

**BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF SOUTH DAKOTA**

IN THE MATTER OF THE APPLICATION BY PREVAILING WIND PARK, LLC FOR A
PERMIT OF A WIND ENERGY FACILITY IN BON HOMME COUNTY, CHARLES MIX
COUNTY, AND HUTCHINSON COUNTY, SOUTH DAKOTA, FOR THE
PREVAILING WIND PARK PROJECT

EL18-026

PREFILED TESTIMONY OF RICHARD R. JAMES

ON BEHALF OF INTERVENORS



1 **Q: Please state your name, title, affiliation, and address.**

2 A: My name is Richard R. James. I am the Principal Acoustician for E-Coustics
3 Solutions, LLC, in Okemos, Michigan.

4 **Q: What is the purpose of your testimony?**

5 A: I am testifying to the acoustic issues of appropriate thresholds for audible and
6 in-audible wind turbine sound at non-participating properties in the footprint of the
7 proposed Prevailing Wind Park Project (PWPP) and to the computer modeling used by the
8 applicant to assess impact of noise.

9 **Q: What is your educational and professional background?**

10 A: I have a degree in Mechanical Engineering with emphasis on noise control and
11 acoustics. I have attached a set of documents that provide the details of my professional
12 work. (See Exhibit 1.) The first page of that packet summarizes my work with focus on wind
13 turbines since 2006 when I formed my current company, E-Coustic Solutions, LLC, (E-CS). It
14 summarizes my published papers and qualifications to speak to wind turbine noise
15 measurement, modeling and the impact of wind turbine noise on people in various
16 jurisdictions. The next page is an excerpt from a Business Week article on my work with my
17 clients using a computer model I developed with my first company based on the work I did
18 for my undergraduate thesis. This model was accepted in government hearings in 1976. It
19 was capable of modeling both in-facility worker noise and community noise. I was one of the
20 first acousticians to use computer models for new facility design long before there were
21 established national standards for such work. Other parts of the package cover my
22 professional credentials and affiliations, list my publications and list hearings that I have
23 participated in over the past 10 years.

24 **Q: What experiences have you had that qualify you as a health expert in cases
25 involving wind turbine noise?**

26 A: I began looking at wind turbine noise as a special case of noise source shortly after
27 closing my last company in 2006. Several early projects resulted in media exposure and I
28 began to get requests from many places, some international, to advise local agencies or
29 intervenors on proper siting methods. Because of that early work I have been involved in
30 many major lawsuits about wind turbine noises where I have had access to not only my
31 research work but also that of the opposing acousticians through discovery. I was also
32 involved with the early studies that found that modern utility scale wind turbines emitted a
33 pressure pulsation caused by the blade when it passes in front of the tower back in 2009.

34 This experience led to my work for the intervenors in the Wisconsin Brown County Shirley
35 Wind case which Mr. Hessler referred to in his written testimony submitted in prior
36 proceedings before the PUC. Subsequent to that I have been associated with other
37 acousticians around the world, such as Steven Cooper of Australia's Acoustics Group who
38 have reproduced my work and expanded upon it.

39 This experience gives me a unique set of experiences that I have used to advise my clients for
40 projects currently under development or for lawsuits related to existing projects.

41 **Q: What materials have you reviewed in this matter?**

42 A: I have reviewed:

- 43 1. The sound study conducted by Burns & McDonnell Engineering Company, dated May
44 18, 2018;
- 45 2. The contour maps of the Project depicting the 45 dBA Leq boundaries from the sound
46 study model;
- 47 3. The pre-filed testimony of Chris Howell, summarizing his and the Burns and
48 McDonnell Engineering report assessing noise from the Prevailing Wind Park Project
49 (PWPP);
- 50 4. The pre-filed testimony of Dr. Mark Roberts regarding Prevailing Wind Park;
- 51 5. The testimony of David M. Hessler, dated May 4, 2018, regarding his review of the
52 Dakota Range Wind Project and recommendations for noise thresholds;
- 53 6. The testimony of David M. Hessler, dated March 28, 2018, regarding the Crocker
54 Wind Farm; and
- 55 7. Bon Homme County's Article 17, regulation of wind energy systems (WES).

56 **Q: After reviewing those materials, what is your overall impression regarding**
57 **any potential health risks posed by the proposed Project?**

58 A: The project, as proposed, has a significant potential to cause **adverse health effects**
59 **related to sleep disturbance and** annoyance to audible sounds from the wind turbines,
60 especially at night. The recommended thresholds by Howell and Hessler of 45 dBA Leq,
61 are not appropriate for rural communities. This is especially true for communities that have
62 no prior experience with utility scale noise sources operating 24/7/365 that produce
63 fluctuating, pulsatile, tonal infra and low frequency sound. Wind turbine noise emissions
64 have specific characteristics that make them more likely to cause these adverse effects than
65 other common rural noise sources. Thus, criteria intended for urban/suburban
66 communities where traffic noise is the typical nighttime noise source (urban hum) are not

67 suitable for communities where people have an expectation of quiet. People in rural
68 communities have lifestyles that are based on the quiet nature of most rural communities at
69 night. This is reflected in ANSI-ASA S12.9 Part 4 "Noise Assessment and Prediction of
70 Long-term Community Response" Appendix F, which cautions:

71 "F.3.4.1 In newly created situations, especially when the community is not familiar with the
72 sound source in question, higher community annoyance can be expected. This difference
73 may be equivalent to up to 5 dB.

74 "F.3.4.2 Research has shown that there is a greater expectation for and value placed on
75 "peace and quiet" in quiet rural settings. In quiet rural areas, this greater expectation for
76 "peace and quiet" may be equivalent to up to 10 dB.

77 "F.3.4.3 The above two factors are additive. A new, unfamiliar sound source sited in a quiet
78 rural area can engender much greater annoyance levels than are normally estimated by
79 relations like equation F.1. **This increase in annoyance may be equivalent to adding up to
80 15 dB to the measured or predicted levels.**" (Emphasis added)

81 The community's response to the wind turbine noise will be as if the wind turbines were 15
82 dB louder than what is being predicted. This caution was in the EPA's 1974 Levels
83 Document and also is present in current ISO standards followed in the EU and other
84 countries. It is accepted acoustical practice that is overlooked by wind energy developers
85 and their consultants.

86 **Q: Are there sound level limits that you find more appropriate for rural
87 communities?**

88 A: In 2008 I worked with George Kamperman, one of the senior acousticians who led in
89 the development of community noise limits for urban and suburban communities in the
90 1960s and 70s, to determine what the proper sound limits should be for wind turbines in
91 quiet rural communities. Wind turbines were never considered when the community noise
92 limits were set and especially it was not anticipated that they would be located in quiet rural
93 areas near homes. So we decided to apply the same type of analysis to wind turbine noise as
94 had been done for other common community noise sources in the past. We looked at when
95 the turbines would operate, what the nighttime background sound levels would be in the
96 receptor's location, and how much sound they emit in each frequency band. Then applying
97 methods for calculating sound propagation that reflect how low frequency sound differs
98 from higher frequency sound, we estimated the distances needed to prevent the noise of ten
99 (10) wind turbines of the 1.5 MW class common in the late 2000s from causing nighttime
100 annoyance inside a home with windows open.

101 We determined that the maximum sound level for audible sounds should be 35 dBA

102 (Leq) and 50 dBC, especially for nighttime wind turbine noise. We also limited the new
103 noise source to be no more than 5 dBA louder than the pre-operational background sound
104 level at night. Typical nighttime background sound levels are under 30 dBA (L90) in these
105 communities so the 35 dBA acts as an upper limit.

106 The Kamperman/James document was subsequently reviewed in a paper titled:
107 “Noise: Wind Farms,” by three experts (Shepherd (Psychoacoustics), Hanning (Sleep
108 Medicine Specialist) and Thorne (low frequency acoustician)) and published in the 2012
109 edition of the Encyclopedia of Environmental Management. They review the special
110 character of wind turbine noise and in the Appendix update the criteria that Mr.
111 Kamperman and I prepared in 2008 to address the fluctuating character of wind turbine
112 noise. I have attached a copy as Exhibit 2 of their paper for the details behind these criteria.

113 **Q: Are there other acousticians who have made similar recommendations**
114 **for noise thresholds in rural communities?**

115 A: Yes, there are many who have made similar recommendations. In 2017, Dr. Paul
116 Schomer, the Emeritus Director of the Acoustical Society of America’s Standards Committee
117 published a paper titled: “A possible criterion for wind farms” at the 173rd meeting of the
118 Acoustical Society of America. (See Exhibit 3.) Dr. Schomer, in his capacity as Director of
119 the ASA Standards Committee has directed the work of the American National Standards
120 Institute (ANSI) groups that produce the S12 consensus standards on how to measure noise
121 and how noise affects people for over 30 years.

122 In his 2017 paper, he reviews how proper application of the ANSI standards for
123 assessing the impact of a new noise source on a community to avoid adverse impacts results
124 in a criterion of 36 to 38 dBA Leq. Dr. Schomer explains how the character of wind turbine
125 noise requires lower limits than other common community noise sources.

126 He also bases his recommendation on the findings of a major study conducted by
127 Health Canada (the Canadian equivalent to the US Centers for Disease Control (CDC)).
128 That study looked at a sample of just under 2000 people living within 3-5 km of six wind
129 projects in Ontario. It found that the percent of people who report they are highly annoyed
130 by wind turbine noise jumps dramatically from less than 2% when the modeled sound levels
131 are 35 dBA Leq or less to over 10% for levels between 35 and 40 Leq. Health Canada
132 defines High Annoyance to noise as an adverse health effect in accordance with the World
133 Health Organization (WHO) and other bodies. The limits for new wind projects in Canada
134 are set at 40 dBA Leq (worst case one hour). Thus, if PWPP is permitted to produce higher
135 sound levels, it should be expected that annoyance will also be higher for those closest to the
136 turbines.

137 Other countries, such as the U.K., Australia, and New Zealand, also use 40 dBA Leq

138 as the upper limit for wind turbine projects. Some, like Germany and other European
139 countries have limits of 35 dBA Leq for rural communities. Limits like these have not
140 prevented wind energy development in those countries. The developers have to select
141 locations where there is sufficient distance to prevent noise from exceeding the limits or
142 work out private easement contracts with neighbors.

143 **Q: Has the use of a limit of 40 dBA Leq been found adequate to prevent**
144 **adverse effects?**

145 A: No. This might be anticipated from the Health Canada finding that 10% of people
146 find sound levels in the range of 35 to 40 dBA Leq are highly annoyed, increasing to about
147 14% for higher sound levels. Jurisdictions that set the threshold at 40 dBA Leq must deal
148 with ongoing complaints, threats of legal action and other indicators that 40 dBA Leq is not
149 sufficiently protective. Proper siting criteria can prevent this.

150 **Q: How can, what appears to be a small change in sound level from 40 Leq**
151 **to my 35 dBA Leq or Dr. Schomer's 36-38 dBA Leq, make such a difference in**
152 **acceptability?**

153 A: While it may appear that the difference is only a few decibels, it is important to
154 remember that a 3 dB change in sound levels represents a doubling or halving of the
155 acoustic energy. Thus, a change from 40 dBA to 37 dBA Leq is equivalent to turning off half
156 of the wind turbines in a project designed to meet the 40 dBA Leq limit. This implies that the
157 3 dB change increases the setback distances by a substantial amount.

158 Based on my experience reviewing Ontario projects designed for 40 dBA Leq the
159 closest homes to wind turbines have setbacks of about 1800 feet. To meet a 37 dBA Leq limit
160 these setbacks would be increased to about 2500 feet. To meet the 35 dBA Leq limit the
161 setback distance would be on the order of 3600 feet. To prevent annoyance during nighttime
162 periods from multi-turbine projects Mr. Kamperman and I calculated the setback would
163 need to be 1.25 miles (2km).

164 This is primarily because the rural areas are so quiet at night that even at these
165 distances wind turbines can be audible inside homes where people are sleeping, especially
166 those that sleep with windows open. To avoid this disturbance, the people would need to
167 change their behavior to how suburban people cope with noise by having windows closed
168 much of the time and using air conditioning for summer cooling.

169 In parts of Germany and Poland noise limits have been replaced with arbitrary
170 setback distances based on the diameter of the wind turbine's rotors. The setbacks are
171 equivalent to ten (10) times the rotor diameter. Thus, for a wind turbine with a 110 meter
172 diameter blade the setback would be about 3600 feet. This is equivalent to the setbacks

173 derived for 35 dBA Leq limits discussed above but avoids the complexity of sound modeling.

174 **Q: Should these limits be applied to the property lines or to the homes?**

175 A: I am a strong supporter of property rights and believe that noise that exceeds known
176 safe levels should not be imposed on people just because they live near a neighbor who
177 wishes to host wind turbines. This position influences my response to this question.

178 If a person owns property that is primarily agricultural with a residential home, they
179 should still have the entire property protected to prevent future restriction on how the land
180 can be used. For example, in the future they decide to subdivide their property for
181 residential purposes. If the limit was set to the home, it is possible that the future
182 development would be in a location where the noise is excessive for residential land use. If
183 the limits are set for the homes, not the property lines, then wind project's noise emissions
184 physically trespass on the neighbor's property without any compensation for the
185 non-participating neighbor. The phrase "Noise Trespass" has been used in states like
186 Michigan and Ohio where the debate over setting limits for the property line vs home are
187 debated.

