in South Dakota. And so you're feeling the Commissioners' pain when it has stated six months, and the industry didn't want that passed six months a year ago and how hard it is to really come up with final numbers and -- so you're kind of feeling our pain.

So you talked about the timing issue. And I certainly appreciate the developer moving things and adhering to the Commissioners' advice last Thursday. But the shadow flicker final tables you suggested because of timing aren't available yet. Is that what your testimony was?

THE WITNESS: Yes. I believe so.

COMMISSIONER FIEGEN: Okay. So how as a Commissioner -- so as a Commissioner I get to ask questions at an evidentiary hearing, but now I don't get to ask questions about that table that's not available?

THE WITNESS: I do have the table here with me

on the computer, and I could look up specific receptors if you would like. And we could also get that table produced and available later in the hearing.

COMMISSIONER FIEGEN: Okay. So I would like to see the table, and then I would like -- if your counsel would agree if I have questions about the table, that I may ask questions later in the hearing.

We have, you know, received many documents, like you said, at the eleventh hour, and so it's hard as a Commissioner to study everything and et cetera.

I still can't find on your testimony -- let's see. I think it was April 3. Your testimony on April 3. And your page numbers are numbered, and it's page 6 of 7. You're talking about receptor 106 in page 6 of 7 in your April 3 testimony. And I'm going to give you a little bit of time.

(Discussion off the record.)

THE WITNESS: We're talking about my Direct Testimony?

COMMISSIONER FIEGEN: Was it your Direct? It's supplement. Supplement testimony and exhibits. April 3. I think your Direct would have had January.

THE WITNESS: Yeah. I don't have that.

MR. SCHUMACHER: If I may, that would be the exhibit marked as A22.

THE WITNESS: Okay. I'm there.
COMMISSIONER FIEGEN: So then do you see on line 6 you talk about CR1-C106P?
THE WITNESS: I'm sorry. The page number? I thought it was page 6.
COMMISSIONER FIEGEN: It is page 6 and line 6. So we've got lots of 6s going on.
THE WITNESS: I think I'm in the wrong exhibit.
COMMISSIONER FIEGEN: Let's see. So I have supplement testimony and exhibits.
THE WITNESS: Yep.
COMMISSIONER FIEGEN: Of Jay Haley, April 3, 2019.
THE WITNESS: Okay. I'm looking at the bottom page number. And the top page number is different.
Okay. Now I'm on your page.
COMMISSIONER FIEGEN: I hope 666 doesn't mean anything.
THE WITNESS: Okay. I'm sorry. I'm here now so what was your question?
COMMISSIONER FIEGEN: Line 6. We're talking about 106.
THE WITNESS: Yes.
COMMISSIONER FIEGEN: Help me -- is that still -- and it talks about 50 hours, and it talks about

abandoned building but then an occupied residence.

Can you explain all of that to me?

THE WITNESS: 106 was verified by the land team that it is, in fact, an abandoned building so it's been dropped from our tables. In the more current tables. At this time it was -- at this moment in time it wasn't --

We had it in our records as abandoned. The Intervenors brought it up and said we should include it so we did. We then later investigated and found out it is, in fact, an abandoned building.

COMMISSIONER FIEGEN: So is 106 a tower or not a tower anymore?

THE WITNESS: 106 is a receptor.

COMMISSIONER FIEGEN: Receptor. Okay. All right.

So that is an abandoned building.

THE WITNESS: That's correct.

COMMISSIONER FIEGEN: Okay. I think -- let me just look at my notes to see if I have any other questions.

You talked about -- when you first testified you talked about your sound inputs when you were doing -- when the lawyers --

When your lawyers, the Applicant lawyers, asked you questions about how you modeled and you said most of

the time you used the conservative approach, and then you gave examples of instead of 25 feet, 50 feet. You gave all sorts of examples.

Why did you say most of the time? When don't you use the most conservative?

THE WITNESS: I don't remember saying most of the time. But I'm not saying that I didn't. But if I did say that, in some cases we have developers that I work for that do not want me to add the conservative 2 decibels. And so at their direction.

COMMISSIONER FIEGEN: Oh, okay. But in this model you did use all your conservative approaches.

THE WITNESS: That is correct. Everything I stated is what we did.

COMMISSIONER FIEGEN: Okay. Thank you. We certainly appreciate that, and that makes our life easier at the Public Utilities Commission when we look at your item.

You talked about sunshine hours and that -- can you explain again what you use for sunshine hours? Do you use past --

THE WITNESS: Yes. They call it sunshine probabilities. And what it is is they look at historical weather data and keep track of how many sunshine hours there are per day of every day over I think in this case

it was an 18-year period.

So then we turn that into a sunshine probability by a month. And the first results of the model run assume that the sun is always shining. So then that gives us a number which we would call a worst-case number.

And then we factor in that sunshine probability to reduce the number from 100 percent of shadow flicker down to a realistic number.

COMMISSIONER FIEGEN: So when you do the shadow flicker is there any type of conservative -- did you talk about your model is conservative because you determined -- I can't remember exactly how you explained it. But what conservatism do you put in that model?

THE WITNESS: I'm just going to refer to my notes to make sure I don't miss something.

COMMISSIONER FIEGEN: Okay.

THE WITNESS: So the conservative assumptions for the shadow flicker model are, number one, that the receptors are what we call greenhouse receptors. And that means basically the house is made of glass and, therefore, we're counting shadows in places where there wouldn't be any.

COMMISSIONER FIEGEN: And there was one more.

THE WITNESS: There's a few more.

COMMISSIONER FIEGEN: Okay.

THE WITNESS: We also don't take any credit for blockage from trees or other buildings which may, in fact, be the case. We also assume that the wind farm and all the turbines are running at 100 percent availability. That means that any time the wind is blowing every single turbine is turning, even though in reality some of them won't be.

COMMISSIONER FIEGEN: Okay.

THE WITNESS: Another one is that we assume that the rotor, the turbine itself is always facing the sun like a sunflower, and that then casts the widest shadow, which is going to increase the number of shadow flicker hours.

And when you factor in the wind data and the wind direction, how much time the turbine spends facing different directions, when we factor that in, that will reduce that number.

COMMISSIONER FIEGEN: Okay. The fourth one is the one that I couldn't remember.

Also you talked about one participant -- did you talk about one participant having 37 hours --

THE WITNESS: That's correct.

COMMISSIONER FIEGEN: What number of tower is that?

THE WITNESS: The receptor is CR1C10-P. And that's Mark Fransen.

COMMISSIONER FIEGEN: Mark Fransen.

THE WITNESS: Fransen.

COMMISSIONER FIEGEN: And you also talked about Grant and Codington Counties and their ordinances. And I got a little confused. And I certainly appreciate it -- did you say that you use the most constrictive -- or restricted sound and shadow ordinances?

THE WITNESS: The shadow's the same for both counties. It's 30 hours. But, yes, in the case of sound we modeled it based on the actual ordinance limitations and then again applied the more stringent requirements of Grant County to Codington County as well.

COMMISSIONER FIEGEN: Okay. And I, as a Commissioner, I certainly appreciate that so the footprint looks the same when we're dealing with constituents. I certainly appreciate you guys modeling that.

I think that was my only questions at this point, and I'm going to reserve the opportunity to ask questions after I see the final table.

Thank you.

MS. CREMER: Redirect.

MR. SCHUMACHER: Very briefly. Thank you.

REDIRECT EXAMINATION

BY MR. SCHUMACHER:

Q. Mr. Haley, do you recall Staff Attorney Hanson presenting you with an exhibit and looking at a number of what we've referred to as the Hessler seven turbines?

A. Yes.

Q. And is it your recollection that five of those seven were included on Mr. Hanson's exhibit that he showed you?

A. Actually there were six.

Q. Six. Okay.

A. Yeah.

Q. And was the turbine that was not included CR 49? Is that correct?

A. Yeah. That's correct.

Q. Why was turbine CR 49 included in the -- again, loosely referred to as Hessler seven group of turbines?

A. I guess the table that I'm referring to doesn't have a note on that.

I need to take a quick look at my computer.

THE WITNESS: I'm sorry. It's going to take me a while to find that again. Maybe someone else on the team could get me some information about the history on that one.

Q. Mr. Haley, what was your objective in selecting the group of turbines that were included in what we call the

Hessler seven?
A. Well, I didn't select those. Those were selected by Crowned Ridge. I just ran that model. But I did keep track of which turbines were affecting which receptors, but the table that I have I just -- turbine 49 was included in the Hessler seven, and I don't recall the particular reason why the CR team included it in that.
Q. And did the overall result of moving these turbines increase or reduce the applicable sound levels at receptors?
A. They reduced them.
MR. SCHUMACHER: No further questions at this time.
I'm not sure whether or not we moved Exhibits A1-H and A1-I that I believe Intervenors also had objected to when I offered exhibits earlier, and I would move those two at this time just to be sure they were included.
MS. CREMER: I show them as having been included.
MR. SCHUMACHER: Okay.
MS. CREMER: But to confirm, Intervenors.
MR. GANJE: The standing objection would apply.
MS. CREMER: All right. Thank you.
Staff.

MR. MIKAL HANSON: No objection.

MS. CREMER: They would be admitted if they weren't before. Thank you.

MR. SCHUMACHER: Thank you very much. Nothing further for this witness.

MS. CREMER: And can I just inquire as to the table that Commissioner Fiegen wanted. Would that be this afternoon? Tomorrow? Any idea?

THE WITNESS: Tomorrow morning.

MS. CREMER: Okay. Thank you.

Intervenors, did you have any recross as to Commission questions or redirect?

MR. GANJE: I did. Thank you.

RECROSS-EXAMINATION

BY MR. GANJE:

Q. Mr. Haley, looking at Exhibit A57, A57, and I think it's Bates -- let's look at Bates marked page number 1. So it's Bates -- it's paged on the bottom. A57, the table.

A. All right. I have it.

Q. Okay. Very good. Thank you.

Now this is a noise only table for Codington County; correct?

A. No. This is for the entire project.

Q. Oh. This includes Codington and Grant?

A. Yeah. Grant is further down in the table.
Q. Indeed. Okay. Yeah. I was looking at the Codington entries.
I think on the Codington entries you testified but I want to make sure that's correct that you didn't do this table based on the boundary lines. You, rather, did it on structures and not the boundary line; correct?
A. That is correct.
Q. Okay. So that -- and this is not a final table?
A. This is a final table.
Q. Okay. Why didn't you use the Codington ordinance boundary line protocol on this?
A. The purpose of Hessler's suggestions were to reduce the sound levels at the homes. And so with that in mind, there was no point in comparing the reduction at a boundary line to his anticipated reductions at structures.
Q. So are all the proposed movements that Staff is apparently working on with Applicant, the so-called Hessler seven turbines, are they based on that presumption rather than the ordinance which sets a property boundary line as the point of reference?
A. Yes. The point is is that Crowned Ridge went above and beyond the ordinances by agreeing or setting a target of reducing the sound noise levels at homes to 45 or less

for nonparticipants where that is not a requirement of the ordinance.

So in going above and beyond in trying to match up their turbine moves with Hessler's suggestions, the point of comparison is that the structure has nothing to do with the boundaries.

Q. Another point I think of your testimony to one of the Commissioners was with regard to the question of postconstruction sound survey and then comparing that to the preconstruction -- what's commonly referred to as the preconstruction ambient sound survey.

But I recall reading a report, I think, or part of a report where you were involved and there was a preconstruction ambient sound survey done by the Applicant in that case and you were involved in the postconstruction work.

So you have been involved in those type circumstances?

A. No. I've never been involved in measurements. I came into the realm of sound through the necessity of wind farm design. Most people that do sound measurements come to that profession by doing sound compliance for highways and industrial sites and other things and, you know, doing the measurements for permitting purposes. That's not how I got into the sound business.

So, no, I have never done any sort of sound measure work.

MR. GANJE: No further questions.

MS. CREMER: Thank you.

Staff.

MR. MIKAL HANSON: No further questions.

MS. CREMER: Certainly. Yeah. Go ahead.

COMMISSIONER FIEGEN: I'm assuming -- this is Commissioner Fiegen. I'm assuming that the boundary lines are in -- you're in compliance with the Codington County ordinance?

THE WITNESS: Thank you. Yes. That's correct. In fact, we were in compliance before we made the Hessler drops, and any drops we made simply made those numbers lower so there was no point to check for compliance.

The real question was what's the difference on the structures.

COMMISSIONER FIEGEN: Perfect. That was my assumption but just wanted to clarify before you got off the stand.

Thank you.

THE WITNESS: Thank you.

MS. CREMER: Any further redirect?

MR. SCHUMACHER: Thank you. No.

MS. CREMER: Thank you. You may step down.

(The witness is excused.)

MS. CREMER: Well, at this time -- well, let me ask my question first because I can do that.

Does anybody have questions for Mr. Hessler?

MR. MIKAL HANSON: Staff has none.

MS. CREMER: And, Mr. Ganje, you're indicating none. The Commission has indicated none. And Crowned Ridge has indicated none.

So based on that, I don't believe Mr. Hessler needs to be called. But, Staff, did you want to add something?

MR. MIKAL HANSON: We have a stipulated postconstruction sound condition, and Staff is concerned that maybe you'd want to ask Mr. Hessler some questions about that condition so --

MS. CREMER: And I know -- I'm sorry.

MR. MIKAL HANSON: I'm the one that was trying to get him off. I guess we're the one saying we should probably have him be available.

COMMISSIONER NELSON: I just received this proposed condition. If I had not received it, this was going to be the genesis of my questions for Mr. Hessler as to why this wasn't included in the original set of proposed conditions.

I think my only question, and maybe you can

answer it, is this a mirror of the Hankard methodology?

It's different. Then I need to know what the -- I haven't studied it so I need to know what the differences are. So yes.

MR. MIKAL HANSON: Could Staff be able to answer that easier.

COMMISSIONER FIEGEN: And if we could just make sure we're on the mics.

MR. KEARNEY: This is Darren Kearney of Staff, and there were some tweaks of language in the methodology section, the test methodology section from the Hankard proposal.

It is consistent with the Hankard proposal as far as the format from Deuel Harvest, but based on their expert's position on how to do a sound study, we made some slight adjustments. Those would be captured in Subpart B of the condition.

And we also took out references of specific ANSI standards. We just referenced generically that it shall be conducted in compliance with ANSI standards. And Crowned Ridge can add any other color if they think I missed anything.

MR. MURPHY: Thank you.

Commissioner Nelson, from my study of past cases here, I know this is of particular interest. My

suggestion would be to have Hessler on the phone so that you can get those answered.

I do feel very comfortable that Mr. Hessler and Mr. Lampeter had a meeting of the minds that we were trying to improve upon, not trying to take away.

COMMISSIONER NELSON: I appreciate that. So let's have him on and have him step through the changes.

MS. CREMER: So my understanding is we're going to need just a few minutes here to hook him up to the phone. So we'll take a short recess, but don't go far because we'll start without you.

(A short recess is taken.)

(Mr. Hessler is connected via teleconference.)

MS. CREMER: Mr. Hessler, this is Karen Cremer. I'm just going to remind you that you're under oath. And there are a few questions that have been raised, and so I will let Commissioner Nelson ask.

COMMISSIONER NELSON: Thank you, Mr. Hessler, for accommodating us. I hope that you are learning lots where you are at.

The question that I have relates to an exhibit that has just been filed this morning entitled A63 and this is an amendment to some proposed permit conditions and this expounds or expands upon the methodology for postconstruction noise measurement.

And the question that I posed to Staff here was, well, is this the Hankard methodology, and the response I got back was, well, it's close but it's been modified.

So my question for you is can you quickly explain how this has been modified, and, in your opinion, do those modifications improve the methodology or not?

THE WITNESS: Okay. The Hankard -- so-called Hankard methodology relies on certain wind conditions setting up that, in my experience, aren't all that common or easily realized, and that is to be a valid measurement, the turbines need to be operating at full power or at a wind speed of about 7 meters per second at hub height. And the wind speed at ground level needs to be low.

And that doesn't always happen. It does happen sometimes. But it might be difficult to capture data in any seven- to 14-day period that captures a number of samples under those conditions.

So in order to make the testing a little more practical and to avoid having to extend the measurement period or go back and measure again, what I've modified is that during -- well, first of all, I've set the time to be a 14-day period just to capture the maximum number of measurements.

And then I've added that the -- that during the

testing when the project is operating at full power that all the turbines be turned off for a 10-minute period, irrespective of what the ground level wind speed is doing. And I've specified that they do this 10 times. So there will be at a minimum 10 samples taken when the project is operating at full power.

And as long as the background level is accurately quantified, you can get a valid answer. And that's what this testing will do. Because during the 10-minute shutdown the level without the project will be recorded under those -- all those wind conditions that's happening at that moment, and then that level can be accurately used to correct the total level measured just before and just after that to get what the project is doing.

The big challenge is separating the background contamination from the actual project level. So this makes it -- it assures that there will be a fair number of good samples.

COMMISSIONER NELSON: Thank you. I appreciate that explanation.

And just so I'm clear, what you are anticipating here is that the on/off tests will be conducted regardless of whether or not you have a sufficient number of samples utilizing the regular methodology; is that

correct?

THE WITNESS: Yeah. That's correct. Because you don't -- you won't really know until after the survey's over and you go back and look for conditions meeting the original criteria.

There may be many samples that are valid. There may be few. But by adding this additional mandatory 10 shutdown tests, it will ensure that a good amount of valid data is obtained irrespective of, you know -- it's basically because you don't know until it's over of whether you got enough or not. The other way.

COMMISSIONER NELSON: And I guess -- thank you. I appreciate the explanation.

I guess the only other question, I know in past dockets applicants have balked at the idea of shutting their turbines off. Was that not an issue with this Applicant?

THE WITNESS: The original test procedure offered by the Applicant already included the proviso that the turbines would be turned off to attain the background level. That was already part of the offer. And so presumably if they're willing to do that -- and then in this modification I've limited the shutdown to only a 10-minute period so that shouldn't be overly onerous.

COMMISSIONER NELSON: Thank you. I think that is all the questions I've got. And, again, greatly appreciate your coming on the phone to explain those changes.

THE WITNESS: Oh, sure. No problem.

MS. CREMER: And do either of the other Commissioners have any questions for Mr. Hessler?

So he's Staff's witness. I would go to Crowned Ridge. Did that raise any questions for you?

MR. SCHUMACHER: No. Thank you.

MS. CREMER: And Mr. Ganje?

MR. GANJE: No questions.

MS. CREMER: Staff, did you need any follow-up?

MR. MIKAL HANSON: No follow-up questions. Thank you.

Thank you, Mr. Hessler.

MS. CREMER: Thanks, Mr. Hessler, and you may step down.

THE WITNESS: Okay. Very good. Thank you.

(The witness is excused.)

MS. CREMER: Crowned Ridge.

MR. SCHUMACHER: Thank you. The Applicant would call Rich Lampeter.

(The oath is administered by the court reporter.)

DIRECT EXAMINATION

BY MR. SCHUMACHER:

Q. Please state your name, business title, and company for the record.

A. My name is Richard Lampeter. I'm an associate and group manager of the acoustics group at Epsilon Associates located in Maynard, Massachusetts.

Q. What is your role with regard to the Crowned Ridge Wind Project?

A. My role has been to review and comment on the testimony from David Hessler and the proposed conditions from the Intervenors regarding sound levels and measurements.

Q. Please provide a short overview of your education and experience.

A. I started working at Epsilon Associates in 2001 following my graduation at Lyndon State College in Vermont where I earned a bachelor's of science and environmental science.

Since 2004 I've been involved in wind energy projects across the United States, and during that time I've worked on approximately 90 such projects. My role on these projects has been primarily to conduct shadow flicker and sound level analyses.

In addition to my experience in wind energy

projects, I've also conducted sound level analyses for other types of power generating facilities, commercial developments, and industrial facilities. And those analyses have involved -- and I've either conducted or managed these types of analyses -- either preconstruction sound level measurement programs, sound level modeling, noise mitigation and noise control analyses, and postconstruction sound level evaluations.

Q. Did you file Prefiled Rebuttal Testimony on May 24, 2019, that is marked as Exhibit A41 and accompanying exhibits marked as A41-1, A41-2, A41-3, and A41-4?

A. Yes, I did.

Q. Do you have any changes or corrections to that testimony or the exhibits?

A. No, I do not.

Q. Please provide a short summary of your prefiled testimony.

A. My testimony includes my opinion on preconstruction sound level measurements and that it's specific to Crowned Ridge, and my opinion is that they're not necessary. And that's because the collection of baseline or ambient sound levels would not aid or be required as part of evaluating the county sound level limits.

In addition, an evaluation of an increase over background sound levels is problematic for a variety of

reasons, which I've outlined in my testimony in that that type of limit creates uncertainty for the owner, operator, and developer, as compared to a project only sound level limit.

The other part of my testimony was to comment on the proposed conditions by the Intervenors with respect to sound. And to summarize those, I feel that the inclusion of infrasound is unnecessary based upon the findings of the Massachusetts wind turbine health impact study, along with other studies that I reference in my testimony, one of which I was a co-author on.

I did not agree with the recommendation for monitoring sound levels during maintenance activities or construction activities, as those activities would be brief and/or intermittent in nature. And also there's not a limit to compare those sound levels to.

Finally, the postconstruction measurement methodology that was proposed is inconsistent with the county sound limits. From a location and frequency perspective, it's unnecessary and atypical as compared to other types of programs, and the sound level metric proposed is inappropriate for these types of measurements. So, therefore, I would not recommend any of the conditions that were proposed by the Intervenors with respect to sound.

MR. SCHUMACHER: Applicant has no further questions for this witness and would tender him for cross-examination.

MS. CREMER: Thank you.

Intervenors.

MR. GANJE: No questions.

MS. CREMER: Thank you.

Staff.

MR. MIKAL HANSON: We do have a few.

CROSS-EXAMINATION

BY MR. MIKAL HANSON:

Q. You are the postconstruction sound measurement person, expert; is that correct?

A. Yes. That's correct.

Q. And how many would you -- how many postconstruction sound studies do you estimate you've probably been involved in?

A. I would estimate about 20.

Q. And in almost all of those 20, were there modeling sound done before the construction in those projects or at least a significant number of those projects?

A. I would say the more recent projects, yes, that modeling was a component of the preconstruction analysis.

Q. How do they compare? Is the premodeling a pretty good predictor on postconstruction sound?

A. I would say since I've been doing it for quite a few years, I've seen sort of the development of the industry. So early as projects were being developed and modeled, there was greater inconsistency with the modeling inputs, and you would see typically some more aggressive types of modeling analyses which would not show necessarily the best agreement with a postconstruction measurement program.

Over time and as more studies have been done, those modeling inputs have become more standardized, not -- there's still some variation, but there's a higher degree of confidence in those levels, and you would expect compliance done with typical modeling assumptions.

Q. Mr. Haley said he's using a software to model. Are you familiar with that software?

A. Yes. I'm familiar with the WindPRO software package.

Q. And is that the more recent and it's been working pretty well, in your opinion?

A. Well, WindPRO is one of the software packages. And these packages incorporate international standard ISO 9613-2.

Q. Slow down a little bit.

A. Oh. Sorry. And so when you use that standard there still are some inputs that are user driven. So you can

still use that software package, and that has been used in the past. But if you make the wrong assumptions, then you can even with that software get sound levels that are either very close or could underpredict. It really depends on the inputs you put into that software.

Q. You were involved in Exhibit A63, the condition for postconstruction sound? I'm going to show you a copy. You have a copy?

A. They passed it around.

Q. Okay. You were involved in helping to agree to that condition, were you not?

A. Yes, I was.

Q. And to your expert -- in your expert opinion, that is a proper way to do the postconstruction sound?

A. I think every consultant has some variations in what they think may be best. So there are certainly some aspects here that I would prefer maybe a slightly different approach, but I would say that the intent in how it's laid out is a reasonable and workable methodology.

I think there's still a challenge in getting the number of measurements that are required, but the approach that's laid out is workable and reasonable.

Q. And you're aware Crowned Ridge has stipulated and agreed to do that?

A. Yes, I am.
Q. Are you aware that some counties or municipalities or wherever these wind farms are built sometimes have a wind ordinance that says whatever the sound is now, it can't be increased over 5 dBs? Or, you know, their sound ordinance starts at a level and then adds?
A. Right. There are some ordinances that set an increase over background for dBA levels. I would say that quite a few of those are ones where they set a limit, a project only limit, and then if background is above that, then there's the delta for that particular situation.

So it's kind of a combination, but some are also just stand-alone increase over background type noise.
Q. And an ambient sound study has to be done. That's the situation where you need to do an ambient sound study?
A. Right. If you have a situation where your only limit is increase over background, you would want to obviously collect that background in advance.
Q. And we don't have that situation here?
A. That is correct.

MR. MIKAL HANSON: I don't have any other questions.

MS. CREMER: Thank you.

Commissioner Hanson. Or Chairman Hanson.

CHAIRMAN HANSON: Thank you.

Good afternoon.

THE WITNESS: Good afternoon.

CHAIRMAN HANSON: I was just reviewing your -- I didn't expect to get to you yet. I thought we'd be a little bit longer.

Do you find yourself in disagreement with any of Mr. Haley's or Mr. Ollson's testimony?

THE WITNESS: Their written testimony?

CHAIRMAN HANSON: Yes.

THE WITNESS: I haven't reviewed either Mr. Ollson's or Mr. Haley's testimony.

CHAIRMAN HANSON: You didn't read their testimony?

THE WITNESS: No, I haven't.

CHAIRMAN HANSON: Really. Okay. Is that to protect you so you don't have to answer a question like that?

THE WITNESS: No. I've looked over Mr. Haley's reports. I've read through those to become familiar with the project and what the predicted sound levels are --

CHAIRMAN HANSON: All right.

On page 7 of your written -- let's see. This would be your Rebuttal Testimony. I guess that's the

only one that you had. On line 17 that type of an answer is the type of an answer I don't give any weight to. I don't particularly like it because it doesn't address the question.

You state that you're "unaware of any state or county limit on sound during decommissioning; therefore, the monitoring of sound during this temporary condition would be unnecessary." But that's not the question.

The question is do you agree that sound monitoring, including infrasound, should be completed during decommissioning? Do you know of any decommissioning that has ever taken place?

THE WITNESS: Yes.

CHAIRMAN HANSON: And do you know if anyone did any sound testing?

THE WITNESS: I'm not aware of any sound testing during that.

CHAIRMAN HANSON: Have you any idea of the volume of the sound? Chatted with anybody about it or been there and observed it or anything of that nature?

THE WITNESS: No. I would assume it would be similar to the construction activities where they erect the wind turbines and pour the foundations and --

CHAIRMAN HANSON: And I suspect it would take a shorter time to do than erecting it. Any --

THE WITNESS: I'm not sure of the time line on it.

CHAIRMAN HANSON: I'm just curious -- forgive me for talking over you.

THE WITNESS: Sorry.

CHAIRMAN HANSON: I tell people not to do that.

I'm just very curious about that. Not that I think that we -- some of my questions are more to my curiosities than to what we should be monitoring or regulating.

THE WITNESS: Usually -- I would assume decommissioning would fall under a similar type of conditions as a construction where you use best management practices to limit time durations for the construction or -- is the main way to mitigate any sound concerns as to -- the activity, unlike the operation, is going to be moving so there will be different areas where there's going to be activity, and it's temporary so it's there for a period of time and then that piece of equipment either stops operating or moves on to the next spot.

CHAIRMAN HANSON: And you're not a sound guy from the standpoint of giving opinions on infrasound and such and effects?

THE WITNESS: I can. Because one of the papers

that I referenced in my testimony we did one of the earlier sound level measurement programs to look at infrasound and low frequency sounds from wind turbines and compared them to different criteria, some of the ANSI criteria, some of them international criteria.

And we did a literature review. I was a co-author on this peer-reviewed journal article where we did a literature review of what the studies were to date, both also looking at what criteria might be available for us to compare to. And then we went and did a measurement program and looked at two wind turbines at this particular facility, monitored those sound levels at 1,000 feet from operating wind turbines, and then compared them to the criteria.

CHAIRMAN HANSON: Interesting.

So would you have an opinion on whether a sound level of 45 dBA or less would have absolute universally no effect on the health of all human beings?

THE WITNESS: That's a pretty broad statement to have. I'm not a health expert. But what we have seen through the literature reviews we've done and when you look at things such as sleep disturbance, 45 decibels is definitely a very good number to have as a limit to prevent things like sleep disturbance, which is usually the major concern at a residence.

CHAIRMAN HANSON: So would you agree that 45 decibels or less of noise would have no effect on sleep disturbance or the health of human beings?

THE WITNESS: Yes. I would say that that's an accurate statement.

CHAIRMAN HANSON: Curious. Thank you.

THE WITNESS: You're welcome.

CHAIRMAN HANSON: Thank you.

COMMISSIONER NELSON: Mr. Lampeter, thank you for coming out here to help us sort this out.

You heard my discussion this morning with Mr. Haley, and his modeling as recorded on Exhibit A58 shows that at a particular receptor the sound level increases by one half of the dBA from wind turbines that would be located 20 to 25 miles away.

Does that make sense to you given your experience with how sound travels from wind turbines?

THE WITNESS: I'd have to stare a little bit closer at the modeling to have a definitive answer. But what I can say is that if you had all of the wind turbines a significant distance, very far away from a particular receptor, you could see a small increase. But those numbers would have to be very low.

I would expect that if there were turbines significantly closer than that in the modeling already, I

would not anticipate seeing any increase at a modeling receptor when you add a turbine 20 miles away.

COMMISSIONER NELSON: Thank you. No further questions.

COMMISSIONER FIEGEN: Thank you for joining us in South Dakota. Kristie Fiegen.

You were asked about your participation in pre and postconstruction modeling, and you talked about how earlier in the earlier years they were a little more -- there may have been developers that were a little more aggressive.

When you state that do you mean like it appears this project is being conservative. Do you mean aggressive means opposite of conservative?

THE WITNESS: Yes. And I wouldn't necessarily -- it was the developers that were advocating perhaps for that type of differences in modeling inputs. They may or may not. I don't know.

But some consultants would, let's say, perhaps not use a conservative ground attenuation factor. Maybe they would use a different factor that would result in more reductions in the sound levels model at a home so you would get a lower number in the model, which would not verify through a measurement program. So by making or not including an uncertainty factor from the

manufacturer the plus 2 that you mentioned.

So if you tweak those numbers, in certain instances you could exceed, perhaps, the modeled number when you take a measurement.

COMMISSIONER FIEGEN: So I have a note here that you were asked approximately you've been involved in maybe about 20 of the postconstruction surveys; is that correct?

THE WITNESS: That's correct.

COMMISSIONER FIEGEN: Okay.

So out of those 20, especially I don't know what you would call most recent. Is that most recent would be the past six years or the past 10? I don't know. What's that 20 years -- I mean, what's the span of years?

THE WITNESS: So I started -- the first postconstruction program would have been in 2004.

COMMISSIONER FIEGEN: Okay. So less than 20 years.

THE WITNESS: Yes.

COMMISSIONER FIEGEN: So probably -- let's just look -- if you can, in your mind, look at the more recent -- maybe the last eight years or 10 years or whatever the case is.

Can you give me the worst-case scenario or the worst case in the last eight or 10 years of pre and post

and give me examples of what actually happened in some of that post compared to what the pre was, the analysis of the preconstruction and then the postconstruction and then the variance.

Were the variances 2 decibel dBA or --

THE WITNESS: The postconstruction programs often are not designed in a way to evaluate the model. They're more designed to evaluate compliance.

So the subtle difference there is that if the limit is, let's say, 50 decibels. You can measure the sound levels with contributions from background sound or wind, and you may measure a sound level that comes in at 48 decibels, which would still show compliance in this particular example but your model predicted 46. So you may exceed it, but you don't take it the next step to determine has the model been done correctly because it complies and that was the closest location and there's no reason necessarily to take it further than that and you've demonstrated compliance.

In other instances where the modeling is right at the limit, I have had a situation where it was above that limit, but we're talking about a decibel in that particular instance.

So usually the model, even if it's done what I would have said more aggressive or did not include all

the conservatism, often the difference between modeled and measured would be small.

COMMISSIONER FIEGEN: So if I'm hearing your testimony correctly, like the last eight to 10 years there was only one tower that was over?

THE WITNESS: There were two. I just gave you --

COMMISSIONER FIEGEN: There were two.

THE WITNESS: Yeah. Both were about a decibel.

COMMISSIONER FIEGEN: And do you remember if that level was at 50 dBA? Or do you know what level those were at, or you just remember that you had two that were over by one decibel?

THE WITNESS: Yes.

COMMISSIONER FIEGEN: Okay. Thank you.

THE WITNESS: Yes. I think -- well, I'm not 100 percent sure so I'd rather not say.

COMMISSIONER FIEGEN: Okay. Thank you. But that's helpful to realize that you've been involved in 20, and especially the most recent ones there were two towers.

Thank you.

THE WITNESS: You're welcome.

MS. CREMER: Any redirect, Crowned Ridge?

MR. SCHUMACHER: No redirect from the Applicant.

Thank you.

MS. CREMER: Thank you.

Mr. Ganje, did you have any recross as to Commission questions?

MR. GANJE: None.

MS. CREMER: Thank you.

Staff.

RECROSS-EXAMINATION

BY MR. MIKAL HANSON:

Q. Should the Commission be concerned about -- there are a number of nonparticipants right at 45 dBAs. Should they be concerned that they're right up there at the level that the county ordinance is?

A. I thought they were -- I thought most of them were lower than 45. I don't remember how many were close. But I think with the additional uncertainty that's been added into the modeling here, you have the 2 decibel uncertainty and a lot of the modeling inputs that were described by Jay that I wouldn't have concern with respect to compliance.

MR. MIKAL HANSON: Thank you. No other questions.

MS. CREMER: Does that raise any final redirect -- or -- yes.

MR. SCHUMACHER: We do not. Thank you.

MS. CREMER: All right. You may step down. Thank you.

THE WITNESS: Thank you.

(The witness is excused.)

MS. CREMER: Please call your next witness.

MR. MURPHY: Thank you. I call Dr. McCunney.

(The oath is administered by the court reporter.)

DIRECT EXAMINATION

BY MR. MURPHY:

Q. Hello. Please state your name, business title, and company for the record.

A. My name is Dr. Robert J. McCunney. I'm a physician. I practice in Boston at the Brigham and Women's Hospital, which is the flagship hospital of Harvard Medical School.

Q. What is your role with Crowned Ridge Wind?

A. I was asked as a consultant to review documents that have been submitted in this case to address potential health-related issues associated with the project.

Q. Please provide a short overview of your education and experience.

A. I have a bachelor's degree in chemical engineering from Drexel University. I have a master's degree in environmental health from the University of Minnesota. I have a medical degree from Thomas Jefferson University Medical School in Philadelphia. I trained in internal

medicine at Northwestern University Medical Center in Chicago. And I did a fellowship in occupational and environmental medicine at the Harvard School of Public Health in Boston.

Q. Did you file Prefiled Rebuttal Testimony on May 23, 2019, that is marked as A40 and accompanying Exhibits A40-1 through A40-9?

A. Yes, sir.

Q. Do you have any corrections or changes to that testimony or exhibits?

A. No.

Q. Please provide a short summary of your prefiled testimony.

A. Based upon my review of the documents and testimony introduced in this case, there are no health or welfare concerns associated with the project as proposed by Crowned Ridge.

The turbine placement and setbacks will not adversely affect the health or welfare of nonparticipants.

I base this conclusion on three major factors: The sound and shadow flicker results developed by CRW witness Jay Haley; two, my professional experience as a physician addressing health risks from noise; and, three, the scientific peer-reviewed literature.

Although reports suggest that some people living near wind turbines may find the noise annoying, it is important to point out that individual factors play a significant role in why people report annoyance in addition to noise.

In fact, noise has been shown in research studies to be a minor factor in why some people living near wind turbines report annoyance. Attitudes toward wind energy, potential economic benefits, and visual aspects of the turbines have been shown to be more important than noise in why people report annoyance.

Annoyance, it's important to point out, is not an adverse health effect, and it is not coded as a specific diagnosis in the latest version of the international classification of diseases. The ICD is used worldwide for diagnostic, insurance, and research purposes. In fact, everybody in this room when you go to a physician and the physician completes the evaluation and prepares the report, the ICD code has to be listed for insurance purposes. So the international classification of diseases does not list annoyance as an adverse health effect.

Although wind turbines can generate infrasound and low frequency sound, detectable levels of infrasound and low frequency sound at residences near wind turns are not

at harmful levels. And these conclusions are based on studies in the United States, the United Kingdom, the Netherlands, Denmark, and Australia, among others and mostly notably Germany.

No studies demonstrate harmful effects to people from exposure to infrasound or low frequency sound at the noise levels measured in the vicinity of wind turbines or, frankly, in experimentally designed studies that involved noise levels several orders of magnitude higher than those noted in the vicinity of wind turbines.

And, furthermore, it is not necessary to differentiate low frequency sound or infrasound from broad noise level measurements conducted in the A scale.

And, finally, in conclusion, in my view nonparticipants will not suffer adverse health effects, including sleep disturbance, at noise levels up to 46 decibels.

That concludes my brief summary.

MR. MURPHY: Thank you. I offer the witness for cross-examination.

MS. CREMER: Thank you.

Intervenors.

MR. GANJE: No questions.

MS. CREMER: Thank you.

Staff.

CROSS-EXAMINATION

BY MS. EDWARDS:

Q. Dr. McCunney, you just mentioned one of the annoyance effects as being potential economic benefit. What do you mean by that?

A. Well, it's in any research study when there is what we call a health outcome measurement. For example, if we want to to determine what the cause of heart disease is and we know that there are various factors such as cholesterol, high blood pressure, diabetes, family history, cigarette smoking, et cetera, what is used in research studies is a method called multiple regression analysis, which may sound complicated, but it's a method designed to determine which of the various factors that can cause the outcome of interest and in this case heart disease is most important.

Well, similar methods are used when annoyance is found in the context of research studies of people living in the vicinity of wind turbines. So similar multiple regression analyses were conducted in numerous studies to determine what's the most important factor as to why people report annoyance when they live near wind turbines?

And factors that are more important than noise include the attitudes that people may have towards wind

turbines, whether they develop economic benefit, the visual aspects, and so forth.

And when I say "economic benefit" I mean research studies have shown that the people who develop economic benefit from the wind turbines do not report annoyance. In fact, there's a recent study just published last year by the lead investigator of the Health Canada Study about which you may have heard already. People who derive economic benefit from the turbine don't simply report annoyance. That's what I meant by that comment.

Q. Okay. I wasn't sure if you were getting at it's a shakedown or where you were coming from. Okay. So that clarified. Thank you.

A. No.

Q. And you've also testified in your written testimony that you've never testified before this Commission. Have you testified before another commission or a similar body?

A. Not near here. No, I haven't. I've testified in other jurisdictions I've indicated in Canada and in the U.S., but not in this area.

Q. Okay. On page 5 of your prefiled testimony you state the Health Canada Study -- the largest epidemiology study in the world found no adverse health effects and so on at noise levels up to 46 dB.

Has it been studied, to your knowledge, above 46 dB?
A. Well, there are studies, all kind of environmental noise studies, that have been conducted worldwide for all sources of noise sources, whether it's airports or railroads or transportation noise, construction noise, and so forth. And some of those investigations do address noise levels well into the mid 50s.
Q. So by that statement are we to take that to mean that there could be effects over 46 or that we don't know?
A. Well, there are studies. If you look at the more recent World Health Organization document that was promulgated and released about a year ago, they will actually allow levels up to the mid 50s, if I remember right, 53 decibels for some sources of noise.
So that's an indirect way of answering your question. I find that it would be unlikely to be adverse health effects from 45 to 50 although research demonstrates pretty conclusively, at least in my view, that up to 46 is safe with respect to wind turbines.
MS. EDWARDS: Thank you. No further questions.
MS. CREMER: Thank you.
Commissioner Nelson.
COMMISSIONER NELSON: No questions.
MS. CREMER: Commissioner Fiegen.

COMMISSIONER FIEGEN: Thank you for coming. Can I be off the record a second.

(Discussion off the record.)

COMMISSIONER FIEGEN: So you are the expert for the Applicant on health; is that correct?

THE WITNESS: That's my understanding, yes.

COMMISSIONER FIEGEN: Okay. So have you been involved personally in any studies studying wind developments and health?

THE WITNESS: Well, yes. I'm the author of at least four publications, one of which is in press. They're listed in my CV. If you'd like me to list them and go over them now, I can.

COMMISSIONER FIEGEN: And have you evaluated residents that live by wind farms? Have you evaluated them on a health issue before?

THE WITNESS: Yes.

COMMISSIONER FIEGEN: Okay. Thank you. Those are my questions. Thanks.

CHAIRMAN HANSON: Good morning.

THE WITNESS: Good morning.

CHAIRMAN HANSON: Welcome to South Dakota.

THE WITNESS: Thank you.

CHAIRMAN HANSON: Would you agree that the presence of wind turbines annoys some people?

THE WITNESS: Yes.

CHAIRMAN HANSON: Would you agree that the sound annoys some people?

THE WITNESS: Well, in some cases as I tried to indicate earlier, Commissioner, sound is one of the factors that may cause people or noise -- however you want to define the term, can affect some people in terms of reporting annoyance. But it tends to be a minor factor in terms of other factors that cause people to report annoyance.

CHAIRMAN HANSON: Would you agree that persons who are economically benefited from the presence of wind turbines are more likely to tolerate the annoyance?

THE WITNESS: Well, that's assuming they have annoyance that they may be better to tolerate it. I'm not sure they're annoyed. I mean, I've talked to many people who live close to wind turbines, and they're not annoyed at all.

CHAIRMAN HANSON: Well, at least that's what these studies that we've been reading and that are throughout our information arrive at that conclusion. But there are different conclusions that can be reached by looking at the same -- let's see. The same criteria, I'll say.

You know, some people can look at that and say,

well, gosh, the self-reporting is less among those folks who are economically benefited and yet it's greater among obviously those people who are not economically benefited; therefore, we can conclude that people who are not -- are not economically benefited are annoyed more than the others.

Or we can conversely say that those people who are economically benefited are going to tolerate it more. They're going to say, hey, I'm getting paid for this and I signed up for it so I'm not going to complain. I'm not going to self-report.

THE WITNESS: Well, it's certainly a possibility, but in my view it's less likely. The other explanation -- you've heard a little bit about Health Canada. One of the advantages of Health Canada in addition to the subjective information that was obtained from the questionnaire, there was a lot of objective information that was obtained as far as the study, for example, measurement of cortisol levels through monitor of stress, measurement of blood pressure, measurement actually of objective findings associated with sleep disturbance.