188 The question may be easier to answer if we look at other forms of pollution than
189 noise. Take water pollution for example. If a farmer raises livestock and that livestock
190 causes pollution of a stream passing through the property, the adjacent property owner is
191 deprived from using the stream for normal purposes. In most states that I am aware of, the
192 pollution is controlled at the emitter's property line. The same should be true for noise
193 pollution. The landowner hosting the wind turbine may have a right to have a wind turbine
194 on his/her property but does not have any rights to allow that sound energy to trespass onto
195 the properties of neighbors. The obligation to prevent that trespass is on the property
196 owner hosting the wind turbine(s) and the utility operator.

197 There is nothing that prevents the utility developer from working out an agreement
198 with non-participating property owners to compensate them for allowing higher sound
199 levels on parts of their property that are between the home and property line that they know
200 will not be used for residential developments. Thus, the property line should be the default
201 for protecting neighbors. If the utility developer/operator is willing to provide compensation
202 for the "Noise Trespass" they can work out arrangements to protect that part of the property
203 that is residential or may become residential in the future.

204 **Q: What other characteristics of wind turbine sound emission affect**
205 **adjacent properties?**

206 A: The limits using dBA criteria are focused on sound that is in the speech frequency
207 range. Sounds that are heard. The A-weighting process de-emphasizes low frequency

208 sounds from 500 Hz and below. That includes sound that is felt. Like the bass beat from a
209 neighbor's home when they play the stereo loud. Modern utility scale wind turbines like
210 those proposed for PWPP have most of their acoustic energy in the range from under 1 Hz to
211 500 Hz that is ignored by the dBA calculations. This sound is called infrasound (0-20Hz)
212 and low frequency sound (20-250Hz). Low frequency sounds, including infrasound, are
213 problematic because they propagate much further than higher frequency sound with little
214 loss of energy. That results in people hearing a rumble (very low frequency noise) or roar
215 (low frequency sound above 100Hz) that penetrates their homes, especially at night when
216 the house is quiet. Infra and low frequency sounds are not blocked by normal home
217 construction methods for walls, roofs and windows.

218 Infra sound is a special case of low frequency sound where the energy has to be very
219 high for the sound to be audible, but some people can “feel” the sound as body vibrations,
220 pressure changes, migraines, tinnitus, dizziness, and other non-auditory effects. This is not
221 limited to wind turbines. It also is a characteristic of helicopter sound emissions or large
222 fans in high rise office buildings when they need maintenance. (In that last case the term is
223 Noise induced Sick Building Syndrome.)

224 Dr. Schomer’s 2015 paper titled: “A theory to explain some physiological effects of the
225 infrasonic emissions at some wind farm sites” (attached as Exhibit 4) explains how these
226 inaudible levels of wind turbine sound, which are presented as pressure pulsations inside of
227 homes, can trigger these non-auditory sensations and symptoms. The phrase “Wind
228 Turbine Syndrome” was coined by Dr. Nina Pierpont, MD. to describe them. These
229 symptoms cannot be explained as occurring due to audible sound levels in the speech
230 frequency range. See the attached Exhibit 5, which is a one-page summary of wind
231 turbine blade pass frequency and effects, for an explanation of how these pulsations are
232 produced.

233 Mr. Hessler refers to a study in his written testimony that he participated in for the
234 Wisconsin Public Service Commission for the Shirley Wind Project in Brown County
235 Wisconsin. That study was conducted in the homes of my clients who had filed complaints
236 with the WI PSC during a hearing on a second wind project in another part of the state. The
237 study that Mr. Hessler points to was designed by me for my clients and accepted by the PSC.
238 I developed the test protocol, selected the homes to be tested, and picked the acousticians
239 who would conduct it. Because the complainants were my clients, I did not participate, but
240 was given full access to the data and did an independent analysis for the PSC which
241 confirmed the presence of pulsating infrasound.

242 This study confirmed that inside the homes, wind turbine pulsations created by the
243 loss of lift on the blades as the blade passes into the wind deficit region in front of the tower

244 was present at levels almost the same as outside the homes. I have attached as Exhibit 6 a set
245 of graphs showing the infrasound that I prepared for the Brown County Health Department
246 showing the infrasound using two types of instrumentation. The graph on the first page
247 shows the spectrograms from multi-hour micro barometer tests in the home with the
248 highest infra sound during the test Mr. Hessler describes. (This was R1 of the study at 3600
249 feet from the nearest wind turbine). The infrasound pulsations are seen as horizontal
250 bands of energy and are explained in the notes. The last page shows a simultaneous test at
251 R1 and another home located about four (4) miles away where the occupants experience
252 pressure related headaches when the turbines are operating even though none of the wind
253 turbines are visible. The infrasound traces are still present at this distance although
254 somewhat attenuated. It is this ability to propagate long distances that makes the infra
255 sound component of wind turbine noise so problematic.

256 Brown County's Health Department declared the entire region within 2.5 miles of the
257 Shirley Wind project to be a "Human Health Hazard" zone. This is an official classification
258 under Wisconsin law.

259 The owners of two of the homes (R1 at 3600 feet and R3 at one mile) abandoned their
260 homes shortly after the project started to operate due to symptoms that included nausea and
261 dizziness. Those homes are still vacant. R2 was abandoned to the mortgage company who
262 resold it to a different family.

263 **Q: Has this study been duplicated?**

264 A: Yes, several times by myself and other acousticians, most notably Steven Cooper of
265 Australia's Acoustics Group. Cooper's Cape Bridgewater study is very detailed and lengthy
266 but can be obtained at
267 <http://www.pacifichydro.com.au/english/our-communities/communities/cape-bridgewater-acoustic-study-report/>.
268

269 He finds that the test subjects in his three test homes were able to reliably sense the
270 starting and stopping of the wind turbines without visual cues. One test subject was
271 functionally deaf due to childhood illness damaging the auditory nerves. This test subject
272 was able to sense the operation of distant wind turbines without any auditory or visual cues.
273 Mr. Hessler refers to this study as one that resulted in him rethinking his position on
274 inaudible infrasound as a source of adverse health effects.

275 Dr. Schomer references this study in his paper (referenced earlier) and also
276 conducted a peer review of it. His peer review concludes:

277 "The results are that there is a cause and effect relationship between turbine power output
278 and subject response, and, at the same time there is no correlation between subject

279 response and either sound level or vibration level. These results show that there is a
280 non-visual, non-audible pathway by which wind turbine emissions can cause some specific
281 effects in some people. These results say nothing about the nature of these effects. Nothing
282 internal to the body is discussed. We again reiterate to government and to wind farm
283 operators, if you don't believe the results, replicate the study using clearly independent
284 consultants.

285 “Some may ask, this is only 6 people, why is it so important? The answer is that up until now
286 windfarm operators have said there are no known cause and effect relations between
287 windfarm emissions and the response of people living in the vicinity of the windfarm other
288 than those related to visual and/or audible stimuli, and these lead to some flicker which is
289 treated, and “some annoyance with noise.” This study proves that there are other pathways
290 that affect some people, at least 6. The windfarm operator simply cannot say there are no
291 known effects and no known people affected. One person affected is a lot more than none;
292 the existence of just one cause-and-effect pathway is a lot more than none. It only takes
293 one example to prove that a broad assertion is not true, and that is the case here.

294 Windfarms will be in the position where they must say: “We may affect some people.” And
295 regulators charged with protecting the health and welfare of the citizenry will not be able to
296 say they know of no adverse effects. Rather, if they choose to support the windfarm, they
297 will do so knowing that they may not be protecting the health and welfare of all the
298 citizenry.”

299 **Q: Has this been duplicated in a controlled laboratory test?**

300 A: Yes. Mr. Hessler references such a study in his testimony. This was reported in a
301 paper presented by Steve Cooper at the Acoustical Society of America’s December 2017
302 conference and published in the Proceedings of Meetings on Acoustics (POMA) in a paper
303 titled: “Subjective perception of wind turbine noise - The stereo approach.”

304 Steve Cooper designed a laboratory where he could accurately reproduce the sounds
305 he measured in the Cape Bridgewater homes in both frequency and time domain, down to 3
306 Hz. He created an audio sample from one of his Cape Bridgewater measurements that
307 reproduced the pulsations at the infrasonic rate of the blade pass frequency. He did blind
308 testing of people who included some who live in wind projects and by others who did not
309 think they were sensitive to such sounds.

310 Cooper’s controlled experiments reproduced the acoustical characteristics found
311 inside homes where sensitive people have filed complaints of sensations and other
312 non-auditory complaints. Inaudible sound pulsations occurring at infrasonic rates emitted

313 by wind turbines were shown to cause perceptible sensations in test subjects who
314 self-identified as being sensitive to wind turbine infra sound. Those who self-identified as
315 being sensitive to wind turbine infra sound were able to reliably detect when the sample was
316 played or not and could also detect the direction from which the sound came (blindfolded
317 and sitting in a swivel chair). Some of the test subjects who did not identify as “sensitive”
318 were also able to detect the presence of the infra sound pulsations.

319 Mr. Cooper’s study shows that:

- 320 1. It is possible to reproduce in a controlled laboratory experiment the acoustic
321 characteristics of wind turbine sound pressure pulsations occurring at
322 infrasonic rates found in homes of people living near utility scale wind
323 turbines who have filed complaints of adverse sensations and health effects.
- 324 2. These inaudible acoustic conditions reliably trigger in self-identified “sensitive
325 people” sensations and adverse effects associated with the complaints by
326 people who live in or near the footprint of utility scale wind turbines.

327 Wind turbine sound emissions consisting of dynamically modulated pressure
328 pulsations at infrasonic rates synchronized to the blade pass frequency were shown to cause
329 sensations and other adverse effects under controlled laboratory conditions.

330 There are other studies of this type being conducted but they do not use a real audio
331 sample from a home where people have reported the sensations. Those studies rely on
332 what is being called a “surrogate sample” that does not include the dynamically modulated
333 pressure pulsations, they only reproduce the frequency and sound pressure levels measured
334 in the homes. Thus, they do not include the most important characteristic of pulsating
335 noise. These studies report that the test subjects do not respond to the sound. This is a
336 strong piece of evidence that it is the pulsations and not the infra and low frequency sound
337 levels that are important in producing sensations. It also explains why people do not report
338 these sensations when exposed to steady infra sound from the natural environment.

339 **Q: Do you have any comments on the Burns-McDonnell Sound Study for the**
340 **Prevailing Wind Park Project?**

341 A: Yes. First as indicated by my testimony above I disagree with the idea that a
342 threshold of 45 dBA Leq is protective for people living near the wind project. Second, I
343 reviewed the information on the computer model prepared for the report. I find the model is
344 deficient in many ways. One significant way is that it fails to include two important sets of
345 tolerances. The sound power data used as input to the model is derived using a method
346 that has about a ± 2 dB tolerance for measurement repeatability. This tolerance should
347 have been added to the sound power levels used as input to the model to account for known

348 variability in measurement data. Also, the model uses the formulas and protocols from ISO
349 9613-2 which states it is not applicable for noise sources that are more than 30 meters above
350 the ground or receiver elevation. Even if the model was appropriate for wind turbine noise
351 the model has known tolerances of ± 3 dBA. This should have also been applied as an
352 adjustment to the Burns-McDonnell sound model. Given these two tolerances the
353 predicted sound levels are as much as 5 dBA low.

354 Further, the values used for ground attenuation are not disclosed. The proper value
355 for ground attenuation is “0” to turn off any calculations of ground effect. This is because the
356 height of the wind turbines means that the sound emitted by them radiates directly from the
357 blades to the homes without interaction with the ground. The ISO ground attenuation
358 calculations are intended for ground-based noise sources where the sound radiates along a
359 line from source to receiver just above the ground.

360 Dr. Schomer has in the past, identified additional problems with wind turbine noise
361 prediction using the ISO model methods. He was a member of the committee that developed
362 the ISO 9613-2 standard and its ANSI equivalent (ANSI/ASA S12.62). He has repeatedly
363 stated in hearings and conferences that the model does not properly predict the propagation
364 of low frequency noise. The ISO model range for accuracy is focused on sound in the
365 frequencies that are most important for other types of ground-based community noise
366 sources. In testimony he gave for the White Pines project in Ontario he stated that the
367 model is likely to underestimate the sound propagation from wind turbines by as much as 11
368 dBA. This is in addition to the issue of tolerances for the calculations. As I have stated above
369 I have also measured wind turbines operating at levels 10 dBA Leq or more above the
370 predicted sound levels.

371 **Q: What does this mean for the Prevailing Wind Park project?**

372 A: It means that the predicted sound levels at receptors in and near the PWPP are at least 5
373 dBA less than what should be expected if the project was operating and the sounds
374 measured and compared to the model’s predictions. I have conducted such studies and
375 routinely find that the wind turbines exceed the modeled sound levels by 5 dBA and in some
376 cases, especially when the operating mode includes high blade angles or wind turbulence,
377 the model under predicts by 10 or more dBA.

378 The flaws in the model make it likely that if the project is approved as designed there
379 will be many complaints of annoyance **and some of adverse health effects** along the lines of
380 what occurred at Shirley Wind and Cape Bridgewater.

381 Before any decisions are made on permitting this project the applicant should be
382 required to submit a new model that applies the known tolerances to the input data. It
383 should also show the contour lines for 30, 35, and 40 dBA. These new sound levels should

384 then be viewed as indicators of what the community will experience on a day when the wind
385 turbines are operating under optimum conditions for the lowest noise emissions. They are
386 not precision predictions. Review of the model should be done keeping in mind that the
387 operating values can be as much as 10 dB higher than what is predicted, under operating
388 conditions that would be considered normal.

389 The likely complaint times will be at night when winds at the blades are strong with
390 high wind shears at the hub elevation, but calm or no winds at the ground (called a stable
391 nighttime atmosphere). Studies have shown that these weather conditions occur as
392 frequently as 2 out of 3 nights during warm seasons. Since the ground level winds are calm
393 there is no wind induced noise or leaf rustle to mask the wind turbine noise. This condition
394 is recognized in many jurisdictions (e.g. Ontario) as the “worst-case” condition for
395 complaints.

396 **Q: Do you have any comments on Dr. Roberts' testimony.**

397 A: Yes, however I understand the Dr. Punch will be addressing that testimony in more
398 detail. What I would add is that, in my opinion as an acoustician, Dr. Roberts is not
399 qualified to speak to the issue of acoustics or human response to wind turbine noise.
400 Acoustical engineers are trained in how to measure sound and relate those measurements to
401 human and community response. I saw nothing in his background that qualifies him to
402 speak to these issues.

403 Dr. Roberts' testimony is not reliable when read by an experienced acoustician who
404 understands the particular character of wind turbine noise that leads to it being highly
405 annoying at sound levels well below other common community noise sources.

406 **Q: Do you have anything further to add at this time?**

407 A: The foregoing written testimony is to be presented to the South Dakota Public
408 Utilities Commission for SD PUC Docket EL 18-026.

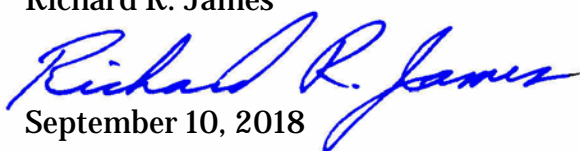
409 I reserve the right to revise and expand upon these written comments during the
410 hearing.

411

412 Richard R. James

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PREFILED TESTIMONY OF JERRY L. PUNCH

ON BEHALF OF INTERVENORS



1 **Q: Please state your name, title, affiliation, and address.**

2 A: My name is Jerry L. Punch, and I am a Professor Emeritus in the Department of
3 Communicative Sciences and Disorders (CSD) at Michigan State University (MSU) in East
4 Lansing, Michigan. As a retired faculty member, I maintain an office in the Department, which
5 is located in the Oyer Speech and Hearing Building, 126 Red Cedar Road, East Lansing, MI
6 48824. My home address is 4469 Satinwood Drive, Okemos, MI 48864.

7
8 **Q: What is the purpose of your testimony?**

9 A: I have been asked to provide testimony as an audiologist on behalf of Intervenors in the
10 matter of the Prevailing Wind Park wind project (“Project”). My testimony as an expert witness
11 will address **the potential health risks posed by noise from** the Project, if approved according to
12 the application and regulations described in Article 17 of Bon Homme County zoning ordinances
13 and the affidavit of Peter Pawlowski, dated August 9, 2018.

14
15 **Q: What is audiology?**

16 A: Audiology is the study of hearing and hearing disorders. It is a health-related discipline that
17 focuses on sound, the anatomy and physiology of the ear, hearing disorders, and the clinical
18 aspects involved in diagnosing and treating hearing disorders. As an audiologist, I am
19 knowledgeable of the anatomy and physiology of the ear; sound generation, propagation, and
20 perception; and the ear and how it processes sound. I also have knowledge of research design
21 and interpretation of research findings, and I have had a long-standing interest in community
22 noise issues. This background has led me to understand **the relationships between** noise and the
23 impacts it can have **on human health.**

24
25 **Q: What is your educational and professional background?**

26 A: My full CV is appended as Exhibit 1. I hold a PhD degree in Audiology from Northwestern
27 University and have held a number of professional positions in audiology over the past 50 years.
28 I have had an extensive and eclectic career as a clinical audiologist; clinical supervisor;
29 researcher; teacher; and administrator in academic, professional association, hospital, and
30 industrial settings. My academic coursework included the study of the biological sciences
31 through enrollment in MA and PhD-level courses in anatomy and physiology of hearing and

32 enrollment in a PhD-level course in physiological psychology. My work experiences include
33 internships and paid employment as an audiologist in multiple otolaryngology clinics as a
34 graduate student; instruction of ENT residents at Indiana University School of Medicine on the
35 clinical aspects of audiology; and instruction of undergraduate-level courses in the anatomy and
36 physiology of hearing. Over the years, I have taught a large variety of undergraduate- and
37 graduate-level courses in clinical audiology. Those courses include a graduate-level course on
38 Research Methods, which I taught at MSU for approximately five years prior to my retirement
39 in 2011. I have also taught a graduate-level seminar on ethics in research and clinical practice.
40 For seven years in the recent past, I served as a representative of the five departments of the
41 College of Communication Arts and Sciences on MSU's Institutional Review Board (IRB). The
42 IRB is charged with reviewing and approving research applications of MSU researchers, with the
43 aim of protecting human subjects who participate in research studies conducted in various
44 disciplines.

45

46 **Q: What are your current professional credentials and affiliations?**

47 A: I am a member of the American Speech-Language-Hearing Association (ASHA), the
48 American Academy of Audiology, the American Auditory Society, and the Acoustical Society
49 of America (ASA). I hold the Certificate of Clinical Competence in Audiology from ASHA,
50 which I have maintained since 1968 through various formal programs of continuing education. I
51 am also an ASHA Fellow. Fellowship is one of the highest honors the Association bestows. To
52 be awarded Fellowship, nominees must have made outstanding contributions to the discipline of
53 communication sciences and disorders. ASHA Fellows make up less than one percent of the
54 membership of that national organization. Although I am officially retired from MSU, I maintain
55 an office in my academic department and continue to conduct audiological research and to
56 consult on wind turbine projects as a health expert.

57

58 **Q: What experiences have you had that qualify you as a health expert in cases involving**
59 **wind turbine noise?**

60 A: I have had a considerable number of such experiences. Since about 2009, I have coauthored a
61 review article on wind turbine noise in *Audiology Today*, served as Chairperson of the Wind and
62 Health Technical Work Group, at the invitation of the Michigan Department of Energy, and

63 presented invited comments in public hearings and hearings of zoning boards and commissions
64 in several states, including Michigan, Illinois, Indiana, and New York. I coauthored a three-part,
65 invited blog on the *HearingHealthMatters.org* website (Punch & James, 2014). I have been
66 qualified as a health expert in MI by meeting the legal challenge in a Daubert hearing, and served
67 as a health-expert witness in legal cases at local, state, and federal levels in Ohio, Wisconsin,
68 Michigan, Iowa, Illinois, Oregon, Indiana, and New York. This information is detailed in the
69 Forensic Activities section of my CV. I have interviewed multiple individuals and families who
70 have reported adverse health effects, including some who have abandoned homes or are
71 considering abandonment because of health complaints due to wind turbine noise. I have
72 conducted ongoing reviews of the scientific literature on the health effects of wind turbine noise,
73 and in 2016 I coauthored an extensive peer-reviewed article on the *HearingHealthMatters.org*
74 website with Richard James. The title of that article is *Wind turbine noise and human health: a*
75 *four-decade history of evidence that wind turbines pose risks*, which I append as Exhibit 2. That
76 paper contains all of the literature references in my testimony. The purpose of the 2016 article
77 was to review the scientific literature that disputes 12 positions commonly taken by the wind
78 industry. Among those positions are statements suggesting that acoustic energy below audible
79 threshold cannot harm people (“What you can’t hear can’t hurt you”), the complaints are based
80 on psychological expectations, and that there is not sufficient scientific evidence to establish a
81 cause-effect relationship between wind turbine noise and adverse health effects.

82

83 **Q: What materials have you reviewed in this matter?**

84 A: I have reviewed Bon Homme County’s Article 17, drafted on July 27, 2015 to regulate wind
85 energy systems (WES); the sound study conducted by Burns & McDonnell Engineering
86 Company, dated May 18, 2018; the 45-dBA Contour maps of the Project; the direct testimony of
87 Chris Howell, summarizing his noise assessment in the matter of Prevailing Wind Park; the
88 direct testimony of David M. Hessler, dated May 4, 2018, regarding the Dakota Range Wind
89 Project; the pre-filed supplemental testimony of Dr. Mark Roberts regarding Prevailing Wind
90 Park; the direct testimony of David M. Hessler, dated March 28, 2018, regarding the Crocker
91 Wind Farm; and the affidavit of Peter Pawlowski, signed August 9, 2018.

92

93 **Q: After reviewing those materials, what is your overall impression regarding any potential**
94 **health risks posed by the proposed Project?**

95 A: In my opinion, those materials paint an overly optimistic picture by indicating or suggesting
96 that limiting wind turbine noise to an average level of 45 dBA will avoid significant **adverse**
97 **health** impacts and significant community annoyance. Based on my professional background and
98 experience with people living near existing wind projects, numerous anecdotal reports, the
99 scientific literature, papers presented at scientific and professional meetings, and governmental
100 and agency reports, I believe that a substantial proportion of people living in the vicinity of the
101 proposed Project can be expected to experience not only annoyance, but also a variety of adverse
102 **health** effects. Those effects, which vary widely among affected individuals, are commonly
103 observed worldwide. They include **sleep disturbance, annoyance, headaches, dizziness, vertigo,**
104 **nausea, motion sickness, ear and bodily sensations, fatigue, stress, depression, memory deficits,**
105 **inability to concentrate, and** reduced quality of life. In a given individual, these effects can
106 occur alone or in combination with other effects. In short, a design goal of a 45 dB average
107 level will not adequately protect **the health of** residents who live in the boundaries of the
108 proposed Project.

109
110 **Q: You seem to imply that not all residents will be affected adversely. In what percentage**
111 **of residents would you expect these adverse reactions to occur?**

112 A: Certainly, not everyone will experience or report negative consequences. Landowners who
113 lease their farmland to host wind turbines (“participants”) are less likely than others to
114 complain, partially because they earn an income from their leasing agreements with the wind
115 company, but also because they are often constrained by lease agreements that restrict them
116 from complaining or speaking negatively about their experiences. Likewise, not all non-
117 participants will experience negative impacts, or they may not overtly complain if they do.
118 Some of these individuals have signed waiver agreements with the wind company,
119 occasionally accompanied by a financial payment, which virtually ensures that they will be
120 less likely to complain. One factor that makes the noise tolerable for many people is that the
121 noise is intermittent because the wind is often not sufficiently strong to run the turbines. For
122 almost all exposed residents, though, the turbines inevitably generate relatively a loud
123 thumping, or whooshing, noise, and some residents experience ill effects from the low-

124 frequency noise and infrasound. The result, for what I would estimate at being around 15%-
125 25% of exposed residents, is extreme annoyance and sleep disturbance. In the longer term,
126 some of the other symptoms I've mentioned begin to emerge. In some cases, a few residents
127 may suffer serious cardiovascular problems such as high blood pressure.

128

129 **Q: Some of the symptoms you describe seem naturally to occur with aging. How can wind**
130 **turbine noise be distinguished from aging and pre-existing conditions as the cause of such**
131 **complaints?**

132 A: One line of evidence comes from the World Health Organization (WHO, 2009), which
133 focuses primarily on low-frequency community noise. That organization states that, based on
134 multiple research studies, such noises can lead to stress, and subsequently to health problems.
135 The pathways from noise to adverse health effects may be direct or indirect. It indicates that
136 several studies have established a closer relationship between subjective responses to
137 community noise and cardiovascular outcomes when the annoyance is sleep-related than when
138 it is non-sleep-related (p. 78). In addition, there are many anecdotal and scientific reports of
139 residents who have experienced sleep disturbance, as well as headaches, dizziness, ear pain or
140 pressure, and inability to concentrate, when near the turbines. When they leave the project area
141 temporarily or for a few days or more, their symptoms subside, and when they return, those
142 symptoms, including sleep disturbance, reappear. Similar observations can be made regarding
143 pre-existing conditions, which are sometimes reported to worsen after turbines become
144 operational. If it can be determined that the additional stresses experienced when near the
145 turbines can be relieved by leaving the area, and that they reoccur when the individual returns to
146 the area, that is a good indication that the turbines are responsible for their deteriorating state of
147 health. The scenario in which symptoms subside and recur with changes in location with
148 respect to the turbines, which many have experienced repeatedly, is similar to the research
149 design known the case-crossover design. Case-crossover studies are described in the 2016
150 Punch and James paper (Exhibit 2). The types of evidence I've described indicate that there is
151 a strong association between exposure to wind turbines and the health complaints, and they
152 strongly suggest that the link is causative. The main point is that all possible precautionary
153 steps need to be taken to ensure the Project will not substantially impair the health of those
154 living in and around the Project.