So you make a good point about subjective assessments, and that, in my view, was supplemented at least in the Health Canada Study by the objective

measurements.

CHAIRMAN HANSON: Should we ignore -- should we ignore the fact that -- or the health effects that -- I don't know how to phrase this because there's -- I've read all of the information, and they're continually saying that there's no health effects whatsoever.

And I recognize that people can become accustomed to noise and such. And I shouldn't bring my own personal experiences of different people that -- you know, it's not evidence.

But intuitively it would just seem that especially if I haven't signed up for wind turbines to be on adjacent property and I do hear the noise and the flicker is based upon receptors of windows in -- and interior and I'm sitting on my porch and I hear better on my front porch and I've got the flicker on my front porch but not inside, it would just seem that that would annoy me a lot more if I'm not making $20,000 or however much.

THE WITNESS: Well, the research would support your perspective.

CHAIRMAN HANSON: So that high blood pressure and those other concerns -- high blood pressure's the silent killer, and you're testifying that it can have an effect on high blood pressure by those persons that are being -- so how do we not ignore -- that's a health

effect, isn't it?

THE WITNESS: I'm not sure I understand your question. What is a health effect? Annoyance?

CHAIRMAN HANSON: Annoyance that causes my high blood pressure, which I take pills for. Doesn't that create a health effect?

THE WITNESS: Well, it's assuming that the annoyance is leading to high blood pressure or elevations in the blood pressure. I'm not sure it always does. Noise means -- as you know, means different things to different people. And annoyance, per se, does not necessarily mean the blood pressure will increase.

CHAIRMAN HANSON: I like your statement that annoyance has different effects on different people. Because we're talking about thousands and thousands of people. And start looking at the odds and, you know, we're supposed to protect everybody.

THE WITNESS: Ideally, yes.

CHAIRMAN HANSON: Well, that's our job.

So if people are annoyed and it creates high blood pressure -- I know how it affects some people with ADHD and things of that nature but -- I'll ask you.

You're certainly a well versed individual with a heck of a background. Special needs kids, you would seem to be capable of answering a question on stimulus from

shadow flicker and noise on special needs kids.

Isn't there some effect in that area?

THE WITNESS: Well, I've been asked this question before in other settings, whether wind turbine noise may aggravate, for lack of a better word, or to affect the well-being of people with autism; for example, the Asperger syndrome. I've been asked to address whether cardiac pacemakers may be affected, so forth.

So in the course of my 10 years, the last 10 years when I've paid attention to potential health implications of wind turbine operations, in my view it shouldn't be affecting those children.

With respect to autism in particular, I had some discussions with the director of Children's Hospital in Boston about this particular issue after looking at the literature myself to get the perspective of a clinician who actually treats patients such as these -- because I don't really treat people with autism or Asperger's in my practice. So I sought out consultation with a physician, director of the department who does.

And he reassured me that the literature that I had reviewed was pretty much indicative of lack of effect with children with these special needs.

It's all based on noise levels, as you know. I mean, the noise levels can get pretty high with airplanes

and so forth and construction. So it's all -- like any type of occupational or environmental hazard, it's the dose that makes the poison, meaning how high and how long the exposure is.

Everybody here knows that one cigarette is not going to cause you to get lung cancer. But smoke two or three packs a day for 30 years, really increase your risk. It's the same thing with any hazard. The higher the levels, the greater the risk.

CHAIRMAN HANSON: Thank you. I just struggle with absolute statements like there is absolutely no health detriment to anybody on 45 dBA or on flicker or, you know, so many hours. I struggle with those types of absolutes. Because I know everyone in this room is different, and it's going to affect everyone in this room differently. And I appreciate your being here because I place a lot of weight on your testimony.

So you're telling me that annoyance can create -- from your experience and your information, we don't have to worry about Asperger's or any other childhood challenges, that it's a nonfactor here.

THE WITNESS: Yes. In my view based on the experience that I've gained over the last 10 years addressing this issue.

And, first of all, let me agree with you

completely. I'm always very concerned about categorical comments, categorical statements. Because, as we say in medicine, never is never true and always is always wrong, to use the cliche.

But you have to make decisions based on the best available information. And I am very impressed with the Health Canada Study. Even within the results of the Health Canada Study when they tried to segment out those who reported annoyance as to whether they had adverse health effects or they did not.

CHAIRMAN HANSON: Thank you very much, Doctor. Appreciate your testimony.

THE WITNESS: My pleasure. I appreciate the opportunity to be here.

COMMISSIONER FIEGEN: I have one follow-up question that Mr. Hanson talked about special needs kids. And I had the opportunity to teach three on Sunday, and all of them had headphones, and at one point they went and got their head phones and put them on, which was interesting to me.

So I asked you earlier if you've evaluated residents that live by wind turbines. Any of the people that you evaluated, were there any diagnosis of autism, and did you evaluate those people?

THE WITNESS: No. There were no autism

diagnoses.

COMMISSIONER FIEGEN: Okay. Thank you.

MS. CREMER: Any redirect?

MR. MURPHY: No redirect.

MS. CREMER: Thank you.

Intervenors, any questions based on Commission questions?

MR. GANJE: No questions.

MS. CREMER: Thank you.

Staff.

MS. EDWARDS: Briefly.

RECROSS-EXAMINATION

BY MS. EDWARDS:

Q. So is it fair to say that different doctors have different areas of expertise?

A. Well, certainly. There's a whole range of specialties. I think there now have been 24 different specialties.

Q. So would you consider epilepsy within your area of expertise?

A. Well, epilepsy is usually managed by neurologists. However, one of the beauties that -- what I really like about my field, although I trained in internal medicine, I've really been focusing my entire career on occupational and environmental medicine. I have to learn

a little bit about a lot of diseases because I have to know, for example -- you brought up epilepsy.

Earlier in my career I had to evaluate commercial drivers as to whether they could have a license to drive a big semitruck and they may have epilepsy. That forced me to learn about epilepsy in more detail perhaps than a general physician, engage with neurologists to try to make informed decisions.

So the direct answer is I'm not a neurologist. I don't usually primarily treat epilepsy, but some of my patients have epilepsy. See the difference? They may be treated by a neurologist, but I see them for something else.

Q. Sure. How about ADHD?

A. I don't usually treat ADHD. That's usually -- mostly in pediatrics but some psychiatry for adults. Some adults have ADHD.

Q. So are you able to opine -- and I'm not going to ask you to, but are you able to opine on the effects or -- if any, of wind turbines on children with ADHD?

A. I'd certainly be willing to take on that task as I approach every other challenge posed to me and that is to evaluate whether exposure to any potential hazard -- and noise clearly is a potential hazard. How to evaluate the effect of a potential hazard on human health.

It's what I do in my clinical practice. When people come to see me they're either concerned they have a health issue that may be related to some exposure to a hazard of some sort or they have been exposed to a hazard. They're renovating their attic and they find asbestos or there's lead in the drinking water or something like that. That is the essence of my medical practice, as is evaluating whether exposure to a hazard affects human health or whether a health condition may have been aggravated by exposure to a hazard. Usually one or the other.

Q. Have you ever seen either of those health conditions, epilepsy, ADHD and let's throw in autism, affected by wind turbines in your practice?

A. No.

MS. EDWARDS: Okay. Thank you. No further questions.

MS. CREMER: Any final redirect?

MR. MURPHY: No. Thank you.

MS. CREMER: Thank you for coming.

THE WITNESS: Thank you very much. It's a pleasure to try to be of help. Thank you.

(The witness is excused.)

MS. CREMER: Crowned Ridge, you can call your next witness.

MR. MURPHY: Thank you. I call Dr. Ollson.

(The oath is administered by the court reporter.)

DIRECT EXAMINATION

BY MR. MURPHY:

Q. Please state your name, business title, and company for the record.

A. Dr. Christopher Andrew Ollson, spelled O-L-L-S-O-N. I have a Ph.D. in environmental health. I am the owner and senior environmental health scientist at Ollson Environmental Health Management.

Q. What is your role with Crowned Ridge Wind?

A. My role first began in late 2016 when Crowned Ridge Wind engaged me to aid in their Commission discussions with both counties in planning and zoning during ordinance.

My role has been to review the literature, scientific literature, provided by some proper siting of the project.

Q. Please provide a short overview of your education and experience.

A. Certainly.

Commissioners, I hold a Bachelor's of Science in biology from Queens University. I held a master's and a Ph.D. in environmental health, environmental sciences from the Royal Military College of Canada. Over the

course of the last 20 years I have been an environmental health consultant as well as adjunct professor at the University of Toronto.

Day to day when I come to work on the wind -- well, it essentially started out about 10 years ago when I was in practicing and things like air quality assessments, risk assessments, and contaminated sites and the like. I was approached about what are the health concerns or effects of living around wind projects.

Since 2009 and up to today, I've conducted a number of research studies, published over six peer-reviewed publications in scientific literature. And appearing before you is not uncommon for what I do. I've appeared before the North Dakota Public Services Commission on a number of projects. I appeared before a number of county commissions when they're making their decisions on proper siting of wind projects.

In addition to my role with working with developers, I've also been the consultant of record for the Vermont Public Services Department when they were setting their sound rules, and I've also appeared before the North Dakota and Indiana Senates during hearings that they were holding with regards to wind turbines and noise and siting.

Q. Did you file prefiled Supplemental Testimony on

April 9, 2019, that is marked as A24 and Exhibits A24-1 through A24-17?
A. I did.
Q. Do you have any corrections or changes to that testimony or to the exhibits?
A. I do not.
Q. Did you prefile Rebuttal Testimony on May 23, 2019, that is marked as A38 and accompanying Exhibits A38-1 through A38-7?
A. I did.
Q. Do you have any changes or corrections to that testimony or those exhibits?
A. I do not.
Q. Please provide a short summary of your prefiled testimony.
A. Commissioners, I believe the weight of scientific evidence of over 100 peer-reviewed scientific papers published in the last 15 years indicates that the project as proposed by Crowned Ridge Wind meets the test for proper siting.

There are three main areas of concern that need to be addressed when dealing with proper siting of wind turbines: The audible noise level or the level of decibels, dBA, infrasound and low frequent sound, and shadow flicker.

As Dr. McCunney indicated just prior to my testimony, the most comprehensive study that's been conducted around the world was that by Health Canada. They're essentially the equivalent of the CDC here in the United States.

From 2012 to 2014 they surveyed over 1,200 people living as close as 820 feet from wind turbines and as far as 7 miles away. They investigated both subjective and objective measures of health, including annoyance and, for the first time, looked at things like sleep, cortisol, blood pressure, amongst others, and the audible sound level this those studies was up to 46 decibels.

For audible sound if the wind turbines are sited too close to people's homes, candidly, they can be too loud, and you can experience health impacts. We used to site turbines a lot closer in the United States and around the world to people's homes than we do today.

If you look at old county ordinances or even state statutes, used to be 1,000 feet and 55 decibels was a very common sound standard. Not to say that anybody was actually impacted by those. We do know that that is too close, and, in fact, I won't work on projects where the sound level is over 50 decibels at the exterior of people's homes.

That said, I think that Crowned Ridge has sited the

project adhering to the most stringent Grant County standard of 45 decibels at the exterior of homes or nonparticipants and 50, participants. I've provided you with many papers in my Supplemental Testimony that support that these levels are protective of health.

With respect to low frequency noise and infrasound, candidly, if I was before you seven or eight years ago, Mr. Lampeter's paper would have been the only one where we actually had measurements of low frequency noise and infrasound.

Over the past five years or so my research, as well as many others, have conducted research on low frequency noise and infrasound specifically to turbines, and what we've concluded is that if you set an appropriate audible sound level, the dBA, the 45 dBA, you set far enough back from turbines, that the level of infrasound, although you can detect it, is certainly well below a threshold that poses a health threat.

With respect to shadow flicker, as detailed in my testimony, shadow flicker is not a health impact. The turbines -- quite simply, epilepsy was initially a condition that they were concerned about, epileptics living around turbines. However, they quite simply don't spin fast enough. And the flicker rate is well below the threshold of a flicker rate that actually triggers

photosensitive epilepsy.

That said, shadow flicker can be a nuisance. So similar to us talking about noise before, when we used to set these turbines 1,000 feet from people's homes, you will see shadow flicker videos, for example, in areas where you've got quite a bit of shadow flicker in that home. And that's because we had turbines to the east of the house and to the west of the house a thousand feet and, you know, could be well over 100 hours of shadow flicker at that person's home.

So I believe the 30 hours of shadow flicker that's been in both county ordinances proposed by Crowned Ridge is consistent with other state statutes across the Midwest as well as other counties, and it really has a long history dating back to a German study and a German ordinance that they put in place. So I believe limiting shadow flicker to 30 hours is reasonable and will help protect the welfare and quality of life.

So turning now briefly to welfare and quality of life, as Dr. McCunney indicated -- similar to what Dr. McCunney indicated, that we are looking to protect against quality of life and, you know, protection of annoyance and the like.

So we know that the question is does that annoyance level lead to an impairment of quality of life or

welfare? There has been a number of studies, and, again, including the most comprehensive would be the Health Canada Study where they've got nine or 10 research papers published. One of them specifically focuses on quality of life and that what we see is for those living close to the turbines, up to 46 decibels and 820 feet or if you live 7 miles away, there's no difference in these blinded surveys that they were provided in the various factors of quality of life. And this is similar to other reports that have been done around the world.

What is driving that annoyance? As Dr. McCunney indicated, it's usually about 10 percent of the annoyance can be attributed to the sound itself and not to any one specific sound level. It's more in the literature. What I have published, Health Canada, other researchers is that it's driven by visual cue and attitude.

That's not to downplay those things. It's, you know, like any noise source or any change in someone's environment, there will be those who are not happy about that change in the environment. That's what tends to drive the annoyance.

And then, finally, turning to complaints. So does annoyance then result in increased complaints? You've heard from Mr. Hessler I know both in this hearing as well as past hearings that he's found about a 2 percent

complaint rate with those living in the 40 to 45 decibel range.

If we look at the Health Canada Study that did over again 1,200 people, those living as far as 7 miles away, those living as close as 820 feet, you actually get the same result as Mr. Hessler did, about 2.6 percent annoyance in that 40 to 45 range.

But that actually jumps up to approximately 4 or 5 percent in the 35 to 40 percent range. And we still see 2 percent complain even for those living 7 miles away at less than 25 decibels where they won't possibly hear the turbines. So this again comes back to the notion that it's more driven by visual cue and attitude.

So, finally, Crowned Ridge Wind meeting and exceeding the requirements of the county ordinance meet the test for a properly sited wind project. I do not believe there would be any added benefit to health, general welfare, quality of life to reduce the sound levels below 45 decibels for nonparticipants.

However, that being said, the Commission has heard -- I guess we're referring to them as the Hessler seven. That they are in agreement with Mr. Hessler, and when we can reduce sound levels, that's great. And they have removed seven turbines to switch them to alternates.

What this has resulted in for the five Intervenors

is the closest turbine will be just under the mile. It's about .96 or something of a mile from their home, and two of the Intervenors' homes are actually over two and a half miles away. This results in sound levels of 29 to 39 decibels and a range of zero to no more than seven hours of shadow flicker at any one of the Intervenor homes.

Thank you.

MR. MURPHY: Thank you. I offer this witness for cross-examination.

MS. CREMER: Thank you.

Intervenors.

MR. GANJE: Thank you.

CROSS-EXAMINATION

BY MR. GANJE:

Q. Dr. Ollson, good afternoon.

A. Good afternoon.

Q. Is this your first time testifying in South Dakota?

A. First time in South Dakota, yes.

Q. I'm going to refer you hopefully to documents that the Applicant's counsel has provided to you. I'll start with Intervenor I9-B.

A. Sorry. Is 9-B the witness statement?

Q. That's correct. There's two compatible documents.

A. Right.

Q. The witness statement is the longer of the two.
A. I have that in front of me, yes.
Q. Indeed, you have both?
A. I do have both, yes.
Q. Okay. And was this a witness statement that you provided in 2014 in the Cedar Point wind farm proceedings in Canada?
A. It was.
Q. Indeed.
You made some conclusions in the witness statement -- the written witness statement. Were those conclusions made in your written witness statement based on the available evidence and taken also from articles that you had coauthored I believe with one other author at this time?
A. Yes. At this time the conclusions reached within this article would have included all of the literature up into --
Q. 2014?
A. -- I believe about mid-2014. So about June of 2014, although it's dated October, is when the witness statement -- at that point I believe it includes reliance on at least three of the peer-reviewed publications that I have as well.
Q. I thought so. Thank you.

Was your conclusion in that testimony that setbacks should be based -- should be sound-based rather than distance-based?

A. Yes. That's correct. And still maintain that today.

Q. Yes, sir. Did you also conclude in that testimony that postconstruction monitoring should be commonplace to ensure modeled sound levels are within required noise limits?

A. Yes. And that's still my position today.

Q. Indeed.

Did you suggest in that testimony that community consultation and community support when sound emissions are in the 40 to 45 dBA range for nonparticipators should be undertaken?

A. Yeah. I mean, perhaps it would be useful to the Commission that it can read the actual bullet verbatim. It is on page 6 of 8 of that witness statement. And it is under paragraph 17, and I believe it is subparagraph D.

"If sound emissions from wind projects are in the 40 to 45 dBA range at nonparticipating receptors, we suggest community consultation and community support." And I stand by that today, and I believe that's what Crowned Ridge Wind has achieved.

Q. Okay. Did you participate in community consultation in this proceeding?
A. I did. In fact, I was at a number of consultations. There was a public open house meeting that was -- I don't have the exact date, but it was held in Watertown on at least one occasion where the public was invited to come and speak on the project.
My involvement in this project actually began back in late 2016. At that point it wasn't Crowned Ridge I and II. It was Crowned Ridge. And so starting in Deuel County. And then I spent a significant amount of time in Deuel County, Codington County, and Grant County, appearing in front of the county commissions and the county planning and zoning.
Q. I believe in that testimony you said that the limit of 40 dBA or less for nonparticipators was the same guideline as WHO, that is the World Health Organization, had recommended in a 2009 study, isn't it?
A. Yes. In fact, there's a bit of nuance to that, but, yes, it is consistent.
Q. And you cited that, I believe, in the testimony, in the Canadian testimony?
A. I did.
Q. You did.
And in that -- I'm going to -- prior to that

Canadian testimony that you were talking about here in the Cedar Point proceeding, you stated that in another matter 40 dBA and a minimum separation of 550 meters were reasonable and sufficient to protect against human health effects.

And that's found, isn't it, in the Cedar Point testimony?

A. Yes. To clarify, the reason why it says less than 40 decibels and 550 meters is that is the statute and the limitation in Ontario. So it's being asked to opine specifically on whether or not 550 meters, which is give or take just over 1,600 feet, and 40 decibels would be a sufficient setback.

And it wasn't stated that anything above that would be incorrect. It was just whether or not that was a reasonable standard in Ontario.

Q. Well, you said generally that it was reasonable and sufficient to protect against human effects, didn't you?

A. Indeed, I did.

Q. Okay.

A. Again, commenting specifically on their limit at the time.

Q. In your 2014 Cedar Point testimony, did you identify certain best practices for wind turbine development?

A. Yes. In fact, again, that comes from that page 6 of

8, bullet 17, and that is from a 2014 paper. Those are immediately -- I'm sorry. They are reproduced out of a paper that I and my colleagues had written in 2014.

Q. Okay. So you had published not only -- but in this testimony we're talking about here, this Canadian testimony, but you also published an article in which you've identified certain best practices for wind turbine development; is that correct?

A. Yes. That I believe to be correct at the time in 2014.

Q. Okay. In your written testimony or statement did you state that "these best practices include a preference for sound emissions of 40 dBA or less for nonparticipating receptors"?

A. I did. And that was in the absence of any community consultation or community support. So what that bullet says is that if you're going to go build a project -- there are jurisdictions, for example, where there are unzoned counties or there's states that don't have requirements, that if you were going to go into a state like that -- Texas is a good example -- without any consultation, that it might be a good idea at that point if you wanted to limit your project to 40 decibels.

If you wanted to go beyond 40, in this case 40 to 45, then it suggests in that best practices that one

should conduct consultation and have community support. And I believe the consultation certainly has been done, including with the tribes.

In addition to that, the community support piece of that, I would suggest, is the fact that you have two county commissions that have gone through significant changes to their ordinances, in addition to that that both counties have approved the project with their updated ordinances, and further to that, that we have, you know, a hearing here before you today.

So you're looking at does the community have support? I would suggest to you that if you look at the Intervenors in this case, that for those that live within a mile and a half of the project, there are only two, and within that, you know, that represents about 2 percent of the community. So I believe that this does that condition that I said, with community consultation and support is met.

Q. In your best practices recommendation given in that proceeding, did you state that setbacks permitting levels of greater than 45 dBA wind turbine noise only, not including ambient noise, for nonparticipating receptors is not supported because of possible direct effects from audibility and from levels of annoyance above background?

A. I did. Again, and that was specifically for nonparticipants.
Q. Uh-huh. I would refer you, sir, to another exhibit.
A. Yes.
Q. Sorry about that. I will refer you to I10. I don't think I mentioned it to you.
A. That's the slide presentation.
Q. That's correct.
A. Yes. I have it in front of me.
Q. Okay. And is this a slide presentation that you did in 2014 with the firm identified as Intrinsic?
A. Yes. At the time that I gave this presentation I was working as a vice president and senior environmental health scientist at a small health scientist firm called Intrinsic, which is out of Toronto, Canada.
Q. You were the co-presenter at that presentation?
A. I don't have the exact date on this presentation, but, I mean, certainly I gave this presentation and some form of it. I couldn't tell you exactly which conference it was at. But certainly it would have been around 2014 that I gave this talk, yes.
Q. Thank you.
In the presentation did you state that the environmental noise above certain levels is a recognized factor in human health issues?

A. Certainly I did, or we wouldn't have limits. And that's why I said today that above 50 decibels I wouldn't support that for a wind project.
Q. Do recognized human health issues that you discussed in the seminar include the issue of hearing, sleep disturbance, and myocardial infarction as well as annoyance?
A. Certainly these are a -- it says, "Environmental noise above certain levels is a recognized factor in a number of human health issues," and, yes, the list that you had read. And certainly it can be.
Q. In the presentation did you state that "Noise from wind turbines can be annoying to some and associated with sleep disturbances especially at levels greater than 40 dBA"?
A. Yes. And, again, if we were to go back and then above 40 so now it's looking at what is that number above 40, and when we look at the -- and, as in my Supplemental Testimony, the most comprehensive study about what constitutes sleep disturbance specifically for wind turbines is Dr. Michaud.
You'll hear me refer to him as the Michaud papers. He's the senior author from Health Canada. And in the 2016 article about sleep I've included in the Supplemental Testimony, Dr. Michaud vetted out

approximately half of the research people around those turbines.

So over 700 people were wearing what's called an active meter. It looks like a Fitbit. It's a fancy Fitbit. And they put them on for sleep. And they're able to monitor sleep data through that. And what you see from the Mishaud and Health Canada work is even up to 46 decibels whether you live close by the turbines 46 decibels or you live 7 miles away and you can't possibly ever hear them, that the sleep was no different for those living close or nearby. So that's why I believe 45 decibels, up to that, at least, for nonparticipants is a reasonable number to ensure protection for sleep.

Q. In that presentation didn't you report that a 40 dBA limit was based on the World Health Organization noise guideline?

A. Yes. And, again, you have to be -- I mean, yes. And there's a lot of nuances to that World Health Organization noise guideline.

The first is that the night noise guideline for Europe was a 2009 document.

Q. But the only reference in that --

MR. MURPHY: Objection.

CHAIRMAN HANSON: Hold on.

MR. MURPHY: Objection. Objection. Three

times. I would like the witness to be able to finish his statement.

MS. CREMER: I am going to sustain his objection. You did ask him kind of an open-ended question, and I would allow him to answer.

A. So, Commissioners, the 2009 night noise guidance from Europe is an excellent document. Doesn't have anything to do with wind turbines, but at that point it wasn't a concern yet.

But the 40 decibels that's listed there as the target level for nighttime noise to protect sleep is on a metric called L night. So it is the average sound level at the exterior of somebody's home over the course of all 365 days, and then you average that out.

What you're looking at and what your rules say and what the county commissions have adopted, this 45 decibels is not an L night. It is a one-hour or a 10-minute that you can't exceed 45 decibels during the monitoring.

So if Mr. Lampeter was to go out and measure -- and the way I understand the postconstruction monitoring that's done here, it's not an average over the course of a year.

There are jurisdictions, such as New York and some others, where actually they look at an average over the

year. What we see for all the modeling that's done for how you get an annual average versus the modeling you've seen from Mr. Haley and discussed by Mr. Lampeter, there's about a 5 decibel difference there.

So the World Health Organization L night 40 is the equivalent of what this Commission has seen in the past, what the counties have as a 45 decibel Leq. So you can imagine there's lots of nights the wind turbines aren't spinning. There are times where they're not spinning as loud because you're not producing low power.

So when you average out over the course of the year nighttime exposure, the 45 decibel Leq that you're looking at is the equivalent of the WHO 40 L night average over the year.

Q. But in your testimony -- strike that.

In this presentation that you did as a co-leader you referenced the 40 dBA, and you didn't put any of these conditions on it that you're now discussing, did you?

A. What I was referencing in the 20-minute presentation given at a conference, no, I did not go into the overly great specifics that I'm doing here with the Commission because it's an overview presentation to a scientific audience.

So certainly it's a well held view. It is scientifically factually correct. And it's in many of

the writings that I've done since this presentation prior to this presentation.

Q. Okay. You're talking about the 40 dBA recommended level.

A. Yes. I mean, and I believe that you provided me with the WHO document. I'm happy to take you to the footnote in the table that explains exactly what the L night metric is.

Q. No. My question was whether we were all referring to the 40 dBA label on it. And I think you answered that so thank you.

My next question is did your presentation in this 2014 seminar also state that health effects occur regardless of regulated setbacks?

A. No. I don't believe I said that. Could you take me to the slide?

Q. Well, we can. I think we can.

I don't think your slide is numbered, but it would be page 7.

A. Sorry. What's the title on the top of the slide, if you would.

Q. Yes. I'll get it. The slides weren't numbered.

A. No, they weren't.

Q. Okay. Your title on that particular slide in your presentation was Human Health - The Debate.

A. Yes.
Q. And in that doesn't this program state that human health effects related to wind turbine operation -- and then it goes down to an asterisk or footnote that says, "often regardless of regulated setbacks," and then you list some of the issues.
A. So, again, maybe to put this into context, this is a slide where I put the slide up. Says, Human Health - The Debate.

And I go on to say, these are the issues -- just like I said here today to the Commissioners, these are the issues that are often in debate: The audible noise, low frequency, shadow flicker, visual cue, attitude, and the like. The asterisk saying often regardless of regulated setbacks.

It doesn't mean these effects occur. Just like I was describing with the complaints, whether you're close by or farther away, you may have subjective views that, you know, I don't like the noise, I don't like the wind turbines. And when I say regardless of regulated setbacks is that whether you have somebody who's very close in or the person's very far away, I have no way of telling which one's going to complain because there's no difference.
Q. Okay. Then I'm going to ask you to look at what I

think would be page 20 of your program. And it's called Intrinsic Health-Based Siting Recommendations. It's on page 20 but, again, the presentation isn't numbered. But that's the caption at the top of that page.

A. Yes. These are the same recommendations that I say came from the 2014 paper that are similar or the same recommendations that we just went through in the testimony that I gave at the senior point project.

Q. In this presentation did you state that -- did you recommend that preference should be given to sound emissions of 40 dBA or less outside, not including ambient, for a nonparticipating individuals?

A. Yes. And, again, as I have previously described, that is without consultation. So if there's no consultation or regulatory requirements, that you should start thinking about 40. And that is the fourth bullet down from there is the same bullet I've read a number of times that says between 40 and 45 dBA that that is more than sufficient once you have community support and consultation.

Q. But you called the 40 dBA recommendation a preference; correct?

A. Again, in the absence of any consultation or community support. So if you're in a jurisdiction where there's no requirement, there's no statutory limits,

there's no need to consult with the community --

That first bullet is essentially now no longer really relevant because the vast majority of jurisdictions that you're in, that consultation is going to occur. You are going to be working with the communities. And most counties now if they do not have zoning ordinances if a wind developer comes into the community, it's my experience that they will develop ordinances and so consultation will need to be done.

Q. Okay. So you've testified that yes, indeed, you did use the word "preference" for 40 dBA in this presentation. You've testified that you've also indicated that in apparently some writings that it be your preference.

Have you retracted that and changed that number in any subsequent writings?

A. No. Counselor, again, you're missing the point of it says -- there's no words around consultation or anything else. That fourth bullet is what we're discussing today, that it's entirely appropriate for a 40 to 45 decibel limit for a project if you have community engagement and community support.

So I'm not retracting number 2. And still, if you were to find a jurisdiction that's going to let you just come in and build a wind farm, you probably should start

at that 40 decibels because you may have pushback later. But when you do two to three years of consultation and garner community support it's certainly acceptable to be up to 45 decibels.

In addition to that, this was all done and written before the Health Canada Study, the two and a half million dollar study --

(Discussion off the record.)

A. This was all done prior to the Health Canada Study being published and the numerous other articles since then that I believe firmly support a 45 decibel limit for a nonparticipating receptor is acceptable.

Q. But have you changed, in any of your writings, your opinion from the statement that preference should be given to sound emissions of 40 or less dBA?

A. I have not. And, again, if you were in a community that you're going to do no consultation and you're not going to try to get community support, then I would still advise that 40 might be the right number to go to. But that's not the case here.

Q. You were good enough to provide some of your writings. I believe that you attached them to your resume in this proceeding; correct?

A. Certainly the peer-reviewed publications are all on my resume. I'm not certain if all of them are attached.

Q. Okay. I'm going to ask you to look at Applicant's Exhibit A24-2.
A. Okay. One second, please.
Q. Sure.
A. I believe that's the one entitled Health Effects In Wind Turbines, a review of the literature coauthored by Dr. Knopper and myself co-authored in 2011, yes.
Q. And in that 2011 article, which is A24-2, on page 2 did you refer to the 40 dBA noise guideline as a "health based value limit"?
A. If you could take me --
Q. Sure. I apologize. Can I help you get there?
A. That would be great.
Q. Okay. Let's go with the left-hand column.
A. Yes.
Q. And the last full paragraph.
A. The one that starts "as a result"?
Q. That's right. And then towards the bottom you discuss the 40 dBA recommendation. Just to help make you move forward to what I want to ask is --
A. Sure.
Q. -- you quoted the World Health Organization recommendation, but then in your own words in the article you referred to it as a health-based limit value; is that correct?

A. Certainly. Yes. Again, it refers specifically commenting on the Ontario limit of 40 decibels, and it comments that, yes, at 40 decibels that is a health-based limit. It doesn't restrict it to other limits. It's simply commenting specifically on that limit.

Q. Okay. Thank you.

I refer you now, please, to page 4 of your article. We will look at page 4 of that exhibit, and we'll start with the first full paragraph.

A. Starting with "in 2011"?

Q. That's right.

In that paragraph I believe you're discussing prior studies that had been done on issues of sleep interruption and sleep disturbance; is that correct?

A. Yes. This is the early work by Eja Pedersen, Dr. Pedersen, out of Sweden and some of the work that she had done prior to 2011.

Q. Does her study conclude that sleep disturbance spikes at 40 and 45 dBA? It's the last couple --

A. Yes.

Q. Okay.

A. What Dr. Pedersen found in her early work -- and this was, again, all on the subjective questions that she had been asking people, blinded. It was excellent research that had been conducted in Europe at the time.

They actually had sound levels -- and well over 50, up to 54 decibels at these projects. And what we noticed actually in her work not only in 40 decibels, 45, she started seeing self-reported discussions around sleep with some of the individuals. Yes.

Q. Anywhere in that article, sir, do you disagree in your conclusions?

A. No. No. In this 2011 article, in fact, we cautioned that, you know, more work needed to be done. Because this is -- we're talking about eight years ago. And Eja Pedersen had done some excellent preliminary research. She hadn't done objective measures of sleep.

There's now -- since that time in addition to the Health Canada Study, Commissioners, there's a number of other sleep studies that have been done, actual sleep studies. Jalai was another one that I put in for you in your binder.

And, again, what we see is when we actually further the research and we're now at a point where we've done those studies of getting people sleep meters and we're actually studying people's actual sleep around wind turbines, that what we're seeing is that this isn't actually the case.

And when I say "spike" there it wasn't saying that it was above a level that would have been a concern. It

was something that we needed to investigate further.
Q. Okay. I refer you, please, to page 9 of your article.
A. I'm there.
Q. Okay. Thank you. To get it a little more focused, the first full paragraph of the right-hand column.
A. Starting with "assessing"?
Q. This was a part of the conclusion portion of the article; is that correct?
A. That's correct.
Q. Okay. In your conclusions do you conclude that research into the effects of wind turbines could involve a baseline health study, a baseline noise and infrasound monitoring, and noise modeling, and then postconstruction follow-up to these things?
A. Yes. And, in fact, I take great pride in the fact that this paper was published in 2011 and since that time those studies have actually been completed and we have a lot more detailed information on that, including studies that we did on infrasound both in a post and preconstruction manner.
Q. In this proceeding did you recommend that there be a baseline health survey and a baseline infrasound and noise study?
A. So, again, that's not referring to every individual

project. What that's referring to is that in the field and in the science of where we were in 2011 that ideally we would have had some of these baseline studies that aren't very common at the time in 2011 and that that would help -- on a couple of projects that would then help inform us for Commission decisions like this Commission faces today.

So it does not say for every individual project. I mean, it would be not feasible to do a baseline health study. Like if you look at the Health Canada Study, if you look at studies done in Japan, if you look at the Australian studies, if you look at some of the studies done here in the U.S., since 2011 --

In 2011 this research article refers to 15 other articles that were available at the time. Since that time and, as I indicated to the Commission, today there are over 100 such studies. So that research gap, I believe, has been filled.

Q. But my question really has to do with your recommendations and comments on this proceeding. On this project we're here on today.

In this proceeding did you recommend a baseline noise study?

A. Sorry. For Crowned Ridge I?

Q. Yes. This one.

A. No, I did not. Because I don't believe it's warranted.
Q. Sir, I would kindly now refer you to Applicant's Exhibit A24-10.
A. The paper that I authored entitled Wind Turbines and Health?
Q. Yes.
A. June 2014?
Q. Exactly. So this was several years later; correct?
A. Yes. This is the article that we were discussing that those conclusions that came out of the five bullets that we've been reading through is this paper, yes.
Q. I refer you, please, to page 17 of the article and the last paragraph in the left-hand column.
A. Sorry. The one that starts "stress/annoyance"?
Q. Let's see. Page 17.
A. I'm on page 17. Sorry. Which paragraph?
Q. Yes. Okay. Well, we'll start at the very bottom paragraph on the left-hand column.
A. "Based on the available"?
Q. Right. Right. I believe that statement indicates that you're making some best practices recommendation for wind turbine developments; is that correct?
A. Yes. In 2014. And then it goes on and listed the same ones we've been discussing.

Q. Okay. Okay. The right-hand column lists your recommendations; is that correct?
A. It does. And they are the same six that we have been discussing.
Q. Uh-huh. And did you again state in this 2014 article that your preference should be given to sound emissions of 40 dBA or less for nonparticipating receptors?
A. Yes. Again, this is the same bullet and the same context with all the other bullets, but it also in bullet then 4 goes on to describe when it would be appropriate to have a 40 to 45 decibel range.
Q. The only recommendation I see which has the word preference is the one where you recommend 40 dBA or less for nonparticipating receptors; is that correct?
A. Again, where it says, "In the absence of guidelines and/or community consultation and the like." And you have to read all six of these bullets together to put it into context.

So there is a preference. In bullet 4 if the sound emissions from wind projects is in the 40 to 45 dBA range for nonparticipating receptors, we suggest community consultation and community support.

That is my preference. When there is a project that is going to be in the 40 to 45 range my preference is

then it's certainly allowable. It was backed up by all of the research since that time from a health and annoyance and complaint standpoint. And that's where it says in that fourth bullet that you need community consultation and support.

Q. But the only place I see where you use the word "preference" is where you're discussing 40 dBA or less for nonparticipating. I'm asking if it's elsewhere on this list of recommendations.

MR. MURPHY: Objection. This line of questioning, we've been over it five or six times. I think the witness has been clear on his position. I would ask that the Hearing Examiner direct the attorney to go to a new line of questioning.

MS. CREMER: So is your objection asked and answered?

MR. MURPHY: I'm sorry. Yes.

MS. CREMER: Thank you.

Do you have a response?

MR. GANJE: No, I don't.

MS. CREMER: I would sustain.

Q. In your best practices recommendation No. 4 -- no. I'll strike that.

In your best practices recommendation No. 5 did you recommend that setbacks that would permit sound levels of

greater than 45 dBA wind turbine noise only, not including ambient noise, for nonparticipating receptors was not supported due to a possible direct effect from audibility and possible levels of annoyance above background?

A. Yes. That's what it says.

MR. GANJE: No further questions.

MS. CREMER: So we've gone a long time here. Do you have a lot of questions?

MR. MIKAL HANSON: No.

MS. CREMER: And, Commissioners, do you have any questions?

COMMISSIONER FIEGEN: I do not. I have no questions.

MS. CREMER: Oh. Do you anticipate much redirect?

(Discussion off the record.)

MS. CREMER: Staff.

MR. MIKAL HANSON: Thank you.

CROSS-EXAMINATION

BY MR. MIKAL HANSON:

Q. I saw on I believe it's your Direct Testimony that there's no shadow flicker in open space. Do you recall saying something along those lines?

A. Yeah. Yes.

Q. Now just my common sense tells me I'm standing in an open space under a wind turbine, and the blade is going between me and the sun, isn't there going to be a flicker?

I mean, isn't there going to be an interruption of the sun onto me?

A. Right. So that's different, counselor, than shadow flicker. So I'm not saying that you don't have shadows cast or there isn't an interruption between the blade and the sun.

When we specifically refer to shadow flicker it is that flickering effect inside the house. So that is the term that we use within the industry so you actually get a flickering effect in the house.

If you're outside, you don't actually -- the shadow from the turbine itself doesn't create a flicker. It's just a moving shadow you'd see if you were at a farm standing in a field. Certainly if you're looking at the turbine, you will get that interruption of the sun if the sun is directly behind it for sure.

Q. And to me that's a flicker. But a term of art --

A. Absolutely.

Q. -- in the business it has to be through a window, and it has to be through some type of opening in a structure?

A. That's right. Because that's where the annoyance, if you will, of having that in your house actually can be magnified as posed to it just being outside. We don't usually have people commenting when it's outside just because you've got everything else around you.

MR. MIKAL HANSON: That's my question. Thank you.

MS. CREMER: Okay. That would take us to Commission questions. And, Commissioner Fiegen, you said you had none.

So then Chairman Hanson.

CHAIRMAN HANSON: Thank you.

Good afternoon.

THE WITNESS: Good afternoon, Chairman.

CHAIRMAN HANSON: I actually had a lot of questions of you, and I -- I hate to broach anything about 40 because you've answered so many.

What were you an adjunct professor in?

THE WITNESS: So I hold an adjunct professorship in environmental health in the environmental sciences department at the University of Toronto. I supervise doctoral students, and I also teach a graduate level course every year in environmental health.

CHAIRMAN HANSON: You also have a Ph.D. in philosophy?

THE WITNESS: Sir, that is the -- that is the -- the doctorate of philosophy is the designation for sciences Ph.D.s as well.

CHAIRMAN HANSON: Okay. On your testimony you state that the critical effect from a health perspective -- from a health perspective in setting any nighttime sound source standard is to ensure that it is protective of sleep. So sleep is extremely important.

You also state in a book, and you state the book, it was reported that it is estimated that 50 to 70 million Americans suffer from chronic disorder of sleep and wakefulness hindering daily functioning and adversely affecting health.

So it's obviously a challenge in -- you say Americans. I'm assuming it's the United States that you're referring to. Obviously not all those people are affected by wind turbines by any means.

But then you mention sleep. You go on and on and discuss sleep disturbance as being extremely important. And then on page 7 you refer to -- well, your last sentence in a quote that you put down that "no statistically significant affect on any measure of sleep quality" is a conclusion from the WTN levels up to 46 dBA.

Again, the clarification of statistically

significant. So WTN levels up to 46 dBA do have an effect, and we've gone over that, at least others have, with you. But are we to ignore those persons who are not statistically significant?

THE WITNESS: No, Commissioner. It might be helpful -- under my testimony A24 and I believe it's Tab 3, that is the Health Canada Study. That is the Michaud Study. It's one of three or four that I've provided to you.

CHAIRMAN HANSON: Forgive me for interrupting. Yes, I did read that.

THE WITNESS: So perfect.

If we were to turn I believe it's around five or six pages in but it's numbered at pages 102 in that document, and it's Table 1.

And what I mean by no statistically significant difference is that, again, if you have 1,200 people -- or 1,238 I believe was the number of people and of that subset, 734 give or take were actually fitted with these sleep meters. So they actually asked them their perceptions on sleep and also studied their actual sleep patterns.

And you'll see that you've got the self-reported here at the top of that table where it says "Self-Reported Sleep Disturbance." And if you kind of

went across the top, those are the noise levels in the various columns from, you know, less than 25 decibels right up to the 40 to 46 decibels.

And when you kind of go across that row -- and, you know, maybe probably the best one, "self-reported sleep disturbance" so those are the people that said, yeah, I'm disturbed at night in my sleep, if you went to the Highly, about three lines down, the Highly, the numbers that are outside of the brackets are the total number of people, and then the numbers in the brackets are the percentage.

And if you looked at the Less Than 25, so the people living very far away, you had 15.7 percent reporting sleep disturbance. And if you come to the -- right across to the right from the 40 to the 46, you've go only 10.3 percent reporting disturbance.

So, again, it's not that people don't report disturbance, but it's no different than -- in fact, in this case it's lower, but it's not statistically significant. So sleep issues are a common issue for a whole host of reasons.

And the reason I say it's very important -- and down to the individual level to make sure we are -- from the noise itself, right, that we're not causing sleep disturbances. This also captures the annoyance, all the

other issues that came into people's subjective feelings, is that we want to make sure that we are setting a noise level that we are preventing or ensuring a good night's sleep for everybody.

Because you can imagine 20 to 30 years of hosting turbines where that's not going to occur would be very problematic. So it's why we have -- you know, we set these noise levels.