155

156

157 **Q: How do you view your role in this matter, as it relates to an ability to establish a**
158 **causative link between wind turbine noise and adverse health impacts?**

159 A: I distinguish between general causation and specific causation, as they differ based on the
160 targets of interest: the general population versus targeted individuals, respectively. Physicians,
161 including those with epidemiological backgrounds, have the medical expertise to diagnose and
162 treat the health symptoms of their individual patients who have been exposed to wind turbine
163 noise. The chief recommendation of physicians who have become involved with patients who
164 suffer adverse health effects from wind turbine noise is to move away from the source of the
165 problem. On the other hand, acousticians, audiologists, occupational health and safety experts,
166 and environmental experts have the expertise to analyze the available research and other
167 evidence needed to conclude that wind turbine noise causes adverse health impacts in the
168 general population. These individuals are often called upon as experts in legal proceedings
169 such as this one. That is the role in which I see myself in this matter.

170

171 **Q: Dr. Mark Roberts, in his supplemental direct testimony, has testified on the role of**
172 **epidemiological research in establishing a causative link between wind turbine noise and**
173 **AHEs. What is your reaction to that testimony?**

174 A: My reaction is essentially the same as that already described in Exhibit 2. Dr. Roberts'
175 testimony rests primarily on his credentials in epidemiology and apparently not on his first-
176 hand experience with people who have been exposed to wind turbine noise over long periods
177 of time. Also, he appears to be acquainted with only that body of literature on the subject that
178 is favorable to the wind industry, and to his testimony in its behalf. He points to peer-reviewed
179 epidemiological research as the only basis for proof of cause-effect relationships. Although he
180 espouses the Bradford Hill criteria as relevant, he essentially dismisses most of the nine criteria
181 by naming them, without discussing their implications. Those criteria, with descriptions from
182 Punch & James, 2016, were: (1) strength (strength of observed relationships), (2) consistency
183 (consistency, or repeatability, of relationships, based on observations by different persons, in
184 different places, under different circumstances, and at different times), (3) specificity
185 (causation is indicated if the association is limited to specific individuals and to particular sites

186 and types of disease and there are no associations with other factors), (4) temporality (there is a
187 clear temporal relationship between outcomes and periods of exposure and non-exposure), (5)
188 biological gradient (a dose-response relationship exists), (6) plausibility (causation is more
189 likely when certain outcomes are biologically plausible, or possible, a caveat being that
190 plausibility depends on the biologic knowledge of the day; this element is best expressed in the
191 statement: “When you have eliminated the impossible, whatever remains, however improbable,
192 must be the truth” (p. 10), (7) coherence (the cause-and-effect interpretation of data should not
193 seriously conflict with generally known facts of the natural history and biology of the disease),
194 (8) experiment (experimentation or semi-experimental evidence, even if only occasional, can
195 reveal the strongest kind of evidence for causation), and (9) analogy (the recognition that
196 similar cause-effect relationships have occurred under similar conditions). Hill states:

197 What I do not believe (is) ...that we can usefully lay down some hard-and-fast rules of
198 evidence that must be obeyed before we can accept cause and effect. None of my nine
199 viewpoints can bring indisputable evidence for or against the cause-and-effect hypothesis and
200 none can be required as a sine qua non. What they can do, with greater or less strength, is to
201 help us to make up our minds on the fundamental question – is there any other way of
202 explaining the set of facts before us, is there any other answer equally, or more, likely than
203 cause and effect?... No formal tests of significance can answer those questions. Such tests can,
204 and should, remind us of the effects that the play of chance can create, and they will instruct us
205 in the likely magnitude of those effects. Beyond that they contribute nothing to the ‘proof’ of
206 our hypothesis (p. 299).

207
208 Hill makes this final observation in his essay:

209 All scientific work is incomplete – whether it be observational or experimental. All scientific
210 work is liable to be upset or modified by advancing knowledge. That does not confer upon us a
211 freedom to ignore the knowledge we already have, or to postpone the action that it appears to
212 demand at a given time (p. 300).

213
214 In summary, my reaction to that portion of Dr. Roberts’ testimony is that, like many of his
215 epidemiological colleagues who testify on behalf of wind energy projects, he chooses to
216 disregard Hill’s intent to emphasize that experimentation (Hill’s eighth of nine criteria) is only
217 one of many criteria that are useful **is establishing causation between external agents and**
218 **disease processes.**

219
220 **Q: Can you give specific examples of how the Bradford Hill criteria apply to wind turbine**
221 **noise and adverse effects on health?**

222

223 A: Yes, I believe that the available evidence, which includes both research and common-sense
224 observations, meets all nine of the Bradford Hill criteria, and that, in their totality, that
225 evidence supports a causative relationship between wind turbine noise and adverse health
226 effects. This evidence includes, respectively: (1) widespread reports of complaints, (2)
227 consistency of reported symptoms, (3) and (4) concurrence of symptoms with wind turbine
228 operation, (5) an observable dose-response relationship between exposure levels (or distance)
229 and symptoms, (6) the role of disturbances of the hearing and balance mechanisms of the inner
230 ear in causing identified symptoms, (7) coherence with WHO (2009) and other relevant
231 guidelines, (8) in addition to cross-sectional studies, experimentation is established by the fact
232 that symptoms decline or disappear when receptors leave the area and recur when they return
233 to the area, and (9) Sick Building Syndrome as the analogy. Based on these observations, Dr.
234 Roberts' efforts to raise epidemiology as the only cause-and-effect threshold sets the standard
235 so high that we may never expect to reach resolution on this and many similar matters. Dr. Carl
236 Phillips, also an epidemiologist, states in a paper prepared for the Wisconsin Public Service
237 Commission (dated July 3, 2010):

238 Some recent commentators (Colby et al. 2009; Roberts and Roberts 2009) have attempted to
239 dismiss this evidence because none of it is based on the epidemiologic study types that they
240 understand. It is true that other study designs would have told us more, and still could. But
241 dismissing the evidence we have makes little sense given that a huge portion of all knowledge,
242 including formal scientific inference, is based on data that is not from studies designed
243 according to certain preferred approaches. It should be obvious that "does not tell us
244 everything we want to know" does not mean "has no information content". Those making this
245 argument either do not understand scientific inference or are pretending they do not. Claiming
246 that there is no evidence even though there are reports of individuals suffering is akin to
247 claiming that there is no evidence that people get injured as a result of text-messaging while
248 engaged in other activities because, even though the pathway is obvious and there are
249 numerous accidents occurring from some activities, there is often not a "real study" that allows
250 us to make various quantitative estimates. (p. 7).

251

252 **Q: Do you have additional reactions to Dr. Roberts's supplemental direct testimony in this**
253 **case?**

254 A: Yes, I would like to make one other point. Dr. Roberts raises the nocebo argument. He is
255 arguing that the complaints people make regarding adverse effects of wind turbine noise are
256 psychologically motivated by expectations resulting from negative messages surrounding

257 turbines. That argument continues to persist as one of the wind industry's primary explanations
258 for adverse health impacts. In our 2016 paper, James and I, after evaluating these claims,
259 concluded that none of these explanations is as plausible as the notion that a variety of adverse
260 reactions are *physiological* effects caused directly or indirectly from exposure to low-frequency
261 noise and infrasound from wind turbines. While psychological expectations and the power of
262 suggestion can influence perceptions of the effects of wind turbine noise on health status, no
263 scientifically valid studies have yet convincingly shown that psychological forces are the major
264 driver of such perceptions. We describe in some detail in our article the scientific
265 shortcomings of the several studies that have been done, all of which conclude that the nocebo
266 effect is the culprit. I encourage interested individuals to read those details.

267

268 **Q: How does your background qualify you to testify on the general causal mechanism that**
269 **explains these adverse health effects?**

270 A: First, I would note that two of the seven panelists commissioned by the American Wind
271 Energy Association to conduct the 2009 review of literature by Colby and colleagues on the
272 noise and health effects of wind turbines were audiologists. Audiologists have the educational
273 background to understand the functioning of the inner ear, and it is that knowledge that led me to
274 become interested, over the last decade, in the relationship between ear physiology and the
275 health impacts of infrasound and low-frequency noise from wind turbines on people. Like many
276 others who have studied this relationship, I believe that most of these adverse reactions are
277 mediated by disturbances of the hearing and balance mechanisms of the inner ear resulting from
278 the low-frequency noise emitted by industrial wind turbines. The inner-ear components affected
279 include the cochlea, which is the organ of hearing, and the vestibular system, which includes the
280 semicircular canals, utricle, and saccule. These organs are responsible for balance, or
281 equilibrium. While the cochlea is responsible for the perception of audible sounds, the
282 vestibular system is sensitive to movement and changes in head position, and can be stimulated
283 by infrasound to induce perceptions of unsteadiness, dizziness, vertigo, and motion sickness in
284 some people.

285

286 **Q: Earlier, you emphasized sleep as being critical to health. How does wind turbine noise**
287 **lead to sleep disturbance, in your opinion?**

288 A: Wind turbine noise is a significant disruptor of sleep because our ears, unlike our eyes, are
289 always open, especially to unusual or novel stimuli, including “bumps in the night” that might
290 threaten our safety. During operation, the turbines produce audible noise, mostly in the
291 infrasonic and low-to-mid-frequency range. That audible noise results in the perception of both
292 a relatively constant whirling sound and a periodic whooshing sound, caused by a combination
293 of the blade movement against the air and the blades passing in front of the tower. When the
294 three blades are rotating at a typical 20 revolutions per minute, that sound occurs once per
295 second. Those audible sounds can annoy people and disrupt their sleep patterns. The turbines
296 also generate a pulsating sound at infrasonic rates that are based on blade rotational speed,
297 meaning that the sound spikes, or peaks intermittently. These noises, and the unpredictability of
298 the prevailing winds, are responsible for sleep disturbance in a substantial number of people.
299 The peakiness of the noise is especially annoying and disturbing, and is the reason sleep
300 disruption is not adequately predicted from, or correlated with, long-term average decibel
301 levels, designated as LAeq.

302

303 **Q: If dB LAeq is not used to quantify noise levels of wind turbines, what metric might**
304 **better predict sleep disturbance?**

305 A: LAm_{ax}, or the maximum noise level produced during a given nighttime period, appears to
306 be the optimal measurement metric to protect sleep. The WHO (2009) Night Guidelines suggest
307 that a 40 dB LAm_{ax} level should be the maximum allowable level during nighttime hours. That
308 document uses the term “LAm_{ax}” a total of 93 times, which is an indication that the WHO
309 considers the concept highly important as a metric for quantifying nighttime noise. If used, any
310 compliance-monitoring procedures should allow some degree of repetition to occur, and to
311 eliminate other noise sources as the origin of the emissions, before noncompliance is declared.
312 Because there are sufficient audible differences among wind turbine noise and other sources of
313 noise—including traffic noise, thunder, wind, and wildlife—the various sources are easily
314 distinguishable.

315

316 **Q: Are there other noise measurement metrics that could effectively protect sleep?**

317 A: Yes, possibly. Dr. Paul Schomer currently recommends that wind turbine noise should be
318 limited to an average level of 36-38 dBA, based on a 24-hour measurement period. Although he

319 offers that recommendation for the purpose of avoiding substantial annoyance at all hours of the
320 day and night, it is a potential alternative to 40 dB L_{Amax} in an effort to minimize or avoid
321 sleep disturbance. Dr. Schomer's credentials as the former Director of the Standards Division of
322 the Acoustical Society of America, and his use of four independent sources in deriving his
323 recommendation, give considerable weight to his recommendation. The major concern I have
324 with that approach is that verification is required to show that a 24-hour metric can sufficiently
325 protect sleep during nighttime hours. Wind companies typically prefer to use the Leq metric
326 because it is more easily compared to available data, and generally resist accepting levels lower
327 than 45 or 40 dBA as a design goal for its wind projects.

328

329 **Q: The Charles Mix County zoning commission seemingly has joined Bon Homme County**
330 **in establishing minimum setback distances. Rather than establishing the highest**
331 **permissible noise level to protect the health of residents, would it not be simpler to establish**
332 **the minimum permissible distance?**

333 A: Undoubtedly, distance is the most effective means of avoiding negative health impacts from
334 wind turbine noise. The short distances from the property line, such as the 500 feet or 1.1 times
335 the system height, whichever is greater, and from residences, such as the 2,000 feet or 3.5 times
336 the system height, whichever is greater, that have been agreed to in this Project are entirely
337 inadequate. Such short distances are intended to reduce risks from physical failures such as
338 blade throw, ice throw, or falling towers. They do almost nothing to protect residents from
339 exposure to low-frequency noise and infrasound. Researchers who have offered distance as an
340 index to obviate health effects have typically recommended 2 kilometers, or 1.25 miles, as a
341 minimally safe distance from the nearest turbine. Although that distance will not prevent
342 annoyance and health effects for everyone, I think it is a reasonable compromise aimed at
343 protecting health and well-being. We have to recognize, though, that studies have shown that
344 some residents within several miles of an industrial wind project complain that the noise is
345 disturbing, presumably because infrasound travels great distances and is not easily attenuated.
346 The problem with distance as a predictor is that different residences at the same distance from
347 the turbines will experience different noise emissions, depending on the turbine array,
348 topography, variable wind speeds, and other factors. In the end, the actual level of noise

349 emissions is the critical variable that needs to be controlled, as distance in itself cannot assure
350 that the noise will not be invasive for residents in the footprint of the wind project.

351

352 **Q: In your opinion, is there any important information omitted from, neglected, or**
353 **erroneously stated in the documents you reviewed for the Prevailing Wind Park project?**

354 A: Yes. Similar to Mr. Hessler’s observation in his Dakota Range report, I noticed that an
355 important component missing from the Burns & McDonnell Engineering Company’s sound
356 study for this Project is a discussion of the annoyance and adverse health impacts of the Project.

357 Like almost all reports commissioned by wind companies, it does not discuss the fact that
358 annoyance can lead to adverse health effects, as established by Berglund et al. (1999); the WHO

359 (2009); Shepherd, Hanning, and Thorne (2012); and Fast et al. (2016). The WHO (2009) has
360 described annoyance as a critical health effect, in that in some people it is associated with stress,

361 sleep disturbance, and interference with daily living. In fact, the Burns & McDonnell report
362 ignores much of the information in the WHO 2009 guidelines, which were revised downward
363 from the 1999 guidelines as a result of new medical research into adverse health symptoms due
364 to noise. Burns & McDonnell describe wind noise as a masker that can “drown out” the sounds
365 created by the turbines. Although this may be true in rare cases, it is typically not true at night
366 when wind speeds are high at the turbine heights and low at ground level. Also, the design goal
367 of 45 dBA (Bon Homme County ordinance), or 43 dBA (Charles Mix County— Pawlowski
368 affidavit) is higher than what most independent researchers consider protective of health.

369

370 **Q: Did you find any shortcomings in Mr. Howell’s study of background sounds?**

371 A: Yes, in several respects. To me, the most surprising point Mr. Howell made is that he reports
372 measured L90 background sound levels as high as 45 dBA, which is unusually high for a rural
373 area. A table showing all measured levels would have revealed the frequency of such
374 occurrences. Instead, he reports only a range of 21.5-45 dBA. He also understates the sound
375 impact of wind turbine noise by comparing it to levels of normal conversational speech.

376 Comparing the noise from wind turbines to speech using an A-weighted scale is misleading
377 because the levels of low-frequency noise and infrasound from turbines is substantially greater
378 than for speech, as speech energy begins to drop off precipitously at about 150 Hz and below,
379 and the levels of turbine noise continue to rise below that frequency. Using A-weighting

380 attenuates low frequencies below 1000 Hz, and effectively filters out infrasound, leading to a
381 gross underestimate of infrasonic energy. Also, related to the fact that Bon Homme County does
382 not specify how sound measurements should be performed, Mr. Howell does not indicate
383 whether the design goal is met by measurements over a specified time period. They could be
384 taken over hours, minutes, or days, and could cover the daytime hours, nighttime hours, or a full
385 24-hour day. Again, it is essential to limit sound levels to those that fully protect residents' sleep,
386 as sleep is a major determinant of good health.

387
388 **Q: Based on your professional experience and expertise, what restrictions should be**
389 **placed on the Project to ensure that it will not substantially impair the health of those**
390 **living around it?**

391
392 A: As a general rule, no wind turbine should be located closer than 1.25 miles from the property
393 line of any residence. This distance should preferably be applied to all residences, both
394 participating and non-participating. If placed closer to participating residences than 1.25 miles,
395 those residents should be adequately informed, in writing, of the potential for high annoyance
396 and health risks. With regard to permissible noise levels, the WHO recommendation of 40 dBA
397 Leq(night,outside) should not be exceeded at any residence, particularly at non-participating
398 households. To provide adequate protection from sleep disturbance, nighttime noise levels
399 should be limited to 40 dB LAmax. A metric of dB LA10(night, outside), the noise level
400 exceeded 10% during nighttime hours and measured at the façade of the residence, may be a
401 reasonable substitute for LAmax if considered by acoustical experts to be easier to apply for the
402 purpose of compliance.

403
404 **Q: Does this conclude your testimony?**

405 A: Yes.

406
407

408 The foregoing written testimony is to be presented to the South Dakota Public Utilities
409 Commission for SD PUC Docket EL 18-026.

410

411 Dated this 6th day of September 2018.



412

413

414 Jerry L. Punch

ROUGH DRAFT -- DO NOT QUOTE!

1 THE PUBLIC UTILITIES COMMISSION
 2 OF THE STATE OF SOUTH DAKOTA
 3 =====
 4 IN THE MATTER OF THE APPLICATION EL18-026
 5 BY PREVAILING WIND PARK, LLC FOR
 6 A PERMIT OF A WIND ENERGY FACILITY
 7 IN BON HOMME COUNTY, CHARLES MIX
 8 COUNTY, AND HUTCHINSON COUNTY,
 9 SOUTH DAKOTA, FOR THE PREVAILING
 10 WIND PARK PROJECT
 11 =====
 12 Transcript of Hearing
 13 October 11, 2018
 14 8:30 a.m.
 15 Volume III, Pages
 16 =====
 17 BEFORE THE PUBLIC UTILITIES COMMISSION,
 18 KRISTIE FIEGEN, CHAIRWOMAN
 19 GARY HANSON, VICE CHAIRMAN
 20 CHRIS NELSON, COMMISSIONER
 21
 22 COMMISSION STAFF
 23 Adam de Hueck
 24 Karen Cremer
 25 Greg Rislov

A P P E A R A N C E S

Mollie Smith and Lisa Agrimonti,
 appearing on behalf of Prevailing Wind Park;

Reece Almond,
 appearing on behalf of Intervenors Gregg Hubner,
 Marsha Hubner, Paul Schoenfelder, and Lisa Schoenfelder;

Sherman Fuerniss,
 appearing pro se;

Karen Jenkins,
 appearing pro se;

Kelli Fazour,
 appearing pro se;

Kristen Edwards and Amanda Reiss,
 appearing on behalf of Staff.

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

1 MR. DE HUECK: Good morning, everyone. My name
 2 is Adam de Hueck. I'm the Hearing Examiner for Docket
 3 EL18-026, In the Matter of Prevailing Wind Park, LLC for
 4 an Application for a Wind Energy Facility Permit.

5 We are on day three. The Applicant has
 6 concluded their direct case in chief. Yesterday we heard
 7 from our three lay witness Intervenors, and today we're
 8 moving on to Mr. Reece Almond's case in chief. And we
 9 will also hear from a Staff witness today.

10 With that, Mr. Almond, you may go ahead and call
 11 your first witness.

12 MR. ALMOND: We call Mike Soukup.

13 Mike Soukup,
 14 called as a witness, being first duly sworn in the above
 15 cause, testified under oath as follows:

16 DIRECT EXAMINATION

17 BY MR. ALMOND:

18 Q. Good morning, Mr. Soukup. Can you introduce
 19 yourself to the Commissioners, please.

20 A. Hello. My name is Mike Soukup. I live 7 miles
 21 north of Tyndall or about 13 miles east of the wind farm,
 22 proposed wind farm.

23 Q. And, Mr. Soukup, are you involved in the Bon Homme
 24 County government?

25 A. Yes, I am. To give you a little history, I've been

2

1 The following transcript of proceedings was
 2 held in the above-entitled matter at the South Dakota
 3 State Capitol Building, 500 East Capitol Avenue, Pierre,
 4 South Dakota, on the 11th day of October, 2018,
 5 commencing at 8:30 a.m.

1 on the zoning board since 1998 and I've been Chairman of
 2 the County Commission for '17 and '18 and the years of
 3 '15 and '16 I was Chairman of the zoning board.

4 Q. I missed the dates. How long have you been on the
 5 County Commission?

6 A. Eight years. Chairman for the last two years.

7 Q. Thank you. And I understand there's the County
 8 Commission board. You referenced the planning
 9 Commission. Is there another entity known as the Board
 10 of Adjustment?

11 A. Yeah. They switch into that.

12 Q. Can you just explain the roles of those three
 13 separate entities?

14 A. You know, legally I can't quite explain how that
 15 goes. We've always done it and just have a system, and
 16 it works.

17 Q. Who sits on the Board of Adjustment?

18 A. Well, it would be the Commissioners.

19 Q. The County Commissioners sit on the board?

20 A. Yeah.

21 Q. Of adjustment?

22 A. I hope I answered that right but we've done it for
 23 eight years.

24 Q. So you have the County Commissioners and you have
 25 the Zoning Board?

1 A. The same five people. We have five individuals on
 2 the Zoning Board, and usually one on the Zoning Board is
 3 a County Commissioner. And then that guy is also on the
 4 County Commission board of five. One Commissioner for
 5 each district.
 6 Q. Now which of those -- you have the County Commission
 7 board and you have the Zoning Board. Which of those acts
 8 as the Board of Adjustment?
 9 A. The Commissioners.
 10 Q. Commissioners. County Commission.
 11 Then are you familiar with this wind farm project
 12 that's at dispute or being discussed in this proceeding?
 13 A. Yes, I am.
 14 Q. How close do you live to that project area?
 15 A. Oh, I suppose 12, 13 miles. My great-grandfather's
 16 homestead is in the middle of that wind farm.
 17 Q. And have you or any members of your family received
 18 any sort of financial benefit from this project?
 19 A. No.
 20 Q. And --
 21 A. Probably about a third cousin over would be in that
 22 hand print -- footprint of the wind farm.
 23 Q. And have you or any -- or have you signed any sort
 24 of agreements related to this project?
 25 A. No. No.

1 Q. Okay. In front of you is Exhibit I 14. It should
 2 be open to Exhibit I 14 in the binder. Are you familiar
 3 with that document?
 4 A. Looks good.
 5 Q. The one in the binder. Exhibit I 14. There should
 6 be a sticker down at the bottom --
 7 A. Oh, there it is. I was reading that --
 8 Q. Sorry. Can you tell us what Exhibit I 14 is?
 9 A. Well, I guess it's definitions of what the proposed
 10 deals are.
 11 Q. Is Exhibit I 14 the Bon Homme County Zoning
 12 Ordinances?
 13 A. Is what now?
 14 Q. Is Exhibit I 14 the Bon Homme County Zoning
 15 Ordinances?
 16 A. To the best of my knowledge, I would say yes.
 17 Q. If you look at the top of page 1, can you tell us
 18 when these zoning ordinances were adopted originally?
 19 A. Well, it says -- you mean what the date is on the
 20 top, Bon Homme County adopted on 4-13 of '99.
 21 Q. To your knowledge is that when the Bon Homme County
 22 Zoning Ordinances that are in front of you were adopted?
 23 A. That was a long time ago. I would say yes. Like I
 24 said, I've been involved since 1997. It's been a long,
 25 drawn out --

1 Q. Why don't you flip to Article 17 of those zoning
 2 ordinances for me.
 3 A. Where is that at then? Okay. Exhibition [sic] 17.
 4 Q. No. Within the zoning ordinances, within Exhibit I
 5 14, if you could flip to Article 17 of your zoning
 6 ordinances.
 7 A. I don't know what page I'm supposed to go to -- part
 8 of these?
 9 Q. It's page 57, I believe.
 10 MR. MUSHITZ: What page?
 11 MR. ALMOND: 57.
 12 A. Okay.
 13 Q. Have you located Article 17 of the ordinances?
 14 A. Yeah. I'm fairly nervous sitting up here.
 15 Q. That's fine. Take your time. I don't want you to
 16 be nervous. Can you tell the Commissioners what Article
 17 17 is?
 18 A. Well, I don't know how to really explain it. I
 19 guess I read through it before when we adopted it. It's
 20 just improvements on our zoning issues, yes.
 21 Q. And what does Article 17 relate to specifically?
 22 A. The wind farms.
 23 Q. And do you recall when Article 17 was adopted?
 24 A. Well, according to my records, it was on that
 25 Tuesday, October 20 of 2015.

1 Q. Sometime in 2015?
 2 A. Yeah. Because we had a Commission meeting in the
 3 morning, and then we came back that evening.
 4 Q. And I'm not interested in exact dates. We'll just
 5 say 2015. Is that fair?
 6 And if I'm looking at the dates you gave me
 7 previously you were on both the planning Commission -- or
 8 the Zoning Board and the County Commission at that time?
 9 A. At that time, yes. I was not the Chairman of the
 10 Commission but I was on the Zoning Board. And a
 11 Commissioner.
 12 Q. And just generally when ordinances are adopted,
 13 what's the general process that gets played out?
 14 A. I guess we heard input from both sides, and that's
 15 how we adopted it with advice from the public.
 16 Q. And how was the idea to adopt Article 17 first
 17 brought to the county?
 18 A. Well, that was several years ago. I think after we
 19 did that first wind farm some individuals had come
 20 forward that we should try to make something -- an
 21 improvement on that so that's what became of that Article
 22 17.
 23 Q. And the first wind farm, are you referring to the
 24 Beethoven Wind Farm?
 25 A. Correct.

1 Q. And you said some individuals came forward to make
 2 improvements on something. What --
 3 A. Oh, I would say a handful. About every time we
 4 always had a handful either in favor or against.
 5 Q. And in terms of the improvements that were looking
 6 to be made, can you just give a flavor of what those
 7 improvements were.
 8 A. Oh.
 9 Q. Not the ones that were actually made but just what
 10 people were looking for?
 11 A. Yeah. That's kind what have we did on Article 17.
 12 With our advice everything seemed to be up to par.
 13 Q. Prior to the adoption of Article 17 did Bon Homme
 14 County have an article of their ordinances dedicated
 15 exclusively to wind energy systems?
 16 A. It is hard for me to answer that question exactly.
 17 You know, we've always talked about it, but I can't
 18 say -- you know, it's always been on the back burner, the
 19 wind farm, for many years.
 20 Q. And in --
 21 A. I've got to apologize. I didn't brief up on that
 22 history from, you know, way back.
 23 Q. And in the adoption of Article 17 I assume you
 24 didn't pull out a computer and just start typing Article
 25 17 from scratch, did you?