Can I say for certainty that not one single individual may have been affected? I can't say that. But we have -- it's like any source of noise, whether it's airport noise, whether it's roadway noise, or any environmental issue, we can't say for 100 percent certainty nobody, but what we're saying is as a population we do not expect that people will experience that issue.

And I recognize as Commissioners it's a challenge; right? I can't sit here and, as Dr. McCunney couldn't either, say absolutely not one individual would ever be woken up from a turbine.

But then if I was to take you to a couple of tabs over and it was the Bakker paper from 2012 and you'll see the Pedersen name as well -- this is Eja Pedersen's research group -- it was one of the tables that I put into the Direct Testimony. And it's a couple

of pages in on page 47, Table 7. This is the one by, you know, how are people disturbed who are living around turbines in their sleep? And these are the rural people in the Netherlands so, you know, similar to South Dakotans. These are people who live on farms or small acreages in rural Netherlands.

You had -- out of the people who reported being woken up in their sleep, not just to get up to go to the wash room. In fact, they excluded is that. So you had 11.7 percent of people said that they were woken up by people or animal sounds, 12 and a half or 12.5 percent of people by traffic and mechanical sounds, and 6 percent by wind turbine sounds.

So, again, we're well within a background or less than other sources of rural sound that are waking people up. So that's why -- and this study's up to 54 decibels. So these are, you know, turbines that were a lot louder at the time.

So we are trying to find that reasonable balance, I mean, in making sure that we are protecting people to get a good night's sleep because of all the cascading effects that can happen after that if they don't.

CHAIRMAN HANSON: You led us on a very long journey around the world.

THE WITNESS: I was actually supposed to be in Lisbon with Mr. Hessler this week, but instead I chose to come hang out with you folks.

CHAIRMAN HANSON: And I suspect I should be concerned about the animals in the Netherlands waking up the farmers, but my question was should we not be concerned with the people who are statistically unimportant?

THE WITNESS: No, Commissioner. That's not what it means by statistically significant.

We mean that by all of those people who are living near the turbines compared to all those people that were living far away from the turbines, there's no difference in any of them. So we are accounting for all of the individuals.

So we're not saying that there's a few that drop off outside of that.

CHAIRMAN HANSON: You're saying that the number of people who are affected are not statistically important.

THE WITNESS: No, Commissioner. What I'm saying is that people aren't affected. What I'm saying is that the research we've been going through says if you had people living right close to the turbines and you have the people living further away, there's actually more

people living further away that are actually woken -- that have sleep challenges versus those that are living --

Those close versus those far away, we have differences in sleep patterns and challenges, but it's not the turbines that are causing that up to the 46 decibels in any of the individuals that live close by.

CHAIRMAN HANSON: Gosh. That just -- it seems like you're controverting your testimony when you say that. I'm frustrated by that when you say that --

THE WITNESS: Commissioner Hanson, perhaps I could add that, as I indicated earlier, I'm not saying that nobody's ever had sleep disturbance living near turbines. In fact, those older projects, the older models when we're up to 55 decibels and 1,000 feet away, there clearly were sleep disturbances in some of those individuals, and that's why we've lowered the sound standards over the years.

So I'm not saying there's never been that case. And that's why I believe that if we take it down to the 45 decibels for nonparticipants, we're setting a number that will be protective of people's sleep.

CHAIRMAN HANSON: I'm skipping a number of the questions I was going to ask you in reference to that because I don't think we're going to get anywhere.

Mr. Hanson asked you a question pertaining to the flicker effect, which I was going to ask you as well, and you explained that it was a term of art for the industry apparently.

You also stated that in that -- a following sentence to that, "Instead, it can be observed as an intermittent shadow on the ground that does not cause annoyance."

I think I'll just look at that as being asked and answered.

I shouldn't get annoyed. Thank you for your testimony.

THE WITNESS: Thank you.

MS. CREMER: Commissioner Nelson.

COMMISSIONER NELSON: No questions.

MS. CREMER: Any redirect?

MR. MURPHY: No redirect.

MS. CREMER: Any follow-up based on Commissioner questions?

MR. GANJE: None.

MS. CREMER: Staff, did you have questions?

MR. MIKAL HANSON: None.

MS. CREMER: Thank you for your testimony. You may step down.

THE WITNESS: Thank you very much,

Commissioners, for your time.

(The witness is excused.)

MS. CREMER: 2 o'clock we will reconvene.

(A lunch recess is taken.)

MS. CREMER: Call the hearing back into order. And, Crowned Ridge, you are up.

MR. MURPHY: Thank you. That was our last witness. Our direct case is over.

MS. CREMER: Thank you.

That would take us to the Intervenors. And, as I understand it, you do not have any witnesses to call; is that correct?

MR. GANJE: Correct.

MS. CREMER: So you had reserved your opening statement before. My understanding of an opening statement is the evidence will show.

As you have no witnesses, there's no evidence to show so you'll not do an opening statement; is that correct?

MR. GANJE: I don't think it necessary.

MS. CREMER: All right. Thank you.

Staff.

MR. MIKAL HANSON: Thank you.

We kind of got somewhat surprised that we're at this point. We have a witness, Tom Kirschenmann, who's

with Game, Fish & Parks. I believe he's on the telephone at this point in time. And, Mr. Kirschenmann, are you available by phone right now?

MS. CREMER: So we need to go through a few things such as are you asking to allow him to testify by phone, and then we'll need comments from the parties if they're okay with that and then explain the situation with exhibits or lack of internet.

MR. MIKAL HANSON: All right. He's out in the southern Black Hills, which does not -- he explained to us he does not have internet service. So questions about specific exhibits would be very kind of tough for him other than his memory of that.

And we would ask permission to present his testimony by phone since he's at a meeting, a Game, Fish & Parks meeting, at this time.

MS. CREMER: And --

MR. MIKAL HANSON: The other option is he can be here in person but tomorrow at 10:00 is what we had talked about him being able to make. So, everybody, it looks like we might get done today, and we'd have to come back tomorrow if we're going to have him in person.

MS. CREMER: Okay. So, Crowned Ridge, do you have comments?

MR. SCHUMACHER: Thank you. Applicant has no

objection.

MS. CREMER: And, Mr. Kirschenmann, can you mute your phone, please.

MR. KIRSCHENMANN: Yes, I can.

MS. CREMER: Thank you.

And, Intervenors, do you have comment?

MR. GANJE: No objection.

MS. CREMER: Commissioners.

COMMISSIONER FIEGEN: No objection.

CHAIRMAN HANSON: She speaks for me.

COMMISSIONER NELSON: I much prefer to have our witnesses in person but I am not going to hold up the show over my preferences and so I will not object.

MS. CREMER: Okay. With that then, I will grant the motion to hear it telephonically, unless -- it doesn't appear anyone's going to overrule that.

So, Mr. Kirschenmann, you can unmute your phone now, and Chairman Hanson will swear you in. And I think that takes care of everything; is that correct?

Thank you.

CHAIRMAN HANSON: Mr. Kirschenmann, will you raise your right hand, please, and state your name.

MR. KIRSCHENMANN: Tom Kirschenmann.

(The oath is administered by Chairman Hanson.)

MS. CREMER: Staff, you may proceed.

DIRECT EXAMINATION

BY MR. MIKAL HANSON:

Q. Thank you. This is Staff Attorney Mikal Hanson. For the Commission and the public record, could you state your name and your occupation.

A. My name is Tom Kirschenmann, and I serve as the Wildlife Division Deputy Director and Chief of Wildlife for South Dakota Game, Fish & Parks.

Q. And how long have you been so employed?

A. I've been with the State of South Dakota Game, Fish & Parks since 2008 and have served in a couple of capacities before this position, have been in this position for approximately nine years as the chief of wildlife.

Q. And briefly can you outline your duties and responsibilities?

A. Certainly. As chief of wildlife, I'm chief of the terrestrial section, oversee terrestrial-based management activities for the Department, for all kinds of wildlife, both game and nongame, associated habitat. Also includes Staff that focus on threatened endangered species, research and management of both private and public lands across the State of South Dakota.

Q. Briefly, can you give us your educational background.

A. Sure. I attended South Dakota State University where I obtained both a bachelor's and master's degree in wildlife management.
Q. Now as part of your duties and responsibilities do you review wind farm applications to determine -- or review their effects on wildlife and the environment?
A. Yes. That's part of what falls into the section that I oversee. We have on staff an environmental review senior wildlife biologist that does a lot of that work, and then I also review relevant and pertinent information to applications and do consultation with that position and other staff when reviewing projects such as this.
Q. So if I had asked that question better, it would be you and your staff review these things; is that correct?
A. That is correct.
Q. Are you familiar with Direct Testimony prefiled in this case by you done on May 10, 2019?
A. Yes.
Q. And it is Staff Exhibit S3. Have you reviewed that prior to this hearing?
A. Yes.
Q. And outside of my modifications we make in your live Direct Testimony today, you adopt it then, and there doesn't need to be any changes or modifications?
A. No.

Q. And at the end of that there is a -- kind of a resume or curriculum vitae. Are you familiar with that?
A. Yes.
Q. And does it fairly and accurately set out your work experience and more of your education?
A. Yes.
MR. MIKAL HANSON: And it's my understanding, Hearing Examiner, that that's been accepted as already offered and accepted, his Direct Testimony.
MS. CREMER: And that's my understanding when I checked.
MR. MIKAL HANSON: Thank you.
Q. This Crowned Ridge Project, has the Game, Fish & Parks Department been involved in this project for a significant period of time?
A. There has been consultation and conversations with our agency, Game, Fish & Parks, with a couple of different staff over the years and goes back at least over -- at least over nine, 10 years of a span with some initial discussions early on and then in recent time as well.
So, yes, there have been dialogue and discussions for some time over the course for this project.
Q. And I assume if we go back that long that it wasn't Crowned Ridge as the name but under different names. Is

that a fair statement?
A. That would be my understanding. Correct.
Q. Now in reviewing their Application did you -- did you specifically look at things that they were doing in regard to wildlife habitat and vegetation?
A. When we review an application for a project such as this we'll look at potential impacts to different types of habitat, potential impacts to wildlife species themselves. We'll look at and consider, for example, the overall project area where it's located, the layout of the project where the turbines are proposed to be constructed in terms of proximity to other types of habitat out there.
Q. And if we kind of limit myself at the beginning to habitat, does it appear that Crowned Ridge has attempted to minimize their impact to the habitat in this area?
A. Yes. From our review of it, I would say that is a fair statement, in particular, of one of the key things that we look at from a habitat standpoint would be placement of turbines, and with a substantial number of turbines placed in agricultural production fields versus grasslands areas, we would say that that would be a fair statement, that there have been efforts to minimize impacts to habitat.
Q. And even more, is wetlands and public lands

significant concerns for you?
A. Again, those are all habitat types and sites that we will look at based on the project description within the Application. A common recommendation that we offer to developers in consideration of project area and placement of facilities and infrastructure is to avoid, for example, from a wetlands perspective, areas of high concentrations number of wetlands. From the Application there are no turbines being placed in actual wetland basins themselves.

But also knowing the location in South Dakota. We have a project area that -- part of the Prairie Pothole Region and the Coteau area. There's always going to be regions with high numbers of wetlands. Impossible to avoid building and putting in infrastructure in areas of wetlands, but in general we don't have any major concerns of this particular project.
Q. And it appears they've attempted to minimize that. Would that be fair?
A. That would be fair.
Q. And there's a thing, what we call fragmentation of important vegetation areas. Is that a -- am I saying that right?
A. Yeah. Again, that is another common recommendation that we provide in projects such as this to avoid or

minimize to the greatest extent possible of additional fragmentation of habitat out there. Fragmentation can occur in different forms and shapes.

One of the things that we always look at in a project like this if there are some larger contiguous tracts of grassland areas, to minimize as best as possible to further fragmenting that, as many grassland birds, in particular, are dependent on contiguous grassland areas.

And in general looking at the overall Application and the information available, there were several efforts to avoid fragmentation.

Q. And they did that, as you look at the --

A. Yes.

Q. The footprint of the project?

A. Yes.

Q. Now you've said this habitat a couple of times. It's the chateau [sic]? Am I saying that -- the glacier chateau, meaning kind of a ridge line of where the glacier left rocks and debris?

A. Yeah. It's part of the Coteau, the Prairie Coteau, area of South Dakota.

Q. Okay. And does that have some special importance to wildlife?

A. The Coteau itself, which is also part of the Prairie

Pothole Region of the United States is a unique area and significant area in particular from migratory bird species and, in particular, migratory waterfowl, as the Coteau and the prairie again from that glaciated landscape and the wetland basins and particularly the grasslands associated with them are very productive areas for waterfowl and other wetland and grassland-related bird species in particular.

Q. And if we turn to grouse -- in fact, I was actually surprised. There's actually grouse up there in Grant and Codington County in that area?

A. Yes, there is. It's an area that does have -- it would primarily be sharp-tailed grouse. There could be remnant pockets of prairie chickens but less likely of that.

Most prominently would be sharp-tailed grouse, again, a species that is dependent on grassland habitat and, in particular, larger or greater size expansions of grassland habitat.

Q. And in eastern South Dakota is that fairly unique for those species of upland game?

A. When you look at the distribution of grouse in South Dakota and, in particular, eastern South Dakota I would offer up that it's part of the state where grouse is basically nonexistent or would be extremely sparse

would be what I would consider the southeast corner of the state.

We do not have the numbers of sharp-tailed grouse in the northeast corner that we do the central part of the state. But we certainly have pockets and areas where sharp-tailed grouse still remain and do fairly well and in particular up there in that Coteau region because of the associated grassland habitats.

Q. A lek is a -- is a name for a breeding ground for the grouse?

A. That is correct.

Q. And do you have some specifics, education on upland game and grouse?

A. What I would offer is throughout my career I've spent a substantial amount of time focusing on upland game birds. For three years for the State of South Dakota I served as the upland game biologist, which includes primary species of pheasant, partridge, sharp-tailed grouse, prairie chicken, and sage-grouse.

So I have experience working with grouse and have been associated with projects and management activities related around sharp-tailed and prairie chicken.

Q. Your knowledge and experience, are these leks historic used -- often used again and again and again by the grouse?

A. That can certainly happen. Leks are a vital component of both sharp-tailed grouse and prairie chicken population from the standpoint that the leks serve as the primary location that's part of that annual life cycle and the reproductive and mating part.

Leks are used by the males in particular to display. Each species does it a little bit differently, but it is a displaying ground, if I may call it that, or a courtship ground where the males do that for in some cases up to a month, month and a half in spring where they do their displaying and dancing to attract females to bring females in as part of, again, that annual life cycle. And they're a key element to the retention and sustainability of populations of grouse.

Q. Did the Game, Fish & Parks Department recommend a setoff -- well, let me back up.

Were there known leks located in the project area?

A. Our Staff in communication with the developer did provide some data on some known leks that we were aware of. And, again, I would specify known leks.

We would not have the ability to have data or information on every single lek that occurs across the state. We are made aware of leks through ongoing projects, some monitoring that we have done. We could be made aware of leks by the public or landowners contacting

some of our local staff.

So there's various means that we could have information or data to have -- or to know of known leks. But, yes, we did provide some data to the developer on some known leks that we had available to us.

Q. And I saw a map that like in yellow located those. Did you see that map also? Are you familiar with that map?

A. I do recall the map, yes.

Q. Now did Game, Fish & Parks recommend that there be a setoff from those known leks for infrastructure construction?

A. Again, that is a common or the regular recommendations that we provide to projects such as this from the standpoint of prairie grouse, and that's a recommendation of avoiding structures within one mile of a known lek and then avoidance of a two-mile area during the construction phase of development also.

Q. And are you aware that Crowned Ridge has agreed to the two-mile during construction from a known lek?

A. Yes. I am aware of that.

Q. They did not agree to the one-mile, though. Is that your understanding?

A. That's my understanding. Correct.

Q. Are you aware of any studies up in the -- in this

area, Upper Midwest, about whether wind turbines drive away grouse from their leks or draw them into the wind turbines or have no effect?

Are you aware of studies regarding that?

A. I am not intimately knowledgeable or aware of studies that have shown one way or the other. There have been research projects that have looked at the impacts of birds, and prairie grouse being one of them.

We as an agency have actually attempted to look at some of these things internally with some research projects a couple years back trying to determine both prior to construction and postconstruction. Unfortunately, that project, we did the phase where it was prior, and then the development did not happen so we couldn't have that information firsthand.

But there are -- there are studies out there and some projects that have looked at these, and similar to many other wildlife studies when you look at these projects there is no conclusive information or data that says one thing or the other. There are instances where it would show birds being impacted, and seeing limited use or no longer using the areas and other instances there seemed to be no impact.

And so that could vary by species. It could vary by location. So, again, there's no conclusive evidence

showing one way or the other.
Q. Is this an area where more study would be beneficial?
A. Any additional information and data that we could gather from that question would be very helpful not only understanding the overall impacts if they exist to prairie grouse species, but also that could be used for future recommendations and management considerations in terms of projects like this or other types of developmental projects.
Q. Are you aware of the Staff has drafted a proposed condition in regard to grouse lek monitoring that has been recommended that the Commission adopt? Are you aware of that?
A. Yes.
Q. And it talks about having a two-year study during the lekking season, I believe, or during that period to see what is happening to the grouse. Is that fair?
A. Yes. That would be a fair statement.
Q. And it's postconstruction, that this would happen postconstruction.
A. That is correct.
Q. So the condition would not prevent the project from being built, and it wouldn't require the project developers to go out there and look for other known lek

sites; is that fair?
A. That is correct. The concept is to monitor the known leks that would -- that are known out there, and then specifically the ones that would be found within one mile of a turbine and monitor that, survey it for a length of two years to see if any types of impacts can be determined of no longer using it or it's not an issue to the birds using those particular leks.
Q. You probably haven't been in the private sector much, but, I mean, would this study be complicated or expensive, in your opinion?
A. I don't believe it will be. From a monitoring standpoint and in visiting with our current upland game biologist who has some extensive background and experience surveying grouse -- in my time in surveying grouse, with the number of leks known within the one-mile distance we would be looking at less than 10 known leks, and it would probably require visitation of those leks probably two or three times during the spring season.
And based on location of some of those leks, I would anticipate more than one lek could be surveyed in a given morning on a given day. And so full anticipation, your best estimate would be a requirement of approximately, I'll say, 15 days worth of monitoring in the spring. But that monitoring would not be a full day, as lek surveys

are conducted for approximately a two- to three-hour time span in the early morning is the most conducive time period to do that but would look at approximately 15 days worth of surveying effort.

Q. And that information could very well be important for future wind farm development in the state?

A. Again, yes. That type of information would be very useful in the grand scheme of knowing and better understanding those potential impacts, gathering information from this particular site, and looking at too the attempt to gather similar information from other wind farms in their totality could be very valuable information.

Number one, it could be important and valuable when we have those preliminary discussions with developers on wind farms and those conversations again to keep in mind when we do offer those recommendations. And then the other side of this that we look at from the value of that type of information is having a better understanding and maybe some insight as to additional cumulative impacts of multiple wind farms in a general area being developed, as I know that we have had discussions on other projects of potential cumulative impacts and this could be one piece of that puzzle in determining and having some of that information.

Q. To your knowledge, has Staff, with your input -- with Game, Fish & Parks's input asked that these surveys, lek surveys, be done in other projects other than just this one?

A. Yeah. We do know that there is another wind farm that is submitting an Application -- has submitted an Application that has agreed on a voluntary basis to do this same type of effort, a two-year postconstruction of leks within one mile of a turbine.

Again, it's in a different part of the state, but, again, that collective information and data can be very useful when we have these discussions on a statewide basis on development projects as well as individual projects themselves.

Q. Do you know the name of that project just off the top of your head?

A. Yes. I'm sorry. It's the Sweetland Wind farm.

Q. Okay.

MR. MIKAL HANSON: Ms. Cremer, we would tender this witness for cross-examination.

MS. CREMER: Thank you.

Crowned Ridge.

MR. SCHUMACHER: Thank you.

CROSS-EXAMINATION

BY MR. SCHUMACHER:

Q. Mr. Kirschenmann, this is Miles Schumacher. I'm one of the attorneys for the Applicant, Crowned Ridge Wind farm. I have just a couple of questions for you. And really it's clarification.

In your testimony you indicated a strong interest in monitoring grouse leks within one mile from wind turbines; is that correct?

A. Mr. Schumacher, yes, that's correct.

Q. So does that replace your earlier recommendation that there be no turbines located within one mile of the grouse leks?

A. The focus of the request and the recommendation is to monitor the leks within one mile of a turbine, understanding at this point of an application in the layout that turbine locations are likely not going to be moved. So our ask is the consideration of looking at and monitoring those leks within one mile of any turbines that are out there of those known leks.

Q. Thank you.

Just one other question. Am I correct that your testimony was that you're not aware of any conclusive studies that indicate the appropriate turbine setback from grouse leks?

A. That is correct, Mr. Schumacher. Those different research projects out there have seen different levels of impact on grouse at varying distance levels from very close proximity on up to a couple of miles out.

And, again, so there's no conclusive evidence of what that distance should be or what overall impact it may or may not have on some of those leks.

MR. SCHUMACHER: Thank you. No further questions.

MS. CREMER: Thank you.

Intervenors.

MR. GANJE: Thank you.

CROSS-EXAMINATION

BY MR. GANJE:

Q. Mr. Kirschenmann, this is David Ganje, and I am representing the Intervenors in this case. And I'd first off like to say I think you have one of the best jobs in the world. So I'll have a few questions for you.