1 A. No. It probably took a few months, I'm sure.
 2 Q. Rather than starting from scratch, did the county
 3 utilize the draft model ordinance that was on the PUC's
 4 website?
 5 A. We did a lot of our stuff with District III. So I
 6 guess -- I'm just a farmer. I didn't go to college. But
 7 we kind of acted on -- you know, asked them for advice
 8 and helped guide us -- guidance us.
 9 Q. Well, why don't we compare the draft model ordinance
 10 to Article 17 to see if we can conclude that that's kind
 11 of the document that the county used from scratch. Okay?
 12 A. Okay.
 13 MS. AGRIMONTI: Objection. The witness has
 14 testified he doesn't know and if there's a comparison
 15 between the ordinances, I believe Mr. Almond can make
 16 that argument in his brief.
 17 MR. DE HUECK: I'm going to let Mr. Almond make
 18 this comparison.
 19 Q. So also in front of you is what's been marked as
 20 Exhibit I 23.
 21 A. Okay. Two separate sheets?
 22 Q. Are you on Exhibit I 23?
 23 A. Yeah. 2018.
 24 Q. Can you compare Section 17 -- okay. So I want you
 25 to put Exhibit I 14 and Exhibit I 23 side by side. And

1 I'd like you to compare Section 1701 of the zoning
 2 ordinance to the PURPA section of the PUC ordinance. And
 3 you don't need to read it out loud, but read it to
 4 yourself.
 5 So what I'd like to you do is compare Section 1701
 6 of Article 17 with the PURPA section of the draft model
 7 ordinance. Just compare the language of each.
 8 (Witness examines documents.)
 9 A. Okay. I read them both.
 10 Q. Now go to Section 1703 of Article 17 and compare
 11 that to Section 2 of the model ordinance.
 12 A. Now what do you want to know?
 13 Q. I'd like you now to compare Section 1703 of Article
 14 17 to Section 2 of the draft model ordinance.
 15 (Witness examines documents.)
 16 A. Yes.
 17 Q. Would you agree with me that the language of both
 18 Article 17 and the draft model ordinance is substantially
 19 the same?
 20 A. Yes.
 21 Q. So for Article 17 why don't you flip down -- I'll
 22 help you.
 23 A. Okay.
 24 Q. To Section 1723 of Article 17.
 25 A. Ain't there a few pages?

1 Q. In comparing Section 23 of Article 17 -- first what
 2 is Section 1723 of Article 17? What's the title of it?
 3 A. On the setbacks?
 4 Q. Section 1723. Setbacks?
 5 A. Yeah.
 6 Q. Now go ahead and compare Section 1723 titled
 7 setbacks with page 6 of the draft model ordinance.
 8 A. Okay.
 9 Q. Where it talks about setbacks.
 10 (Witness examines documents.)
 11 A. Okay. I read it, that Section 1723.
 12 Q. Do you think Section 1723 matches the language from
 13 the draft model ordinance regarding setbacks?
 14 A. Unless I made a mistake when I read it, I think it's
 15 the same.
 16 Q. That's what I thought when I read them too so I
 17 don't think you made a mistake?
 18 A. Yeah. I read sentence by sentence but I'm very
 19 nervous and I could easily make a mistake up there.
 20 Q. No. And I get that. I think that's the point; it's
 21 the same language; right?
 22 A. Looks the same to me. I just read it.
 23 Q. And we could continue this process, but for the sake
 24 of time while you were considering Article 17 and what to
 25 adopt it, did you know something that's the state

1 standard? Was there a state standard?

2 A. You know, back that many years ago I remember that

3 word, state standard, but I cannot sit here and say that

4 I remember.

5 Q. I mean, did you refer to the state standard during

6 these meetings?

7 A. I'm pretty sure we did.

8 Q. And what was the state standard that you were

9 referring to? Was it the draft model ordinance there?

10 A. I would say yes.

11 Q. Okay.

12 A. That was three years ago. And then in that summer

13 of 2015 my dad died so we were in and out of the hospital

14 quite a bit.

15 Q. And it makes sense?

16 A. Yeah.

17 Q. If the PUC has a draft model ordinance, it would

18 make sense that a county would start with that when

19 drafting the zoning ordinance; right?

20 A. Right.

21 Q. I think you need to --

22 A. As far as my opinion we did everything up to par. I

23 can't say that we -- we can't make a mistake because

24 everybody watches us.

25 Q. Okay. So we can set aside --

1 MR. ALMOND: Well at this time I'd like to move

2 for the admission of Exhibit I24.

3 MR. DE HUECK: Absent any objection, I'm going

4 to go ahead and admit it.

5 MS. EDWARDS: Is that the draft model ordinance?

6 MR. DE HUECK: Yeah.

7 MS. REISS: Staff would object just based on the

8 fact that no appropriate foundation was laid. The County

9 Commissioner never said that he reviewed it. He just

10 reviewed the language and answered questions as to

11 whether it matched or not.

12 MR. DE HUECK: Anything from the Applicant?

13 MS. AGRIMONTI: I'd join in the objection.

14 MR. ALMOND: Would you like a response from me.

15 MR. DE HUECK: Go ahead.

16 MR. ALMOND: I believe his testimony was that he

17 just relied on the state standard which was this PUC

18 model ordinance.

19 MR. DE HUECK: With that, I'm going to go ahead

20 and admit it.

21 Q. You can set aside the model ordinance now and we're

22 going to change topics. Okay?

23 A. Okay.

24 Q. Earlier when deciding whether or not to -- or in

25 adopting Article 17 you mentioned you heard from the

1 public and took in public input. Who were some of the

2 more active participants in the public input process?

3 MS. AGRIMONTI: Objection. I'd like to have a

4 standing objection to this investigation into how a

5 zoning ordinance was adopted.

6 I understand the Commission's ruling and I won't

7 continue to interpose objections but I would like it to

8 be maintained.

9 MR. DE HUECK: So noted.

10 MS. AGRIMONTI: Thank you.

11 Q. Who were involved -- who were the more active public

12 participants in that public input process?

13 A. Mainly Mr. Hubner, who I've known forever. And his

14 wife.

15 Q. Anyone else?

16 A. Mr. Van Gerpen from Avon.

17 Q. Anyone else from the public that was involved in the

18 public input process?

19 A. Those would be the main two to three.

20 Q. Was anyone on behalf of the wind industry involved

21 in the public input process?

22 A. Yes. Mr. Roland Jorgenson [sic] was there, and a

23 couple of landowners that will eventually have windmills

24 were at the meeting.

25 Q. Do you know the names of those landowners?

1 A. Well, I would say through the summer -- Mr. Bowder

2 (check) and I don't know who else to say on the -- I

3 guess just supporters of the wind farm.

4 Q. And you mentioned Mr. Roland Jurgens. Who is he?

5 A. I guess he's the project manager of the wind farm.

6 Q. You say the wind farm, which wind farm are you

7 referring to?

8 A. Actually he was involved with both of them. I'm

9 pretty sure he was on the -- with the first wind farm,

10 the Beethoven Wind Farm.

11 Q. When you say both of them, are you referring to

12 Beethoven and?

13 A. Right.

14 Q. This wind farm?

15 MS. AGRIMONTI: Objection. Vague. I would note

16 that we have various entities that have owned -- or two

17 entities that have owned the project that was before the

18 Commission, and I'd just like the record to be clear what

19 developer was being discussed in 2015 versus the

20 Applicant in this proceeding.

21 MR. DE HUECK: Does Mr. Almond need to rephrase

22 that then?

23 MR. ALMOND: I think to the extent Ms. Agrimonti

24 wants to clear up the record, she can do so on

25 cross-examination.

1 MS. AGRIMONTI: I can do it that way. It seems
 2 to me we'd have a clearer record if we know what
 3 developer we're talking about when questions are being
 4 asked.
 5 MR. DE HUECK: Yes.
 6 So, Mr. Almond, please refer to the correct
 7 developer while asking questions.
 8 But before I go any further, Mr. Soukup, could
 9 you please scoot your microphone a little closer to your
 10 mouth. Because you end up turning sideways and get a
 11 ways away. And you can move that around if you want to
 12 continue sit sideways. It's absolutely fine.
 13 Thank you.
 14 Q. Again, so who is Mr. Roland Jurgens?
 15 A. One of the -- the wind developer for this last wind
 16 farm.
 17 Q. When you say this wind farm, which one are you
 18 referring to?
 19 A. The one we're talking about today.
 20 Q. And did he hold himself out to the county as
 21 overseeing all development activities for the project?
 22 A. Well, when he would come to our meetings he would
 23 tell us the future plans of what they wanted to do.
 24 Q. Okay.
 25 A. Briefed us on what was coming in the future.

1 Q. And Mr. Jurgens was involved in the public input
 2 process, as we've discussed.
 3 A. Yes.
 4 Q. Who's Eric Elsberry?
 5 A. He's our zoning administrator. I suppose he's been
 6 there the last three years. Our other guy retired so we
 7 hired him and put him in there. And he does a very good
 8 job.
 9 Q. And as the zoning administrator, do members of the
 10 public submit input and comments to Mr. Elsberry?
 11 A. Yes, they do. And if there's any questions he
 12 usually calls District III for some advice because
 13 there's a wide variety of knowledge you need to know.
 14 Q. I'm going to ask you to turn to Exhibit I24 for me,
 15 please. It's in the binder under the tab I 24.
 16 A. With them yellow tags? There's 23 and there's 25.
 17 Right there? I 24. Okay.
 18 Q. And is Exhibit I24 an e-mail from Roland Jurgens to
 19 the zoning administrator Eric Elsberry?
 20 A. Yes, it is. I'm reading it right now. Hi, Eric."
 21 Q. And this e-mail was sent in October of 2015, around
 22 the same time the county was looking to adopt Article 17;
 23 right?
 24 A. Yes. I would say the Commissioner meeting was a
 25 week before that. And then according to what we looked

1 on our records, we started acting on the first meeting of
 2 November, which would be November 3 of 2015.
 3 Q. I want to take -- take your time and familiarize
 4 yourself with that e-mail, please.
 5 MS. AGRIMONTI: I object. This document to the
 6 extent the witness is just being asked to review a
 7 document. No foundation has been laid for it. I would
 8 request that foundation be laid before we investigate and
 9 ask questions about this document.
 10 MR. ALMOND: Ms. Agrimonti, I believe you
 11 stipulated to the foundation of this document.
 12 MS. AGRIMONTI: I stipulated to the document
 13 being an e-mail from Mr. Jurgens to Mr. Elsberry. The
 14 witness has not -- stated he's never seen this document
 15 before. It's also a document from a prior Applicant with
 16 this PUC than Prevailing Winds so it's not relevant, but
 17 I don't believe you've laid the foundation that this
 18 witness can speak to the document.
 19 MR. DE HUECK: Continue reviewing the document.
 20 I'm going to allow Mr. Almond to ask his
 21 questions just based on this mail. I'm assuming, yes,
 22 this gentleman cannot speak to the conversation that took
 23 place in this e-mail, but maybe there's some information
 24 within that he -- Mr. Almond's got some sort of line of
 25 questioning that will make sense.

1 (Witness examines documents.)
 2 A. Okay. I've read it.
 3 Q. As part of the public input process Mr. Roland
 4 Jurgens suggested to the county that a 35 dB
 5 nonparticipant noise restraint is absolutely the best way
 6 to protect nonparticipants?
 7 MS. AGRIMONTI: Objection. He's just asking the
 8 witness to state what is in the document. The document
 9 speaks for itself.
 10 MR. DE HUECK: Yeah. But I'm going to let the
 11 factual basis for these questions just merely go to the
 12 weight of what this witness responds and gives to the
 13 Commission. And we'll go from there.
 14 Q. Would you like the question repeated?
 15 A. What do you really want to know now.
 16 MR. ALMOND: Cheri, can you ask the question
 17 again.
 18 (Reporter reads back the question.)
 19 MS. AGRIMONTI: Further objection of hearsay.
 20 MR. DE HUECK: Well, and I'm just going to
 21 advise Mr. Almond you're basically testifying, and you're
 22 leading your direct examination. So let's try to avoid
 23 leading questions and leave them more open-ended.
 24 Q. Did Mr. Jurgens propose a noise limitation to be
 25 placed on nonparticipants as part of the public input

1 process?
 2 A. I can't answer that. I can't remember. That was
 3 three years ago.
 4 Q. Looking at exhibit -- what's been marked as Exhibit
 5 I24, go to the fifth paragraph for me. Follow along as I
 6 read it out loud.
 7 MS. AGRIMONTI: Objection. The witness has not
 8 seen this document except for today. He has not laid any
 9 foundation that the document in front of him influenced
 10 his decision or that he was even aware of it. To have
 11 Mr. Almond read into the record what isn't otherwise
 12 admissible is improper, it's not relevant, and the
 13 foundation has not been laid.
 14 MR. ALMOND: May I respond?
 15 MR. DE HUECK: You may.
 16 MR. ALMOND: We've heard this witness who is the
 17 County Commissioner also sitting on the Zoning Board.
 18 We've heard that the Zoning Board and the County
 19 Commission receives public input in whether or not to
 20 adopt zoning ordinances. We've heard as part of that
 21 public input process people submit e-mails to Mr. Eric
 22 Elsberry, the zoning administrator for the county.
 23 This is an e-mail from Mr. Jurgens to Eric
 24 Elsberry, the zoning administrator clearly providing
 25 public input into the process of the adoption of Article

1 17. As a County Commissioner and the board of -- a
 2 member of the planning board he's capable to speak to
 3 those public input that is submitted into the process.
 4 MS. AGRIMONTI: The witness has not seen the
 5 document --
 6 MR. DE HUECK: I got this.
 7 So Mr. Elsberry should be on the stand because
 8 it's clear from his statement and from observing him he's
 9 never seen this. He's completely unfamiliar with this
 10 document. So I am not going to let you read it into the
 11 record.
 12 I think you could formulate your questions
 13 without even having this e-mail in front of us right
 14 now.
 15 MR. ALMOND: Well, I asked the question of
 16 whether or not Mr. Jurgens submitted public input, and
 17 I'm now attempting -- to the county, and I'm now
 18 attempting to impeach the witness.
 19 MR. DE HUECK: He's never seen this public
 20 input. But Mr. Elsberry probably has. So I think --
 21 MR. ALMOND: Very clear. Just so we're very
 22 clear on this record, I'm going to move to admit
 23 Exhibit I24. And, as I'm understanding it, I'm not
 24 allowed to use Exhibit I24 either for admission or for
 25 impeachment purposes with this witness.