A. Okay. Please proceed.

Q. Do you know of any mammal surveys that were completed on this project?

A. Mr. Ganje, off the top of my head I do not recall any mammal surveys conducted in this project area.

Q. And I'm jumping to another species or another sort of animal.

I think you cited in your testimony that there was a recent research project done in this state and in North Dakota that showed seven of nine species of grassland birds had been reduced -- in fact, had reduced densities around wind turbines over time; is that correct?

A. Yes. There is a study that was conducted, and the authors of that are Schaffer and Buhl, that looked at wind farms in South Dakota and North Dakota to try to ascertain the potential impacts of wind turbines to grassland bird species in particular, and there were some species that they did determine some impacts from the standpoint of displacement or dispersal at distances, varying distances from the turbines themselves.

And then there were, again, as I mentioned a little bit ago on -- conclusive of study, there were also some species that were not impacted. But that is probably one of the most discussed papers that are out there and studies that are out there, primarily in this area because of the scope of that particular study being the length of it. It was, if I remember correctly, almost a 10-year study.

And probably even more importantly is the geographic location of that study being conducted in the Dakotas, which is why it's typically referred to as it's probably the most relevant study to this part of the country.

Q. Thank you.

And I think it was also your testimony that it is important to perform preconstruction wildlife surveys with a high degree of scientific rigor; is that correct?

A. Yep. We always want to have those surveys done of different wildlife species out there using methods that can be looked upon as, you know, scientific approach, have the potential to have that statistical validity to it, and it gives us the opportunity, whether it's some of our staff or other agencies, to look at it and the best opportunity to review it and have those conversations and see -- and try to determine or ascertain if there's any potential concerns or items that should be further discussed.

Q. And do I understand that part of your work was reviewing an Avian Use Survey report done in --

A. Yes.

Q. Let me finish, please. Done in Grant and Codington County by an environmental study group called SWCA?

A. Yes. I know our staff in particular reviewed that work. Correct.

Q. And your observations with regard to this project are based in large part on a review of that work; is that correct?

A. That is correct.

Q. Now you don't have the benefit of documents in front of you. Maybe it's a blessing. But I'm going to say a statement from the introduction of that survey.

The last sentence of the introduction indicates that, "This report summarizes the methods and results of large and small bird use surveys conducted from April 1, 2017, through November 30, 2017, in the study area." You may not recall that, but I'm refreshing your memory as it were.

Okay. Now --

A. Okay.

Q. -- the end of that study was done on November 30 of 2017, the study I referred to.

A. Okay.

Q. My concern is that this Applicant on November 22 of 2017 purchased the so-called Cattle Ridge properties or Cattle Ridge product, which is the northeasternmost portion of this irregularly shaped proposed project. That acquisition or closing or sale date, whatever we want to call it, occurred on November 22, 2017.

So are you aware of whether the consulting group we referred to a moment ago did an avian survey on that northeasternmost portion of the proposed project commonly previously referred to as the Cattle Ridge Project?

A. Yeah. Mr. Ganje, I am not aware of any surveys that

were conducted in that geographic area that you are describing.

Q. Okay. Well, considering the rigorousness with which you suggest that you, as a policy, prefer to implement, I'm going to suggest that if that consisted of about 15,000 acres of land, would that be an area that you would want to survey for the purpose of making recommendations concerning this proposed project?

A. Not having a complete picture of all the information and the ability to review that is -- I would suggest an offer is always the best approach.

Q. Now there is a little bit of gap between the closing date on the Cattle Ridge Project and the date of completion under the introduction to the avian project study report that I said to you.

Would it be possible between November 22, 2017, and November 30 of 2017 to conduct a rigorous avian study on that portion of the land I've described for you a moment ago?

A. Mr. Ganje, could you repeat the dates of that window or time frame?

MR. GANJE: In view of the horseness of my voice, I will respectfully ask the court reporter to kindly read back the question.

(Reporter reads back the last question.)

THE WITNESS: Thank you for repeating that. My apologies. Sometimes difficult over a cell phone.

A. Looking at those dates in the consideration of doing a bird study in that area, I would have to say no based on less than a 10-day time frame, and that would not be the ideal time of the year to do such a bird evaluation.

MR. GANJE: No further questions.

MS. CREMER: Thank you.

That will take us to Commission questions. And I show Chairman Hanson.

CHAIRMAN HANSON: Good afternoon, Mr. Kirschenmann.

THE WITNESS: Good afternoon, Commissioner.

CHAIRMAN HANSON: You referred to the Schaffer Buhl study, and that's one that we are familiar with. Do you feel that there's a need to examine that study for some enlightenment on this issue?

THE WITNESS: Commissioner, I don't know that there's a necessity to review the paper itself and the study itself. It certainly has application based on the result of that study no different than probably any other wind farm project or development project in that part of the state.

Again, as I mentioned earlier, it continues to be probably one of the primary references that are shared

with people from the standpoint of development considerations and those potential impacts. Probably the most, again, relevant piece of that information from that study is seeing that it was determined that some species of grassland-dependent birds were determined to have some displacement or disbursement from wind turbines.

And, again, that would coincide with our normal recommendations that we offer up as an agency as well to avoid to the greatest extent possible of placing infrastructure on grassland habitats.

CHAIRMAN HANSON: Thank you.

In your testimony you state that the GFP does not have regulatory authority when it comes to permitting wind farm projects. And you also state that your role is to consult with developers and provide recommendations and suggestions on how to minimize or remove potential impacts to wildlife and associated habitats.

Sometimes recommendations and suggestions are as good as commandments. Do you feel that you have that opportunity with wind farms?

THE WITNESS: Commissioner, I would say in many cases I would say our discussions and recommendations do make a difference. They are accepted. At times recommendations or suggestions could be taken as whole, could be taken as part.

So I do believe at various places, different times, various projects that our recommendations do play a good role in trying to minimize those potential impacts to wildlife and associated habitat.

I can't speak for you if they're as good as -- recommendation and suggestions as good as actual policy decisions or regulatory or conditions put in place. But, again, we are hopeful that our consultations and providing such information can just be a positive component of the overall decision process and be a positive component in the decisions of construction, layout, and things of consideration from a project itself.

CHAIRMAN HANSON: You testified that CRW has agreed to some of the recommendations and requests. You highlighted one pertaining to the one mile, for instance, as one of the situations where they did not agree to.

Are there any other recommendations that you may have concern over that they did not accept?

THE WITNESS: Commissioner Hanson, I would say the one that you just mentioned there was probably the one that we talked about the most. And I say "we" being internally with staff and myself looking at it.

As discussed earlier and per some other questions from fragmentation, avoidance of some areas,

totally understand in these projects and in particular the areas where a lot of these projects are being constructed, and this being one of them, it is extremely difficult and very challenging to avoid, again, all the grassland habitat and being in proximity of wetland basins and those things.

So we want to provide those recommendations that, you know, understand that it cannot be avoided or minimized to 100 percent. So in the grand scheme of this particular project, from our review of the Application and the information, a lot of those items that we offered up as recommendations/suggestions we do believe that were considered, looked at, actions taken, again, understanding that not everything can be minimized or avoided 100 percent.

And then the one that you described and brought forward here, the one recommendation that we do offer from prairie grouse is the one-mile avoidance of an individual turbine to a lek. And then a two-mile buffer during construction has been accepted. The one mile within a turbine was not.

I believe within the Applicant the approach was taken at .3 miles. Understand that there might be circumstances or situations that would preclude the ability to completely be outside of the one-mile setback

area or buffer, if you want to call it that.

And, hence, as I mentioned earlier, the reason why we gave that recommendation knowing that there are grouse in the area, the grassland habitat, the close proximity of other wind farms in the geographical area, we primarily offered up the one-mile recommendation as a means of -- to better understand that potential impact to grouse and then to use that information also for future discussions and considerations to those impacts.

CHAIRMAN HANSON: You've spoken a lot -- you've discussed quite a bit about avian ground species. Doesn't quite sound right when I say that.

What about the migration of the birds, of different birds? We haven't really discussed those. What about concern with avian migration?

THE WITNESS: Yeah. Thank you for that question, Commissioner.

And that's one that honestly I wish we as a conservation community had some better information and a better understanding of what that potential impact may or may not be for migratory birds.

Waterfowl in particular. That is the one that is brought up most to us. The question to us in particular again when you think about the geographical area of the state where this particular project is under

consideration to be located, as well as other ones, we have had this discussion even with you as the PUC Commissioners as well.

As we have more farms, wind farms, develop and there's more development out there and in particular in closer proximity, I do believe that's something that we have to somehow figure out how we can actually collect some information or data to have somewhat of a better perspective and understanding of it.

Unfortunately, Commissioner, I just can't give you a good, definitive answer as to what that potential impact may or may not be to migration or to individual migratory species with the development of these particular projects.

CHAIRMAN HANSON: Thank you. There was -- there were a number of questions and discussion centering around minimizing the impacts, and all of those discussions, at least from what I can recall, used the word "attempted." So in regards to impacts, was there an attempt to minimize. And, of course, you stated yes, that there was an attempt.

That's a pretty wide door just to state "attempt." Do you believe that the Applicant sufficiently minimized their potential impact?

THE WITNESS: Commissioner Hanson, from some of

the main pieces of information that we looked at and assessed and evaluated, I would say that over all there was a good attempt to avoid or minimize some of those impacts.

Again, as I mentioned a few minutes ago, one of the greatest challenges, I believe, in a development project such as a wind farm in this general part of the state, you know, one of the things that we continue to bring forward, is the conversations about grassland habitats and wetland habitats. And when you're talking about the part of the state that has some very key grassland areas, again, mentioning that it's on the Prairie Coteau and the Prairie Pothole Region, to avoid 100 percent I would offer up it is basically impossible in this part of the state just based on the geographic and -- geographic location and the topography of the land.

Again, one of the key things that we do look at is turbine placement from various different types of grassland habitats to ground that is already disturbed, in particular agricultural fields and lands. We often and continue to recommend to the great extent possible to put those turbines in undisturbed lands instead of native grassland habitats and such.

And in this particular project based on the

information that we looked at in place and stuff, there was certainly a higher level of those being placed in agricultural lands, which we looked upon as a positive.

CHAIRMAN HANSON: What type of -- I believe this is my last question.

What type of activities will GFP be involved in post -- I shouldn't say it in a positive -- if the Applicant receives a permit, what activities will you pursue during construction and operation?

THE WITNESS: Commissioner Hanson, I would expect that our agency and staff would work with the developer to devise and set up -- for example, if the lek survey monitoring does move forward, number one, assist or provide recommendations in setting that up in the most efficient and effective means possible to gather that information.

I've even had the thought of how we could potentially expand those efforts internally with our staff not only at this particular site but maybe some others, not only to assess and use the information but even take it farther beyond two years to see how we can do more.

So we want to be there to provide recommendations on the approach of those things. Probably just as important or more important, as any

additional data is collected from any wildlife surveys or monitoring, which will be done, is that annual consultation of when reports are provided to us. If anything is of concern or a red flag of potential, to go back and have conversations with the developer and see if we can devise means or mitigation or some operational decisions to help minimize those impacts.

CHAIRMAN HANSON: Thank you very much for your testimony. Appreciate it, Mr. Kirschenmann.

THE WITNESS: Thank you, Commissioner.

COMMISSIONER NELSON: Tom, this is Commissioner Nelson. Thanks for being on the line to help us out today. I've got two questions. One is relevant and one is not and I'm going to start with the not.

THE WITNESS: Very good.

COMMISSIONER NELSON: Recent media reports said that there was a black bear in the Twin Brooks area, and I'm wondering, to your knowledge, is that black bear still wandering around the project area?

THE WITNESS: Commissioner Nelson, yes, we have had reports and obviously confirmed a bear in the area. I cannot tell you today where that bear is at or if it's still in that area. I have not received any reports recently. I'm going on that assumption that it has moved on to where it came from.

COMMISSIONER NELSON: Okay. Thank you.

The serious question for the day, you know, you've spent a great deal of time talking about the real lack of serious scientific analysis as to what is appropriate and what is not so far as a distance of a turbine from a lek.

And so my question is how did you settle on the one-mile figure? Why not a half-mile? Why not two miles? How did you arrive at one mile?

THE WITNESS: Commissioner Nelson, that's a really good question. Over the years that we've looked at this particular discussion topic related to wind farms, obviously looked at other studies that have been done across the country with different species of grouse, of prairie grouse, from prairie chicken to sharp-tailed grouse to greater prairie chick and even sage-grouse.

And I will offer up to you that across the country there are different distances that are offered up as a "setback" or buffer. There has been different pieces of information that have come up in projects that have shown that, you know, at a quarter of a mile there was a higher level of disturbance or displacement. At a half-mile it wasn't quite as much. At a mile it was a little bit lesser on up to different projects all the way out to 3, 4, maybe even up to 5 miles.

We also look and take into consideration what other setbacks are being offered by other state wildlife agencies across the country to relevant species as we're talking about. And, again, that ranges from probably a half-mile or less all the way up to 3 to 5 miles.

And so I will offer to you the one-mile distance that we recommend is honestly a number that falls within range of from various other projects. I don't have any specific scientific data or information that I can share with you that says here it pinpoints that one mile is the magical distance. It's more based off of an accumulation of review of other projects, recommendations, and looking at something that makes sense from the biology of the species to it also is reasonable from the standpoint of consideration in developing a project such as this.

COMMISSIONER NELSON: Thank you. I'm going to take the liberty of asking one further question. When you've talked about what you've observed so far as recommendations elsewhere in the country, are any of those recommendations in the one-third mile area?

THE WITNESS: Off the top of my head, Commissioner, I can't say yes or no on that one. I know there are some distances less than one mile that are offered up, but I just can't remember any specifics and something in particular to .3.

COMMISSIONER NELSON: Very good. Thank you.

THE WITNESS: Thank you, Commissioner.

COMMISSIONER FIEGEN: Thank you for being on line. This is Commissioner Kristie Fiegen. And I know this docket has been moving, and we moved you up.

There's been a lot of moving parts, and one of the moving parts is certainly the turbine locations. And, you know, they -- it's certainly been at the eleventh hour. In your testimony you talk about 19 turbines being placed on native prairie land or prairie grasses.

Has the Applicant given you new numbers that that 19 may be different because of some of the changes that just happened in the last few days?

THE WITNESS: Commissioner Fiegen, in response to that, no, I do not have any new figures, nor do I believe that our environmental review biologist has any new figures. We derived that from the information that was in the Application itself.

So I do not have anything more new if I may put it that way.

COMMISSIONER FIEGEN: Okay. Thank you. And I'm just going to ask the Applicant to file that information so the Commissioners have that when we make our final decision.

Also you certainly reference the 2016 Schaffer report and shows seven of nine species. Do you remember any of those species that were impacted in this study?

THE WITNESS: Commissioner Fiegen, I'll be honest. You caught me off guard. No. Right off the top of my head I don't remember the list of the species, other than the fact that they are grassland dependent pasturing type birds. I'm drawing a blank.

Q. Do you know if grouse -- I'm sorry. You can continue.

THE WITNESS: No. I just was going to say that I don't remember the specific list right off the top of my head.

COMMISSIONER FIEGEN: Do you know if prairie chickens or grouse were one of them?

THE WITNESS: That I can state that, no, prairie grouse were not part of those particular list of that species.

COMMISSIONER FIEGEN: Okay. And I'll probably mostly ask Mr. Kearney this question, but because you're on line and I might not be able to get you back on because of cell phone coverage that Commissioner Nelson hasn't fixed in the southwest part of our state yet as a Commissioner --

So this monitoring, this Staff proposal of the

electric monitoring condition, I guess as a Commissioner what happens if we're seeing that these leks within one mile -- there's a disturbance. Okay. This is a condition, but what are we going to do if it impacts these leks?

Are we going to ask them to shut down the turbines that March, April, and May or -- and I'll probably ask Mr. Kearney this question so you don't have to feel like you have to answer it, but since you're on line, I just want to give you an opportunity to.

THE WITNESS: Sure, Commissioner Fiegen.

I guess what I would offer up is if information that would be collected would show in particular even after that time frame of two years and collecting that data would indicate or predict that there is an impact, I believe that gives an opportunity to have that discussion for some potential operational adjustment to those particular turbines.

I don't believe in general that it would be a requirement to "shut them down" for a three-month period. What there might be, though, is -- again, speak out loud hypothetical, that it could be an operational adjustment where from a lek perspective in particular, the peak activity and the importance of that activity occurs in the early morning for an approximately a two- to

three-hour time span and that varies from day to day. So maybe there are some daily operational adjustments that can be made that would lessen the potential impacts if we determine that something is going on there.

So that would be just one thought I have that I would share with you as a potential outcome of something of that nature, again, an operational adjustment.

And then I would offer up secondly is if we do determine from collecting that type of information from a project such as this and some other ones, I believe then that gives us a stronger discussion in those recommendations why there is the importance of having a distance of whatever that might be from a known lek.

So I would offer those two potential outcomes that could come as a result of having that information.

COMMISSIONER FIEGEN: Thank you. And you'll get to listen to the recording to see what Mr. Kearney says later. And I certainly appreciate that. And as a Commission you know we look at substantial impacts to the habitats so I appreciate that.

Thank you.

THE WITNESS: You're very welcome, Commissioner.

COMMISSIONER NELSON: So this is Commissioner Nelson again. I'm going to -- follow-up question. This postconstruction monitoring of the leks is going on and

it's determined that a historic lek is no longer being used, how do you determine whether that's because a turbine has been placed there or there's some other environmental issue going on that there's no longer grouse in the area?

THE WITNESS: Commissioner Nelson, that's a really good question. Conducting the surveys themselves and monitoring those leks, you're right, could not ascertain that that is the sole and only reason for a lek abandonment or a lek all the sudden not in place. There could be other compounding factors out there, something that we're not simply aware of.

The importance then from that standpoint is you do the same method. You do the same approach for all the leks that are within a mile and you determine if the same thing is happening on all the leks. It becomes easier to have that discussion and probably come to some conclusions of what are the determining factors what caused those birds to no longer use those leks.

Some of them might be the distance dependent from the turbine itself. Some of those things would have to be taken into consideration as well.

So you're going to have to look at leks individually, and you have to look at leks in a collective sense as well and see what kind of trends and

responses occur to help make some of those determinations.

COMMISSIONER NELSON: Thank you. It would seem to me in order for a valid survey, you'd also have to have a control group of leks that are in the area and but not close to turbines in order to do that accurate comparison.

But that's not being proposed here; is that correct?

THE WITNESS: That is correct, Commissioner.

COMMISSIONER NELSON: Thank you.

COMMISSIONER FIEGEN: I do have one more question. Although you didn't hear the testimony yesterday probably -- or was it today? I can't remember.

Aviation [sic] surveys and lek surveys to find a lek, are they different? Is it more comprehensive to have -- I guess I don't even know. I mean, are aviation surveys the same as lek surveys, or are there designated surveys that can find a lek more comprehensively?

THE WITNESS: Commissioner Fiegen, from my knowledge and experiences when it comes to lek surveys and doing other type of avian surveys, they're two different things. When you do a general -- from the context of doing some avian surveys, in particular when you're talking about grassland-dependent species and the

various types of birds, there are different methods to do those surveys from point counts to actual transects to some other different methods to do it.

From the standpoint of a grouse lek survey, it can be and it is more time-consuming and has to be very thorough. And I say that from the standpoint of when you're looking for those leks, typically sharp-tailed grouse and prairie chickens use ridges or knolls and may say that as a lek, and the primary reason why they do that is so that the sound that they make while displaying on the leks carry a long distance again for the attraction of the females.

That being said, it's not as -- it's not as simple to determine leks out there with a standard or some of the standard methods of other avian bird surveys. You have to physically be out on the ground looking for them or having some firsthand knowledge of where some are.

I would also share with you that when you're out there doing listening for leks it is two different -- two different complexities and challenges of hearing a sharp-tailed grouse lek versus a prairie chicken lek.

If you had a very quiet morning and you had both a sharp-tailed grouse and a prairie lek within a reasonable distance of you, the likelihood that you even

hear the sharp-tailed lek would be very, very minimal because likely the prairie chicken lek would make so much louder noise that you wouldn't be able to hear or detect the sharp-tailed grouse lek.

So I just give that example that even at times when we do sharp-tailed grouse lek surveys and if you're in an area that has a high number of Canada geese in the area, you could have a very quiet morning and you could have geese making a lot of noise and it's a challenge to even hear the lek.

So you have to be very thorough and spend a lot of time on the ground doing some very methodical and very thorough searching to find and locate them at times.

And, in particular, up in that part of the state where leks and sharp-tailed numbers are lower and fewer than in other parts of the state, it could be some challenges at times to even find the lek themselves.

COMMISSIONER FIEGEN: I'm sure my son next semester would love to get out of class from SDSU and go do this.

So my question is did you say you got to see the Staff's proposed lek monitoring condition? I'm sorry. I can't remember.

THE WITNESS: Yes, Commissioner.

COMMISSIONER FIEGEN: Okay.

So as a Commissioner when I look at this condition, if I understand you right, the base would be very important. So the determination of where those leks are is going to be extremely important in order to have the monitoring to add value, would you say? I mean, that's just my thought process as a Commissioner.