1 MR. DE HUECK: Can the parties help me out. Did
 2 we have this one?
 3 MR. ALMOND: No. It's not admitted.
 4 MR. DE HUECK: Not admitted.
 5 MS. AGRIMONTI: It's not admitted. And the
 6 Applicant does agree that it is a document from
 7 Mr. Roland Jurgens to Eric Elsberry so that that
 8 foundation -- I'm not suggesting that the document isn't
 9 what it is. But it is hearsay, and there's no foundation
 10 for this witness to opine on it.
 11 MR. DE HUECK: In agreement. It's not admitted
 12 at this point in time.
 13 MR. ALMOND: And, just to be clear, I cannot use
 14 this document for impeachment purposes with this witness?
 15 MR. DE HUECK: I have not seen you try to do
 16 that yet.
 17 Q. Did the county receive public input from Mr. Roland
 18 Jurgens suggesting a 35 dBA limit for nonparticipants?
 19 A. To my knowledge I cannot remember that. It was
 20 three years ago.
 21 Q. Looking at Exhibit I -- what's been marked as
 22 Exhibit I24 in front of you read along as I read for you.
 23 "The 45 dB participant, 35 dB nonparticipant noise
 24 restraint is absolutely the best way to protect
 25 nonparticipants."

1 Did I read that correctly?
 2 A. You're on the page of this I 24?
 3 Q. Yes. It's the fifth paragraph.
 4 A. Read that again for me.
 5 Q. "The 45 dB participant, 35 dB nonparticipant noise
 6 restraint is absolutely the best way to protect
 7 nonparticipants."
 8 Did I read that correctly?
 9 A. That's what's wrote in the book.
 10 Q. What was that?
 11 A. That's what is written here.
 12 Q. Okay. What noise limitation did the county
 13 ultimately adopt for nonparticipants?
 14 A. I'd have to go through the book and you'd have to
 15 show me what page. When we did that three years ago we
 16 did it.
 17 Q. Do you frequently look to your zoning ordinances?
 18 A. Well, I haven't been on the board for a couple of
 19 years and that -- we had read through, and this is all --
 20 you know, we deal with many things, gravel to machinery
 21 to personnel and whatever. We go through that book, and
 22 I guess I'll apologize. I did not read through this
 23 zoning book before I came here today.
 24 I carried it in my briefcase for years. Got it --
 25 but our big concern now was the hog barns. You know, you

1 ask me questions about hog barns and setbacks, and I can
 2 answer them.
 3 Q. Well, let's look to Article 17 and find the noise
 4 setback for nonparticipants. Can you turn to Article 17
 5 of your zoning ordinances for me?
 6 A. What page is that on?
 7 Q. It starts on page 57.
 8 A. Okay. I'm on page 57, Article 17. What do you want
 9 to know?
 10 Q. I want to know what the county's noise restriction
 11 is for nonparticipating residences of a wind energy
 12 system, a large wind energy system?
 13 A. Well, I know it's in here but I'm not going to be
 14 able to tell you right offhand where that paragraph is.
 15 Because we did study that three years ago.
 16 Q. And I'll help you out. It's Section 1741.
 17 A. Okay. "Noise level produced by" --
 18 (Witness examines document.)
 19 A. Okay. Now what do you want to know here?
 20 Q. Yeah. What is the noise limitation placed on large
 21 wind energy systems for nonparticipating residences?
 22 A. I guess I will admit the truth. This is a little
 23 above my head. You know, we went through this three
 24 years ago and according to the zoning administrator and
 25 everything, other counties, it worked.

1 Q. Looking specifically at the first line of Section
 2 1741 it says, "Noise level produced by the large wind
 3 energy system shall not exceed 45 dBA average A-weighted
 4 sound pressure at the perimeter of occupied residences."
 5 What does that 45 dBA average A-weighted sound
 6 pressure mean?
 7 A. Well, they monitor that and not supposed to go over
 8 it; right, is my understanding.
 9 Q. And the 45 dBA average A-weighted sound pressure, I
 10 understand you're saying that they monitor it and they
 11 can't go over it, but what is it?
 12 A. Well, it's the sound from the windmills.
 13 Q. And it says average A-weighted. How is it averaged?
 14 A. I cannot answer that. That is over my intelligence.
 15 Q. Is there a certain time period over which it's
 16 averaged that you're aware of?
 17 A. No.
 18 Q. In that same Section 1741 deals with shadow flicker.
 19 Do you see that?
 20 A. Yes, I do. To the bottom. I read that.
 21 Q. Why did the county think it needed to regulate
 22 shadow flicker?
 23 A. I guess with advice from other counties and other
 24 wind farms there has been issues with shadow flicker. So
 25 according to District III and whatever, they understand

1 that. That's why it was put in there.
 2 Q. And what are the issues you said there had been
 3 issues?
 4 A. That shadow flicker. You know, I personally
 5 don't -- I do understand it, but I don't. I mean, I know
 6 what it is and that's why it was put in there, to the
 7 best of my knowledge.
 8 Q. You said there had been other issues. Do you know
 9 what those other issues are?
 10 A. No.
 11 Q. Okay.
 12 A. But when we -- from some county or whatever, they
 13 said that -- you know, we kind of relied on everybody
 14 else's advice is how we acted on that, other --
 15 Q. In adopting the ordinances, did the county ever
 16 consider the concepts of infrasound or low frequency
 17 noise?
 18 A. Oh, I'm sure that was brought up. About everything
 19 you've talked about has been brought up in them three
 20 years prior a little bit.
 21 Q. And in anywhere in those Article 17 of your
 22 ordinances does the county place any sort of limitations
 23 or restrictions on infrasound or low frequency noise?
 24 A. I did not read up on that. I cannot answer that.
 25 Q. Well, you have Article 17 in front of you so feel

1 free to -- if you can find --
 2 MS. AGRIMONTI: Objection. Argumentative.
 3 MR. ALMOND: I'm attempting to refresh the
 4 witness's recollection of his zoning ordinances.
 5 MS. AGRIMONTI: I think it's an unfair test to
 6 ask him to read the entire ordinance and answer the
 7 question. It's either in the ordinance or it's not.
 8 MR. DE HUECK: I agree. And he gave the answer
 9 he's unaware.
 10 A. I guess we adopted this three years ago, and at that
 11 time we started up we thought everything was up to par at
 12 that time three years ago.
 13 I've flipped through it here and there. You know,
 14 we've heard about this many times and flipped through,
 15 whatever, should be good. And you're asking me these in
 16 depth questions, and they are over my intelligence.
 17 Q. At some point was it communicated to the county that
 18 the PUC model ordinance should not be used as a resource?
 19 A. I honestly can't recall that.
 20 MR. ALMOND: I don't have anymore questions for
 21 you, Mr. Soukup. Thank you for coming in.
 22 THE WITNESS: Okay. But I do recall the night
 23 at Avon when it was 100 degrees and your speaker system
 24 did not work. Remember that? And I sat there for three.
 25 MR. DE HUECK: Mr. Soukup, you're not quite done

1 yet. What I have to do now is to tender you for
2 cross-examination. Which means that now we let the
3 Applicant ask you questions, and then I'll turn it over
4 to these other Intervenors in room and then we'll go to
5 Staff and then the Commission will have an opportunity to
6 ask you some questions as well. So, with that,
7 Prevailing Winds would you like to cross-examine this
8 witness?

9 MS. AGRIMONTI: I have no questions. I thank
10 you for coming in today.

11 MR. DE HUECK: Mr. Fuerniss, do you have any
12 cross-examination?

13 CROSS-EXAMINATION

14 BY MR. FUERNISS:

15 Q. Mr. Soukup, I don't think you're giving yourself
16 enough credit when you say this is over your
17 intelligence.

18 Don't you think perhaps you just haven't looked into
19 this lately, that it's not fresh you're mind?

20 A. I will apologize. You know, I should have brought
21 that -- in fact, I borrowed my zoning book to one of the
22 other Commissioners to read through it two weeks ago.
23 And I should have brought that book along. This morning
24 I was waiting in the hall. I could have read it about
25 twice and refreshed my memory. You know, this was all

1 stuff from three years ago. I remember that October 20
2 night meeting. And there was quite a few people spoke
3 that night. I'm sure Gregg was there that night. I'm
4 sitting here. You know, I know everybody here with the
5 wind farm and I drive right by Karen's farm on my way
6 here and -- you know, cut through your neighborhood, I
7 should say, and --

8 Q. And maybe this came out, Reece got this out, I don't
9 know, but do you remember any specifics that the public
10 was asking for, as far as putting into the ordinance for
11 the wind farm?

12 Do you remember any specific requests that were made
13 that it should have this or it should have that?

14 A. You know, I guess I'm very nervous, but as I sit
15 here I remember Karen speaking in Tyndall at least three
16 different times; right? And you was in Tyndall once or
17 twice.

18 Q. But do you remember what was specifically being
19 asked for?

20 A. Three years ago? The main specific thing was you
21 guys just wanted to stop it.

22 Q. But you don't recall --

23 A. No.

24 Q. By what means or what specific regulations or
25 anything like that that were being asked for?

1 A. You know, I remember taking notes that night you
2 guys all talked in Tyndall. I said who was in favor, say
3 your name. Karen, yes and -- or no. And I kept track of
4 that because I sat right next to the Chairman that night.
5 And, you know, that meeting was two and a half hours
6 long. I guess there was a lot of things that was asked
7 for. I don't really remember anything specifically.

8 MR. FUERNISS: Okay. Thank you.

9 MR. DE HUECK: Ms. Jenkins.

10 MS. JENKINS: No questions.

11 MR. DE HUECK: Ms. Pazour.

12 MS. PAZOUR: No questions.

13 MR. DE HUECK: Staff.

14 MS. REISS: Thank you. Just briefly.

15 CROSS-EXAMINATION

16 BY MS. REISS:

17 Q. Thank you for being here, Commissioner. I just have
18 a couple of quick questions for you. Prior to today, did
19 anyone help you prepare your testimony for today?

20 A. No. I met with the State's attorney two days ago
21 and she said when to be here and I said what room and
22 that was it. And if I would have been prepared I would
23 have brought that book and read it instead of sitting
24 here looking like an idiot.

25 Q. Great. And in response to some of Mr. Almond's

1 questions you responded that the Commission looked
2 towards counties and other entities for zoning
3 ordinances. Do you remember that?

4 A. In that area -- we had paid attention to what some
5 of the other counties up north had done.

6 Q. Uh-huh.

7 A. And like I said that was three and a half years ago.

8 Q. Yeah.

9 A. Almost four. So we did give it a lot of thought,
10 and at that time everything we did in that book we
11 thought we was up to par and District III thought it was
12 up to par. Everything -- we did not want to make any
13 mistakes.

14 Q. Sure.

15 In your experience as a County Commissioner -- I
16 believe you said 17 years? How many years was it?

17 A. Zoning is 21. Commissioner 8.

18 Q. 21 years?

19 A. Yeah.

20 Q. So in your experience on the Zoning Board is it
21 abnormal for the county to look towards other resources,
22 counties?

23 A. Oh, yeah. We're issuing with these hog barns right
24 now, which is a big gray area trying to figure out
25 what -- and no county can figure out the correct answer,

1 setbacks and smell and whatever.
 2 Q. So just to clarify it's a normal practice for the
 3 county to look to other entities or it's not normal?
 4 A. Yeah. I would call other Commissioners. Other
 5 Commissioners call me all the time about something.
 6 Q. Sure. And I guess my last question is after looking
 7 at other resources did the county independently review
 8 the information in the ordinance before passage?
 9 A. I think I'm sure our Chairman had called some other
 10 counties and we just thought everything we did was up to
 11 par.
 12 MS. REISS: Okay. No further questions.
 13 MR. DE HUECK: That will bring us to Commission
 14 questions. And I'll go down to Chairman Fiegen and see
 15 if she has any questions for you.
 16 CHAIRWOMAN FIEGEN: I don't have any questions.
 17 And thank you for coming to your State Capitol and
 18 leaving your farm for a little bit. We are praying for
 19 better weather every single day.
 20 THE WITNESS: Next week.
 21 CHAIRWOMAN FIEGEN: Thank you.
 22 THE WITNESS: Next week.
 23 MR. DE HUECK: Commissioner Hanson.
 24 COMMISSIONER HANSON: No thank you.
 25 MR. DE HUECK: Commissioner Nelson.