THE WITNESS: Yeah. And, again, Commissioner, the condition that has been talked about and discussed is to focus on those leks that are known out there or documented and those that within one mile did not ask or place in the condition to search the entire project area again, and there was the focus on the ones that were known or documented, whether that was determined by information and data that we as an agency provided of known leks and then any leks that were found by the company itself or the developer during their other survey efforts or other means of determining or knowing that there is a lek out there.

COMMISSIONER FIEGEN: Okay. And I'm going to have to go read the transcript after Cheri's done with it. But I believe Crowned Ridge only did a very high level, which I think their person that talked about it stated that that was reviewing their leks, but when you get down to it that might have been more of an aviation study.

So Crowned Ridge's studies may not have done anything on finding leks. But I'm going to go back and read the transcript so I can understand that and make a decision on this condition.

Thank you.

(Discussion off the record.)

MS. CREMER: Redirect. Staff.

REDIRECT EXAMINATION

BY MR. MIKAL HANSON:

Q. Mr. Kirschenmann, in your Prefiled Direct Testimony did you attach this study that the Commissioners have asked you about, this Schaffer Buhl study?

A. Mr. Hanson, I believe that was an attachment that we provided as just as a reference to that study.

Q. I'm going to provide it to the Commissioners. There was a question about which species were part of that study, and I think it shows.

MS. CREMER: You can just tell us, and they can pull it up on their -- or do you have it there? It doesn't matter.

(The document is distributed.)

Q. If I understand your testimony again that was asked on redirect, first that you do -- if they accept the mile setback, are you -- do you request a study if they're a mile back?

A. Mr. Hanson, I guess if no -- if none of the known leks were within one mile of a turbine, I would say that that would not be a necessity to do that.
Q. All right.
A. So I guess it would be contingent upon the placement of the turbines.
Q. And as you -- are you under the understanding that Crowned Ridge has placed turbines within .3 miles of known leks?
A. That is my understanding.
Q. And so based on that is the recommendation by the Staff and your department that there should be some surveys. Is that --
A. That is correct.
Q. My understanding of that correct? Okay.
A. Yes.
Q. Now this northeast part of the project that was Cattle Ridge, do you know enough about the history to know that that was kind of identified as Cattle Ridge?
A. I do not, no.
Q. Okay.
MR. MIKAL HANSON: I don't have any further redirect questions.
MS. CREMER: Thank you.
That will take us to recross. Again, only to

Commission questions and redirect. Crowned Ridge.

MR. SCHUMACHER: Crowned Ridge has nothing further. Thank you.

MS. CREMER: Thank you.

Intervenors.

MR. GANJE: Intervenors has no further questions.

MS. CREMER: Thank you.

Final redirect, Staff.

MR. MIKAL HANSON: None.

MS. CREMER: Well, I was going to tell you you can step down, but you do whatever you want, Tom. But you are excused, and thank you for joining us.

THE WITNESS: Thank you again, and I do apologize for the inconvenience of doing this over the phone. I do appreciate your accommodation today.

MS. CREMER: Thank you.

(The witness is excused.)

MS. CREMER: Let's take a break until 3:30.

(A short recess is taken.)

MS. CREMER: I'll call this back into session.

Staff.

MS. EDWARDS: Staff calls Paige Olson.

(The oath is administered by the court reporter.)

DIRECT EXAMINATION

BY MS. EDWARDS:

Q. Ms. Olson, can you please state your name for the record.

A. Yes. It's Paige Olson.

Q. Where do you work?

A. I work for the South Dakota State Historical Society.

Q. And what is your job title there?

A. I'm the review and compliance coordinator.

Q. Can you briefly explain what that entails.

A. So my job is to ensure that state and federal agencies are taking into consideration cultural resources as defined under state and federal law.

Q. Okay. Did you submit prefiled testimony in this docket?

A. I did.

Q. And do you have that in front of you?

A. I do.

Q. And, for the record, that has been previously stipulated to and admitted as Exhibit S4. If I asked you the same questions today as in your prefiled testimony, would your answers be the same?

A. No.

Q. Can you explain?

A. So I did the testimony prior to receiving the architectural survey report, and we have since received it and reviewed it and have no concerns. And now we are just waiting on the survey report for the ancillary facilities.

Q. What is the ancillary facilities report?

A. So that would include the access roads, crane paths, collection lines, O&M facilities, and the concrete batch plant and lay down areas.

Q. Other than what you just mentioned, do you have any additions or corrections to make to that testimony?

A. I don't.

Q. Are you aware of any outstanding surveys other than that one that you just mentioned that need to be completed?

A. I'm not.

Q. Do you know if they've completed a Level III archaeological survey?

A. They have for several different portions of the project.

MS. EDWARDS: And I'm going to ask Mr. Paulson to hand you Exhibit A61. It should be up there, I believe.

Q. Do you have that in front of you?

A. I do.

Q. Can you please turn to paragraph number 13.
A. Yes.
Q. Are you familiar with that condition?
A. Yes.
Q. Does it address any concerns you might have?
A. It does.
Q. Okay. And with that, can you please briefly summarize your testimony.
A. Yes. So I've reviewed the survey reports, and they -- the company worked closely with the tribes from that region and they identified a number of traditional cultural properties which were documented and recorded and they've stated that they're going to avoid those sites.

And then they found several -- I'm not sure how many -- archaeological properties. And I commented on those as well. And there were no concerns with the architecture.

So as far as I'm concerned, we have no real concerns until we see this final survey report.

MS. EDWARDS: Thank you. I have nothing else. I will tender this witness for cross.

MS. CREMER: Thank you.

Crowned Ridge.

MR. SCHUMACHER: Applicant has no questions for

this witness. Thank you.

MS. CREMER: Thank you.

Intervenors.

MR. GANJE: Thank you.

CROSS-EXAMINATION

BY MR. GANJE:

Q. Good afternoon, Ms. Olson.

A. Good afternoon.

Q. I'm David Ganje on behalf of the Intervenors. Only a few questions, but I would ask you to kindly look at Exhibit A1-B, page 71.

A. 71?

Q. Please. Exhibit A1-B. I believe it would be page 71.

A. Okay. It's a map?

Q. Yes, indeed. If you'd kindly take a moment to look at the map, I'll ask a question or two.

A. Okay.

Q. Is this the map that you used as the basis of your report and work on this project?

A. That's a good question. You know, I am not sure. Unless I looked at the survey report, I can't confirm whether this is the exact same footprint or not.

Q. Would you be kind enough to look at the survey report?

A. Yes. Absolutely.
Where is it?
Q. Well --
MS. CHRISTENSON: We've never received one.
A. Well, I do not have them with me so -- but I would assume if this is the same footprint as when I reviewed the cultural resource reports, then it's the same.
Q. Okay. Maybe I can get you there. I'll try to get you there.
A. Sure.
Q. If you'll be kind enough to look at Exhibit A1-B, page 68.
A. It's an e-mail.
Q. Right.
A. Okay.
Q. And that e-mail was directed to you on June 16 of 2017?
A. Yes.
Q. And that e-mail refers to a document attached; is that correct?
A. Uh-huh. Yes.
Q. And then following that is a memorandum at page 69 dated June 14, 2017?
A. Yes.
Q. And following that is a continuation of the

memorandum on page 70?
A. Yes.
Q. And then the next page thereafter is the map on 71?
A. Yes.
Q. Okay. So I -- my question to you is is that -- based on this other information, is that the map that you used for the purposes of your work and report on this project?
A. Yes.
Q. Okay.
MR. GANJE: May I approach the witness?
MS. CREMER: Yes.
Q. I'll show you Exhibit A1-E, page 2. You may not have it easily accessible, but for the record I'm just putting it in the record so that people will know the map I'm going to hand you to ask you a couple of questions. Okay?
(Counsel approaches the witness.)
Q. When I refer to the Exhibit A1-E, page 2, it has a yellow parameter border area for the project showing a large portion of the project within the yellow border area in the northeast portion of that map.
The map again is A1-E, page 2.
I would ask you kindly to look at the map we started to talk about, which is A1-B, page 71.

A. I'm sorry. Can you repeat that.
Q. Yes. I would ask you to please look at the first map we talked about, which is A1-B, page 71.
A. Yes.
Q. Are you able to look at both maps now?
A. Yes, I am.
Q. Thank you. Thank you.
So my question is there is an area in the northeastern portion of the proposed project. As you can see, it provides a different delineation of the project area than is found on --
The area on Exhibit A1-E, page 2 is an area in the northeastern portion of the project which shows an area within the project parameter, within the project boundary, that is different than the project parameter or project boundary found on Exhibit A1-B, page 71.
Would you agree?
A. Yes.
Q. Okay. So then my question is did your study include this northeastern area which is found on Exhibit A1-E, page 2 but not found on Exhibit A1-B, page 71?
A. So I didn't actually do the study. My role is to review the information provided by the consultants. And so I am assuming that this part and I -- I'm not sure, but I think the part that's in Grant County in that

northeastern part is the second Crowned Ridge project.

No, it's not? Then I assume it's another wind farm project, but I'm not sure. I'd have to look at my records.

Q. But as things sit now with your knowledge of the work that you did with the Applicant and the Applicant's consultant, which was SWCA?

A. Uh-huh.

Q. The area that you studied was that which is found in Exhibit A1-B, page 71?

A. To best of my knowledge, it is, yes.

MR. GANJE: No further questions.

MS. CREMER: Thank you. That would take us to Commission questions.

Commissioner Nelson.

COMMISSIONER NELSON: You've cleared up the only questions I had prepared so thank you.

THE WITNESS: You're welcome.

MS. CREMER: Commissioner Fiegen.

COMMISSIONER FIEGEN: I just have one quick question, and it's about the four tribes, you know, the Native American cultural studies that have been done in the meetings.

Were you part of any of those meetings?

THE WITNESS: I was not.

COMMISSIONER FIEGEN: Okay. You've seen a lot of wind dockets in the past year and a half, maybe two years. Is this the first time that you've seen that many tribes come together and really look at a more in-depth study?

THE WITNESS: It's not the first time, no.

COMMISSIONER FIEGEN: All right. Thank you.

CHAIRMAN HANSON: Good afternoon, Ms. Olson, and welcome back.

THE WITNESS: Thank you.

CHAIRMAN HANSON: I hope we don't do this lots and lots more times. Probably you do too.

You said that they have completed a Level III for several different portions of the project in your testimony just now. Are they going to complete, to the best of your knowledge, for the entire project?

THE WITNESS: Yes.

CHAIRMAN HANSON: Are they making a valiant effort towards that, as far as you know?

THE WITNESS: Yes, they are.

CHAIRMAN HANSON: Are you old enough to have ever watched the Art Linkletter show?

THE WITNESS: I am not.

CHAIRMAN HANSON: Art Linkletter used to bring people on -- well, kids and have them on, a bunch of

them, about maybe 15, 20 of them, and he'd ask them questions and they gave hilarious questions. One of the first questions he would ask -- of course, little kids going on know all of these things about their families, and their parents are always telling them don't say this, don't say that, don't say that.

I'm always tempted to say what did your bosses tell you not to say while you were testifying. But I'll skip that part for now.

THE WITNESS: Thank you.

CHAIRMAN HANSON: Thank you for testifying.

MS. CREMER: Redirect.

REDIRECT EXAMINATION

BY MS. EDWARDS:

Q. Throughout the pendency of this process and potential construction are you sort of kept in the loop and updated when changes are made if that occurs during construction? That was probably not a very good question.

A. No. It depends. If they're changing or doing reroutes and they're doing more survey, then I'm kept in the loop on the additional survey. So, yes, they provide additional information every time they change -- I assume that they'll change the routes because that's what they've done in the -- that's -- I believe that's what

they'll do. I don't have any concerns with it.

MS. EDWARDS: No further questions. Thank you.

MS. CREMER: Recross?

MR. SCHUMACHER: Thank you.

RECROSS-EXAMINATION

BY MR. SCHUMACHER:

Q. Ms. Olson, is it possible that Crowned Ridge could have provided you with supplemental information that covers the studies for that northeast area that we've been talking about?

A. You know, it potentially -- I have so many wind farms going on now that I apologize, but unless I have the specific project in front of me -- I can look it up when I get back to the office, but I cannot specifically tell you at this point.

Q. And is going back and checking your records for any information that would indicate that you had been provided with studies pertinent to that area -- would you be willing to do that?

A. Absolutely.

MR. SCHUMACHER: Okay. Thank you.

THE WITNESS: Yeah.

MS. CREMER: Intervenors.

MR. GANJE: No further questions.

MS. CREMER: Thank you.

Staff, final redirect?

MS. EDWARDS: None.

MS. CREMER: Thank you, Ms. Olson. You may step down.

THE WITNESS: Thank you.

(The witness is excused.)

MS. CREMER: Staff, you can call your next witness.

MS. EDWARDS: Staff calls Darren Kearney.

(The oath is administered by the court reporter.)

DIRECT EXAMINATION

BY MS. EDWARDS:

Q. Mr. Kearney, please state your name for the record.

A. Darren Kearney.

Q. Where do you work?

A. Public Utilities Commission.

Q. What is your job title there?

A. Utility analyst.

Q. Can you briefly explain what your job duties are as they relate to this proceeding?

A. Part of the team of staff that reviews wind farm applications for siting permits, as well as transmission lines and pipelines as it relates to siting, as well as other energy conversion facilities.

Q. Did you submit prefiled testimony in this docket?

A. I did.
Q. And, for the record, that has been stipulated to and, therefore, previously admitted as Staff Exhibit S2.
Do you have that in front of you?
A. In pieces, yes.
Q. I think it's been used a few times.
At the time you wrote the prefiled testimony was it true and accurate to the best of your knowledge?
A. It was.
Q. Do you have any updates to make at this time?
A. In my testimony I had a little bit of a lengthy section about the cumulative impacts as it relates to a couple of projects in the region. In my opinion, Crowned Ridge addressed that concern through the Rebuttal Testimony, and so those sections would be essentially removed from my testimony at this point in time, given that they addressed my concern.
Q. Are you generally familiar with the requirements of Grant and Codington Counties for decommissioning of this project?
A. Yes.
Q. Is it your position that the decommissioning requirements of those counties are sufficient by themselves?
A. I have some concerns if the Commission would, I

guess, defer to the counties on decommissioning.

Codington County simply has a financial assurance requirement. We don't know what that will look like. Grant County has a financial assurance requirement, and in one of the criteria they can require the company to have an escrow account with certain criteria attached to it, similar to probably the Crocker decision that the Commission had ordered here.

My concern is that if you have wind turbines in multiple counties, that could potentially be two different decommissioning criteria that the company would need to do in order to fund or protect against the decommissioning of the wind turbines.

As stated in my testimony, I think it would be more efficient if the State were to have a decommissioning standard that meets the Commission's satisfaction, and the counties could then adopt that if they see fit.

And the main driver for that is with the recent legislation, Senate Bill 16, there's some added protection that the legislature has now put on decommissioning of wind farms through law that, based on my lawyer's guidance, would only protect against the decommissioning if this Commission were to order it. Then that law would apply based upon the way the language is written.

And so that's the basis for our recommendation that this Commission should look at considering the right of decommissioning for this project.

MS. EDWARDS: At this time I would ask that the Commission take judicial or administrative notice of Senate Bill 16, which I have passed out for everybody. I request that pursuant to SDCL 1-26-19 Sub 3.

MS. CREMER: Crowned Ridge, do you have a comment, objection to the --

MR. MURPHY: I have no objection to taking judicial notice of the law.

MR. GANJE: No objection.

MS. CREMER: The Commission will take judicial notice of that. Thank you.

A. Could I add a little bit more on decommissioning?

Q. Please do.

A. The Applicant has agreed to do an escrow account so that's not the issue here. They're willing to fund $5,000 per turbine per year consistent with other wind projects.

And during our talks regarding proposed decommissioning conditions they agreed with pretty much everything the Commission has done within the past, but they wanted to add a new criteria where it kind of would allow the County's escrow account to satisfy the

Commission's.

And Staff wasn't comfortable with accepting that specific language in the condition, given the Senate Bill 16 that was recently passed. And that's why there's not a decommissioning condition that both the Applicant and Staff agreed to and it's left out of Exhibit A61.

Q. Thank you.

In the processing of this docket did you submit any Data Requests to any of the other parties?

A. Yes, I did.

Q. And are those S5 and S6, which have previously been stipulated into the record?

A. Yes. S5, S6, and also included as attachments in S2.

Q. Thank you for that correction.

Moving on to Exhibit S7, also previously stipulated into the record, are you familiar with that exhibit?

A. That's the Staff's proposed lek monitoring condition; correct?

Q. Correct.

A. Yes. I'm familiar with it.

Q. Did you help draft that?

A. I drafted it, yes.

Q. Do you have any corrections you would like to make to that?

A. The only correction I would like to make to it is in the first sentence. This draft came during settlement talks or talks with the company over proposed conditions, and ultimately they didn't agree to it. And I failed to update the first sentence where it says, "Applicant agrees to undertake a minimum of two years."

And given that they didn't agree to it, Staff would propose that the language be changed to "Applicant shall undertake a minimum of two years," should the Commission find that this condition is reasonable and prudent based on the evidence presented to you in this hearing.

MS. EDWARDS: Thank you, Mr. Kearney.

I have no further questions for this witness and would tender him for cross.

MS. CREMER: Thank you.

Crowned Ridge.

MR. MURPHY: Thank you. No initial questions.

MS. CREMER: Thank you.

Intervenors.

CROSS-EXAMINATION

BY MR. GANJE:

Q. Thank you. Mr. Kearney, we've met. I'm Dave Ganje, and I represent the Intervenors in this matter.

I understand you've had a decent amount of settlement talks as you described them with the Applicant

working through potential conditions for a permit; is that right?

A. That's correct. And I identified in my prefiled testimony that we would be doing so and -- and filing draft permit conditions, proposed permit conditions, at the hearing for the Commission to review.

So it was in my prefiled testimony that we would be having those talks.

Q. My question then, the first question is have you -- because you were the lead person more or less for the Staff on the real work on the conditions; isn't that true?

A. Yes.

Q. I thought so. I'm pretty impressed with your abilities. I will compliment you, sir.

But I will ask you whether you included or consulted the Intervenors in the discussions you had with the Applicant regarding working out the terms of possible conditions for a permit?

A. We did not. And I tried to give the Intervenors an opportunity to provide justification for any conditions that they would like to see attached to a permit through my Prefiled Direct Testimony. I think it's table Exhibit DK-8 in Exhibit S2.

And there I kind of went through and said, okay, we

looked at all these proposed recommended conditions that we got through the Intervenor discovery, and I said we could agree, disagree, or maybe, depending upon further information.

Q. Yes.

A. So you had the opportunity to say, okay, well, Staff's not agreeing with these, unless there's more information filed as evidence. And so we were kind of just saying, okay, well, here's our initial position. Submit evidence to us through this process, and then we can reconsider it and update our testimony if needed. So that's kind of how we were seeing that play out.

We did not see any evidence come in that would cause us to reconsider our initial proposed position on those.

Q. Over the last several days you and the Staff have spent considerable time working with the Applicant on a series of probably important conditions that you're recommending to the Commission for the purposes of any approved permit; is that correct?

A. That's correct.

Q. Right. So that's serious stuff.

Did you, during any of this recent communication with the Applicants, reach out to me or to my clients to bring us into the loop in discussing those conditions so

that our input might be considered at this stage of the process?
A. Personally, I did not reach out to you. I cannot say whether or not Staff's counsel reached out to you or not. But I am not aware of that.
Q. Uh-huh. My next question would be is there a rule with which I am not familiar -- but there very well could be, but is there a rule that prohibits you from communicating with Intervenors?
MS. EDWARDS: Objection. Calls for a legal conclusion.
MR. GANJE: I'll ask it a different way.
Q. Is there something within the framework of your job that prohibits you from communicating with Intervenors concerning working out conditions of the potential permit with an Applicant?
A. Not --
MS. EDWARDS: Objection. That was asked and answered. He said he reached out to them in Exhibit DK-8 attached to his testimony. Also it's argumentative.
MR. GANJE: I don't think it is, ma'am. I'm just trying to find out why the process is working this way. And I do think it's a fair, relevant question.
MS. CREMER: I'm going to overrule, and you may answer.

THE WITNESS: Can you read back the question, please.

MR. GANJE: I would ask the honorable court reporter if she would do me the favor of reading back the question, please.

(Reporter reads back the last question.)

A. There is nothing that prevents us from reaching out to the Intervenors and we do so through the formal discovery process and through testimony and that's how we try to identify what issues the Intervenors may have or what concerns they may have with the project.

Q. You use that formal discovery process also on the Applicant; right?

A. That's correct.

Q. But, nevertheless, over the last several days or weeks you have been in informal negotiations with them not through a formal discovery process; is that correct?

A. That's correct, based on Staff's position on the issues in this matter.

Q. Okay. Wouldn't it be, in your opinion, helpful to moving this process along if you brought into the dialogue or into the loop Intervenors who were serious about this project and working with you on it?

A. And "this process" you're referring to --

Q. Is called wind farm siting process.

A. I would just state that this whole process the Intervenors have an opportunity to participate in through the evidentiary process.
Q. So apparently at the end of the evidentiary process communication continues with the Applicant but not with a good-faith Intervenor willing to communicate with you.
A. The evidentiary process has not ended yet, to the best of my knowledge. We're still part of it.
Q. I see. Well, anyway, I think you've pretty much answered my question, and the record reflects what took place here. And I have no further questions.
MS. CREMER: Thank you.
Commissioner Fiegen.
COMMISSIONER FIEGEN: Thank you, Mr. Kearney, for being here today. I finally get to ask you questions because you know I can't just walk into your office and ask you questions.
So a couple questions on the lek survey and just the lek condition and all of those issues.
It sounds like Game, Fish & Parks really recommended that for a known lek that the wind turbines are constructed -- is it at least a mile away?
THE WITNESS: That would be my understanding of their recommendation.
COMMISSIONER FIEGEN: Okay. And then you're

going to have to help me with these surveys and the condition. Because even the condition you've heard that -- it appears to me as a Commissioner that is a layperson, certainly on surveys, it appears to me that Crowned Ridge may not have done its due diligence on lek surveys. Maybe a prior owner back in previous years may have, but they may not have.

And so the condition looks at what Game, Fish & Parks has done, it looks like, and they state a lot of times they get it from the general public or -- and then it has Crowned Ridge Wildlife Survey, which may have nothing to do, it sounds like, as a layperson trying to analyze this finding lek areas.

So what are we going to do with the two-year survey, and do you think it's a comprehensive survey that is really going to look at lek areas in that area or maybe just some Game, Fish & Parks areas that were publicly given from the public to them?

THE WITNESS: What I can say is I drafted this language for the Commission to consider based on the recommendation from the GF&P.

As Mr. Kirschenmann has testified to, it's known leks or leks the Applicant had -- or Crowned Ridge knows of within one mile of a turbine that they would complete the leks monitoring on postconstruction.

It's not calling for a full blown survey of the whole entire project area because the GF&P is wanting the data on those that are located within one mile of the leks that are located within one mile of a turbine.

Does that answer your question, or did I misunderstand?

COMMISSIONER FIEGEN: No. I mean, I think it answers my question as good as I could clarify it. Because I'm still trying to put all of these pieces together and see what the end product will look like July 30 or whenever we have to sign our -- well, I guess we need to decide on it before that.

The other question about it is decommissioning and -- so is it your understanding NextEra is going to own this and Xcel Energy is only a PPA and will not own the project?

Is that your understanding?

THE WITNESS: Xcel's buying the energy from Crowned Ridge, LLC, which is an affiliate of NextEra. So yeah. Crowned Ridge will own the project.

COMMISSIONER FIEGEN: Sure.

So you certainly remember the testimony that we had on Senate Bill 16 and the IOUs when they would own a project it would be different. So we're certainly looking at the decommissioning and how important that

is.

THE WITNESS: And we did take that in past when an IOU has ended up doing a -- what is it -- purchase, bill, transfer, buy, whatever they call it, we took that language out of this condition specifically because an IOU wasn't going to own it. They're just procuring energy through a PPA.

COMMISSIONER FIEGEN: So I'm not going to ask you a legal conclusion because I can't, but do you think there's a way that Staff could possibly work with County Commissioners to get a waiver on their ordinance or --

I mean, because we want to make sure that our residents are protected. So that's our goal. And when you look at Senate Bill 16 we need to make sure they're protected.

So although there's ordinances out there of counties, what can the Commission do to ensure we're not being double commissioned, I guess, but --

THE WITNESS: That's a good question.

COMMISSIONER FIEGEN: -- our people are protected.

THE WITNESS: And that's what Staff's wrestling with.

Ideally there would be one escrow account agreement set up, which Staff would prefer under this

condition, and then the counties say, yep, that meets our financial assurance requirements and, therefore, the developer doesn't need to do anything else.

I don't know what the process would be for reaching out to the counties to get them to sign off on what the Commission does for a decommissioning condition, but I know that Crowned Ridge has been in talks with Grant County and Codington County about what decommissioning they would like to see. So perhaps they could provide more color on the proper process.

But at this point in time Staff's just considering this permit from the State perspective.

COMMISSIONER FIEGEN: Thank you. And I guess I kind of just wanted to have a conversation with you because I can't walk into your office. And the Commissioners are going to have to make a decision whenever Ms. Cremer decides to put it on the agenda, which will be, you know, within the next month.

So I just want to make sure you know how I'm thinking right now because I won't be able to tell you, only at a public hearing.

So thank you.

THE WITNESS: And can I clarify? Right now the way it was kind of going was that the counties would have the decommissioning requirement, and the Commission would

kind of waive their decommissioning -- their decommissioning requirement because you just defer to the counties kind of. And Staff wasn't comfortable with this based on the Commission's past decisions in recent dockets.

COMMISSIONER FIEGEN: Thank you for sticking up for us.

That's it, Chairman. The mic. is yours.

CHAIRMAN HANSON: Thank you, Commissioner.

Have you ever watched the Art Linkletter show?

THE WITNESS: I did not catch that. It must have been humorous.

COMMISSIONER FIEGEN: You have to look at Greg.

CHAIRMAN HANSON: Are all of Staff's concerns satisfied at this moment other than those that you've iterated?

THE WITNESS: Yes, they are, except the decommissioning and then the lek monitoring condition that Staff has the proposed language out there for.

CHAIRMAN HANSON: Thank you.

Does the Intervenor have the opportunity to contact the Applicant and discuss and negotiate their issues?

THE WITNESS: Yes.

CHAIRMAN HANSON: As far as you're aware.

THE WITNESS: I believe they would, as a party to the proceeding, be able to reach out to either Staff or the Applicant to talk about their issues and concerns.

CHAIRMAN HANSON: Has that taken place in this or other dockets, as far as you're aware? Do they send information back and forth and ask questions?

THE WITNESS: They do reach out to us and communicate with us. Some will call us and ask questions about the process or Staff's review of the material -- I guess it happens where it's just more informal communications that they reach out to us through -- in addition to the formal evidentiary process.

CHAIRMAN HANSON: I ordinarily wouldn't ask you -- excuse me.

I ordinarily wouldn't ask you these questions because it sounds more like a redirect, but since you're Staff with the Public Utilities Commission, I feel compelled to pursue.

Do Intervenors occasionally contact the Applicant and have discussions with them without having discussions with you? Are you aware of them? I mean, if they have those discussions, you wouldn't always be notified.

THE WITNESS: I'm not aware of those discussions. I wouldn't be aware of them. So I'm not

saying they do occur or they don't occur. I'm just not in the loop on those if they do occur.

CHAIRMAN HANSON: However, to the best of your knowledge, they do have that opportunity.

THE WITNESS: Yes, they do.

CHAIRMAN HANSON: Are all of your issues and Intervenors' issues identical?

THE WITNESS: No.

CHAIRMAN HANSON: Did you explore the issues that the Intervenors have proposed?

THE WITNESS: We looked into them and have tried to -- I did include our initial position on them in my Prefiled Direct Testimony so they could respond if they disagree with Staff's position and provide us more for support or justification for why that recommendation was being made.

CHAIRMAN HANSON: Yes. Your testimony does show that.

Do you negotiate on behalf -- and perhaps negotiate is the wrong word. Where do your interests lie and your pursuits lie as you go through this process? Do you -- do you work for the Commissioners? Do you work for the citizens of South Dakota? For the State? Where do you see -- what's your direction?

THE WITNESS: I don't view it's Staff's position

to represent the Intervenors' interests in these matters. We're representing the public interests of the whole population in South Dakota. Therefore, we're reviewing minimizing impacts to everyone to the extent practical and making sure that any proposed development is consistent with the laws and rules that the Commission has in place and laws that are in place that give this Commission the direction and authority to site these projects.

(Discussion off the record.)

CHAIRMAN HANSON: The Applicant has stated and Commissioner Fiegen gave her -- expressed some concerns. Once the counties --

The Applicant desires that the Counties' decommissioning requests supersede the State's. And give you -- my personal opinion is that the Counties' will not supplant the State's requirement for decommissioning. That's my position.

That's all the questions I have.

COMMISSIONER NELSON: Well, I like Chairman Hanson's position, but I'm going to have to ask some deeper questions to get at where we're really at with that.

So help me understand if we establish a condition regarding an escrow account as we have in a

number of dockets, why would that not comply with the Grant County requirement?

THE WITNESS: I would suspect that it would, and that's why Staff wasn't comfortable with the language that the Applicant proposed and the condition that we ended up pulling at the last minute.

I don't know why it wouldn't comply with the Grant County -- all the criteria set forth in their ordinance for an escrow account would be met, as well as additional language that has evolved over time through the discussion of wind project decommissioning before this Commission.

COMMISSIONER NELSON: In your discussions with the Applicant, have they relayed to you any reasons why they believe our escrow methodology would not comply with the Grant County requirement?

THE WITNESS: Not that I recall.

COMMISSIONER NELSON: Well, in that case, I think we can follow Chairman Hanson's lead. I'm good with that.

No further questions.

MS. CREMER: Thank you.

Any redirect?

MS. EDWARDS: Can we take a five-minute break so I can go through all my notes?

MS. CREMER: Yes.

MS. EDWARDS: Thank you.

(A short recess is taken.)

MS. CREMER: We'll go back on the record.

Staff.

MS. EDWARDS: Thank you. I just have a very brief redirect.

REDIRECT EXAMINATION

BY MS. EDWARDS:

Q. Are you involved in other wind siting dockets at this Commission?

A. I am, yes.

Q. And there were a number of questions about sitting down with the Intervenor and Applicant. Are you aware, in fact, in another docket did Staff sit down with the Intervenor and the Applicant upon the Intervenor requesting interest?

A. Yes. Staff drove to Miller to meet with the Intervenor and Applicant to try to address the concerns and see if there would be a way to work out her concerns.

Q. Do you know, was this at the Intervenor's request?

A. I believe it was, yes.

Q. Okay. In these wind siting dockets is it your practice to send out a Data Request to Intervenors to gauge their concerns?

A. Yes. So we have an idea of what their concerns are, we do send out a discovery request, and one of those includes what are your concerns with the project. Another one is please provide any recommended permit conditions that you would think is necessary for the project.

Q. Did you do that in this docket?

A. We did, yes.

Q. Did you receive a response?

A. Yes. We received a response.

Q. Is that filed with your testimony?

A. Yes. It's part of S2.

Q. Is that S2 Exhibit DK-8 in your testimony?

A. DK-8 is the table that I made of their proposed recommended permit conditions. Their discovery request is in there, and I believe it's S3 -- or DK-3.

Q. Based upon that discovery request response, did you have an impression of -- strike that.

What was your assessment of a likelihood of a global settlement in this docket?

A. Given that there was no additional justification presented to Staff or submitted through testimony, Staff felt that there was a very low likelihood of reaching a global settlement on those issues.

MS. EDWARDS: Thank you. I have no further

questions.

MS. CREMER: Thank you.

Crowned Ridge, do you have any recross?

MR. MURPHY: No. Thank you.

MS. CREMER: Thank you.

Intervenors.

MR. GANJE: None.

MS. CREMER: Thank you.

There would be no final redirect in that case. You may step down, Mr. Kearney.

(The witness is excused.)

MS. CREMER: Please call your next witness.

MS. EDWARDS: Staff rests.

MS. CREMER: We thought Mr. Paulson was to be called.

MS. EDWARDS: Staff calls Eric Paulson.

MS. CREMER: Okay. Maybe not.

CHAIRMAN HANSON: It's easy not to spot him.

MS. CREMER: So, Crowned Ridge, are you prepared to do rebuttal? Do you have rebuttal?

MR. MURPHY: We do not have rebuttal. If you'd like, I could go through the Data Requests that have been supplied to make sure the Commission's aware of what we supplied and what's outstanding.

And I also believe that the Commission wanted to

recall one of our witnesses to talk about shadow flicker, and we've provided that table.

But other than that, I think that's all that we would have outstanding.

MS. CREMER: Okay. And I will have you go through that in a moment. And so I'm just going to remind all the parties that if you have exhibits that you believe have been offered and admitted, you should confirm that with your notes because we will be closing out the evidentiary hearing shortly.

So please proceed then.

MR. MURPHY: Thank you. I have a number of Data Requests I'll just go through and make sure that we're on the same page with other requests or Data Requests.

The optional agreements were filed this morning as confidential documents. The five FAA pending turbine were filed this morning. The insurance types and limits were filed this afternoon as a confidential document. The coldest temperature that turbines can operate with the extreme cold weather package was filed. And this afternoon the shadow flicker tables were also filed and distributed.

Mr. Haley is available to receive questions on those.

As far as outstanding exhibits that I want to

make sure were moved into the record, I have A52, A53, and A54 that my recollection is not serving me that those were moved into the record, and we would like those moved -- we would move for those to be into the record at the appropriate time.

MS. EDWARDS: No objection.

MS. CREMER: Intervenors. And you said, to make sure, 52, 53, 54?

MR. MURPHY: Correct.

MS. CREMER: All right. Thank you.

MR. GANJE: Counsel, are 53 and 54, have they previously been provided, or is there a more recent map that was submitted?

MR. MURPHY: 54 is the final map that Mr. Wilhelm walked through with the additions of the stickies, which were removed after we walked through it.

MR. GANJE: Okay. That's 53 or 54?

MR. MURPHY: They're one in the same, except that 54 included some turbines that were missing during the printing of 53. They're essentially the same for some dots that were inadvertently not on the original map. Same final status of land, some array, same collection.

MR. GANJE: And that A54 was submitted yesterday; is that correct?

MR. MURPHY: My days are running together for me. I thought it was Monday.

MS. CREMER: Yeah.

MR. GANJE: It was Monday. Okay. It was submitted prehearing, in other words.

MR. MURPHY: Correct.

MR. GANJE: No objection.

MS. CREMER: Thank you.

And then, Mr. Murphy, those ones that you mentioned the options, the insurance, do those have exhibit numbers, and are you offering those?

MR. MURPHY: Thank you. They do, and I'll let -- Miles, if you can read them off.

MR. SCHUMACHER: Yes. I can provide the exhibit numbers for those that were filed today.

Exhibit A62 and A63 are -- 62 is the FAA pending turbine locations. A63 is the Amended Condition 26 with regard to sound level.

Exhibit A64 and 65 are the two confidential landowner agreements. Exhibit 66 is a letter from me that includes information about the extreme cold weather package that is going to be installed on the turbines.

Exhibit 67 and 68 are the updated shadow results. 67 is Appendix C-1 updated, and Exhibit A68 is Appendix C-2 as updated. And, finally, Exhibit 69 is the

confidential exhibit including the project insurance information.

MR. GANJE: If I may, Madam Examiner.

MS. CREMER: Uh-huh.

MR. GANJE: One that you didn't identify, counsel, was the five FAA pending turbines. That was a document, but you didn't indicate that with an exhibit number. That was my first concern.

MR. SCHUMACHER: I'm sorry. Would you please repeat that?

MR. GANJE: Yes. Your colleague mentioned that you were submitting a document identifying five FAA pending turbines or turbine concerns. What exhibit number is that?

MR. SCHUMACHER: That was A62.

MR. GANJE: And that -- I know with regard to the land agreements your colleague mentioned that he was claiming that as confidential, but the five FAA pending turbine question or document, that isn't confidential.

MR. SCHUMACHER: That is not confidential. 62 is not confidential. You were served with that.

MR. GANJE: When was I served with that one, counsel?

MR. SCHUMACHER: Today.

MR. GANJE: I was. By electronic?

MR. SCHUMACHER: Yes.
MR. GANJE: Then at some point I'll be able to see on a map where those five are located?
MR. SCHUMACHER: I don't know whether it's a map or just the turbine numbers.
MR. GANJE: Sure. That will get me to a map eventually.
MR. SCHUMACHER: Yep.
MR. GANJE: Thank you.
MS. CREMER: Did you have any objection to those?
MR. GANJE: No.
MS. CREMER: All right. Staff.
MS. EDWARDS: The only one I have a concern with is Exhibit A69. It's the insurance coverage. I just have sort of a foundational concern just because I don't know where this came from or who has the knowledge of this since all the witnesses testified they didn't have any knowledge of it.
Could you just say what witness this would be tied to, who made it, where did it come from?
MR. MURPHY: It came from Sam Massey, and he worked with our insurance experts in the company.
MS. EDWARDS: No objection.
MS. CREMER: All right. With that, 52, 53, 54,

62, 63, 64, 65, 66, 67, 68, and 69 are admitted.

MR. SCHUMACHER: And, finally, we're not certain whether or not A6-1, which is the joint stipulation of agreed conditions between Crowned Ridge and PUC Staff, has been offered.

MS. EDWARDS: To my knowledge that was never offered.

MS. CREMER: I don't have it marked.

MR. SCHUMACHER: Okay. We do have that marked as Exhibit A61 and would offer that.

MS. CREMER: Intervenors.

MR. GANJE: Well, I wasn't involved in any of these negotiations. I object. I have no grounds to understand -- I've seen it for the first time but I was not involved in it and I can't say whether this is right or fair or relevant or material or it concedes something that will be a prejudice to my clients and that concerns me greatly.

That's why I was disappointed not to be involved in the last series of negotiations that took place with the PUC Staff and the Applicant. I would have made myself available had I even known they occurred. I found out about them only this week. So I object to the introduction of the stipulation or proposed permit conditions on those grounds.

MS. CREMER: Thank you. It will be noted.

Staff.

MS. EDWARDS: I guess I'm not sure whether that was a foundational objection or what, but I have no objection.

MS. CREMER: Thank you. It will be admitted.

Commissioners, did you want to recall Mr. Haley to discuss the exhibits that were filed?

COMMISSIONER FIEGEN: And I do not. I looked at it. The 136 participating one is on there. Otherwise, everybody else is below. So I do not need to call him.

CHAIRMAN HANSON: As much as I enjoy Mr. Haley's company, no.

MS. CREMER: Thank you.

Does anyone have anything further?

COMMISSIONER FIEGEN: Yes. I do have an outstanding one that Mr. Murphy, I bet you -- he had the mic. ready to go. So the outstanding one of the 19 native grasses that was in the original map that you'll supply --

MR. MURPHY: I would think we could supply that tomorrow or the next day at the very latest.

MS. CREMER: All right. So that will be a late-filed exhibit, and that would be A what?

MR. SCHUMACHER: I believe that would be A70.

MS. CREMER: Okay. And as to A70, Intervenors, any objection?

MR. GANJE: Would you be kind enough to describe the nature and contents of the exhibit.

MR. MURPHY: The nature is the Commission's asked to show if the 17, if I remember correctly, turbines that were originally on native grassland are still sited on native grassland or have been removed under the Hessler proposal or the other moves.

COMMISSIONER FIEGEN: And if I can just make a comment, I believe Mr. Kirschenmann said there were 19 of the 130. So I just want to see how that number has changed according to the movement of turbines.

MR. GANJE: I have no objection.

MS. CREMER: Staff.

MS. EDWARDS: No objection.

MS. CREMER: Thank you.

COMMISSIONER NELSON: In relation to the cold weather package, A66, can I have an assurance from the Applicant that when it hits minus 40 that you'll send Mr. Thompson up here to check and make sure it's all working properly?

MR. MURPHY: You do recall where he went to school.

COMMISSIONER NELSON: I did, yes. I thought it

might be a cultural experience for him.

MR. MURPHY: I can assure you, and he is a good friend of mine, I will accompany him to come up here and do that.

COMMISSIONER NELSON: Perfect.

MS. CREMER: Okay. Seeing nothing else, we're done with the witnesses.

The posthearing schedule will be that briefs should be filed by noon on July 2. The Commission will hear oral argument and issue its decision on July 9. And we will come up with a time and how long you're going to have.

The order must be out by July 30. This schedule is very similar to all the previous schedules due to the six-month turnaround.

I would like to receive findings and conclusions from the parties, but you are not required to do so.

And before I give the gavel back to Chairman Hanson, is there anything else?

Seeing nothing, hearing nothing, this concludes my Hearing Examiner portion of this. And thank you, everyone. It went much more quickly than I had anticipated, and I appreciate everyone's courtesies.

CHAIRMAN HANSON: Thank you, Hearing Examiner Karen -- or Ms. Cremer. Appreciate it very much. And

thank you to everyone who testified and participated. We appreciate the process. Every time we go through one of these it's different, and we learn different things.

And from my standpoint, I really appreciate when folks are as open as they have been and provide the information very quickly when we ask for it. And safe travels to you. I will turn to either of my fellow Commissioners if they have something to say.

COMMISSIONER NELSON: I would just simply say thank you to all the parties. I know we have very entrenched positions here, and I appreciate the vigorous advocacy on both sides and your willingness to participate in the process.

Thank you.

CHAIRMAN HANSON: With that.

COMMISSIONER NELSON: Move to adjourn.

CHAIRMAN HANSON: Thank you.

Commissioner Nelson.

COMMISSIONER NELSON: Aye.

CHAIRMAN HANSON: Commissioner Fiegen.

COMMISSIONER FIEGEN: Fiegen votes aye.

CHAIRMAN HANSON: Hanson votes aye. We are adjourned.

(The hearing is adjourned at 4:45 p.m.)

STATE OF SOUTH DAKOTA)

:SS CERTIFICATE

COUNTY OF SULLY)

I, CHERI MCCOMSEY WITTLER, a Registered Professional Reporter, Certified Realtime Reporter and Notary Public in and for the State of South Dakota:

DO HEREBY CERTIFY that as the duly-appointed shorthand reporter, I took in shorthand the proceedings had in the above-entitled matter on the 12th day of June, 2019, and that the attached is a true and correct transcription of the proceedings so taken.

Dated at Onida, South Dakota this 29th day of June, 2019.

/s/ Cheri McComsey Wittler
Cheri McComsey Wittler,
Notary Public and
Registered Professional Reporter
Certified Realtime Reporter

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