1 COMMISSIONER NELSON: Thanks for being part of
 2 the process. No questions.
 3 MR. DE HUECK: Mr. Almond do you have any
 4 redirect?
 5 MR. ALMOND: No.
 6 MR. DE HUECK: With that, you may step down.
 7 Thank you for testifying.
 8 THE WITNESS: Thank you. And you earned your
 9 money that night at Avon. That was a tough one. Between
 10 the heat and the speaker problem.
 11 (The witness is excused.)
 12 MR. DE HUECK: Mr. Almond, you may call your
 13 next witness.
 14 MR. ALMOND: Call Keith Mushitz.
 15 Keith Mushitz,
 16 called as a witness, being first duly sworn in the above
 17 cause, testified under oath as follows:
 18 CROSS-EXAMINATION
 19 BY MR. ALMOND.
 20 Q. Will you introduce yourself to the Commission,
 21 please.
 22 A. I'm Keith Mushitz. Geddes, South Dakota. Chairman
 23 of Charles Mix County.
 24 Q. You're Chairman of Charles Mix County Commission?
 25 A. Charles Mix County Commission, yes.

1 Q. And does Charles Mix County have any zoning
 2 ordinances?
 3 A. It does not.
 4 Q. Are you aware of the project that's being considered
 5 as part of this proceeding?
 6 A. For Prevailing Winds, yes.
 7 Q. And when did you first learn about this project?
 8 A. Six months ago, roughly.
 9 Q. And how did you come to learn of the project?
 10 A. They petitioned the county, let us know that they
 11 had an Application out. But beings how we're not zoned
 12 they're really not required to do a lot. They did let us
 13 know what some of the tax base would be from the project.
 14 Wanted to meet with the highway superintendents for road
 15 agreements.
 16 Q. You said they petitioned the county? Is that what
 17 you said?
 18 A. No.
 19 Q. Okay. Maybe I misheard you.
 20 A. No.
 21 Q. They just reached out to the county let them know
 22 about the project?
 23 A. Right. There would be haul road agreements to be
 24 considered and things like that.
 25 Q. And in response of learning of this project, what

1 did the county do?
 2 A. We're not zoned. We really didn't do nothing,
 3 other -- after there was some protests, we looked into
 4 zoning but that's not going to work in Charles Mix
 5 County.
 6 Q. And you say after some protest. Tell me about that.
 7 A. Your clients were not in favor of wind power or the
 8 placement of it. Whatever.
 9 Q. When you say your clients who are you referring to?
 10 A. This row of gentlemen and Mr. Fuerniss.
 11 Q. Cuss their names and can you get a little more
 12 closer to the microphone?
 13 A. Mr. Sherman Fuerniss, I know he spoke before the
 14 Commission before and Mr. Hubner. And I'm not real good
 15 with names so I don't know the rest of them by name.
 16 Q. And when did the members of the public protest about
 17 this project?
 18 A. When it was prevented -- when it was presented by
 19 Prevailing Winds, I guess.
 20 Q. And you said there was some consideration of zoning.
 21 Tell us about that.
 22 A. Some people thought we should do some emergency
 23 zoning, but after more so meeting on other matters, not
 24 necessarily wind matters, zoning is not just not going
 25 to -- we had zoning once and it got voted out it's not a

1 good fit for Charles Mix County. There's 40,000 acres
 2 that we have no control over.
 3 Q. Did the County Commission start the process of
 4 implementing the ordinance zoning?
 5 A. We looked into it. We never ever read any
 6 ordinances. We did District III draw an ordinance up but
 7 we never acted on anything.
 8 Q. And when you said you looked into it, is that what
 9 you meant by looking it is you had District III?
 10 A. We actually had a draft written up, yes, sir.
 11 Q. And did you do anything else to look into it?
 12 A. Don't understand.
 13 Q. Well, did you hold any public hearings or any public
 14 meetings about?
 15 A. Yes.
 16 Q. Adopting emergency zoning ordinances?
 17 A. Yes, we did.
 18 Q. Tell us about those meetings.
 19 A. Well, we had people that were wanting to have the
 20 wind project and we had people that were not in favor of
 21 the wind power and we just let them air it out.
 22 Q. And approximately how many meetings took place
 23 considering the adoption of emergency zoning ordinances?
 24 A. One special meeting that was just for public comment
 25 and then one of our Commission meetings had pretty much a

1 full house but it wasn't designated as just a wind power
 2 meeting. Those two for sure.
 3 A little later on we had just strictly a zoning
 4 meeting which did end up getting wind power comments.
 5 Q. And you said ultimately the emergency zoning never
 6 went forward. Did any type of zoning get adopted in
 7 Charles Mix County?
 8 A. It has not.
 9 Q. Is Charles Mix County currently considering adopting
 10 zoning regulations?
 11 A. We -- I don't believe the matter will be brought up
 12 again.
 13 Q. So for the time being, there's not going to be any
 14 zoning in Charles Mix County in the near future?
 15 A. I highly doubt it, sir.
 16 Q. Did the County Commission make any sort of
 17 agreements or affirmations about this project?
 18 A. The county signed a document with Prevailing Winds
 19 as to where they would have -- how much they would use
 20 for setbacks. I'm sure you've looked at the document.
 21 We accepted that document, yes.
 22 Q. And if you turn to Exhibit 1-22 for me in that
 23 binder in front of you.
 24 A. I 22.
 25 I 22 or just Exhibit 22?

1 Q. Looking at page 3 of Exhibit 1-22, the Affidavit of
 2 Peter Pawlowski, do you see that?
 3 A. Yes, sir.
 4 Q. And is that that agreement you were just referring
 5 to?
 6 MS. AGRIMONTI: Objection. Mischaracterizes the
 7 document.
 8 MR. DE HUECK: Go ahead, Reiss.
 9 Q. What is that document?
 10 A. That is the document that we approved.
 11 Q. So this is the document that Charles Mix County
 12 approved for this project?
 13 A. Yes, sir.
 14 Q. When was the first time you seen this document?
 15 A. At one of the meetings in the -- one of the public
 16 meetings that we had in the evening. I don't know the
 17 date.
 18 Q. Yeah. And did you -- at some point the County
 19 Commission approved this document.
 20 A. Correct. At the end of the meeting.
 21 Q. At the end of the meeting. Have you ever seen this
 22 document prior to that meeting?
 23 A. I think I've heard that the document was around.
 24 Had I read it? No, sir.
 25 Q. Okay. And from the county's perspective, what does

1 it mean to approve this document?
 2 A. Well, it was Prevailing Wind said that they would go
 3 with these setbacks and distances when they put their
 4 project up within Charles Mix County. That looked
 5 acceptable to us.
 6 Q. And what information did the county rely on to --
 7 A. We looked --
 8 Q. To form the conclusion that it looked acceptable?
 9 A. We looked at other county zoning -- wind power
 10 zoning ordinances. This has greater distance than some
 11 for setbacks, less than others. It's between, you know,
 12 the most severe and the most lenient. The county did not
 13 have the resources to do their own independent studies.
 14 Q. And which counties did you look to?
 15 A. I think we had pretty much a list of every county in
 16 the state that has zoning on wind power.
 17 Q. And give some examples of the --
 18 A. Farther distance was 2 to 3 miles and the least
 19 distance I believe was 1,000 feet.
 20 Q. Okay. Aside from just looking at other county
 21 zoning ordinances, did the county rely on anything else
 22 in deciding to approve of this document?
 23 A. No. Not really, sir.
 24 Q. Okay. And if you go to the noise reference on
 25 page 2 of the Affidavit, page 4 of Exhibit 1-22, do you

- 1 see the section that says, "Noise"?
- 2 A. Page 4? Attachment 2 --
- 3 Q. We're on the same exhibit?
- 4 A. Yes, sir.
- 5 Q. And then the last page of that exhibit.
- 6 In looking at the last page of Exhibit 1-22 can you
- 7 locate the noise?
- 8 A. Yes, sir.
- 9 Q. And it says the noise from the wind turbines will
- 10 not exceed 43 dBA at any existing nonparticipating
- 11 residence. Can you give us anymore information on what
- 12 that means?
- 13 A. That is the sound emitted by the turbines, 43
- 14 decibels, 45 decibels.
- 15 Q. And is this the -- strike that.
- 16 From the county's perspective, is there any
- 17 additional information that the Commission should be
- 18 aware of as it relates to noise?
- 19 A. No, sir. This was in a lot of the other zoning
- 20 ordinances as a standard.
- 21 Q. So as you read that noise limitation what happens
- 22 if -- if the noise from the wind turbines goes over 43
- 23 dBA?
- 24 A. As to what happens?
- 25 Q. Would they be in -- essentially violation of this

- 1 approved limitation?
- 2 A. I would assume so, yes.
- 3 MR. ALMOND: Okay. No further questions.
- 4 MR. DE HUECK: Cross-examination, Ms. Agrimonti.
- 5 MS. AGRIMONTI: Yes. Thank you. Very
- 6 limiteded.
- 7 CROSS-EXAMINATION
- 8 BY MS. AGRIMONTI:
- 9 Q. Thank you for attending today.
- 10 You referenced public meetings where various
- 11 individuals came and spoke about the possibility of a
- 12 zoning change or adoption of zoning. Do you recall that?
- 13 A. Yes.
- 14 Q. And did you listen to everyone who wanted to speak
- 15 about their concerns with respect to wind turbines?
- 16 A. As much time as we had, yeah. One meeting went on
- 17 all night long I think if we didn't close it down.
- 18 Q. And you considered all those comments in determining
- 19 whether to move forward with emergency zoning?
- 20 A. Yes.
- 21 Q. I 22 we've been talking about the exhibit of -- that
- 22 Mr. Almond was asking you questions about. You agree
- 23 that that is a document that binds only Prevailing Wind
- 24 Park; isn't that correct?
- 25 A. Correct.

- 1 Q. Didn't obligate the county in any way?
- 2 A. Correct.
- 3 MS. AGRIMONTI: I have no further questions.
- 4 MR. DE HUECK: Mr. Fuerniss.
- 5 CROSS-EXAMINATION
- 6 BY MR. FUERNISS:
- 7 Q. Good morning, Keith.
- 8 A. Good morning.
- 9 Q. A little bit of housekeeping here. You stated that
- 10 you think I'm a client of Mr. Almond's; is that correct?
- 11 A. I guess I don't know that for sure. I know you're
- 12 not -- do not want wind towers around your property.
- 13 Q. Well, would it surprise you to know that he is not
- 14 my attorney and neither Karen's nor Kelly's?
- 15 A. I apologize for making that assumption.
- 16 Q. Just to be clear there's not an attorney in this
- 17 room that's within my pay grade.
- 18 Were you on the County Commissioners when the
- 19 Beethoven project was built?
- 20 A. Yes, I was.
- 21 Q. Was there any kind of similar Affidavit or any kind
- 22 of agreements at that time to do that project?
- 23 A. When that project came in there was no -- very
- 24 little objection to it. I mean, we never had no public
- 25 meetings or nobody wanted one.

- 1 Q. Do you know how --
- 2 A. We did not sign nothing on that project.
- 3 Q. Yeah. The county didn't have?
- 4 A. No.
- 5 Q. Any kind of agreement or statements?
- 6 A. You're correct.
- 7 Q. Okay.
- 8 So would you have any idea of how that project got
- 9 placed within the bounds of Charles Mix County? Have
- 10 you -- I've got to ask one question at a time; right?
- 11 Do you have any idea how it came about that it was
- 12 put where it is?
- 13 A. No. I really don't. I suppose it's where they
- 14 could generate the most wind from, I'm assuming.
- 15 Q. And have you been up there and looked at those
- 16 turbines that are in Charles Mix County?
- 17 A. Up close or from my place that's 40 miles away.
- 18 Q. Up close. I mean, driven by, driven through?
- 19 A. Just off of highway going to trip 18.
- 20 Q. Okay. So that would put you some 3 miles at least
- 21 probably from --
- 22 A. Or 46. I've never drove to any of the towers.
- 23 Q. Okay. And do you recall at both the -- I think when
- 24 you say public input meetings you're mostly talking about
- 25 the regular Commissioner meetings for the most part? You

1 guys did have a couple of special meetings during the
 2 summer but for the most part these were regularly
 3 scheduled Commissioner meetings?
 4 A. Correct.
 5 Q. Okay. Do you remember particulars or what specifics
 6 in regards to regulations that the people were asking for
 7 in a potential zoning ordinance? Some of the numbers
 8 that were mentioned?
 9 A. They varied quite a bit, yes, sir.
 10 Q. But do you remember what some of them were?
 11 A. Yes. I think I heard a three-quarter-of-a-mile
 12 setback. I've heard mile setback. I've heard half-mile
 13 setback. Depends whether you was for or against the
 14 project.
 15 Q. Do you remember a particular county zoning ordinance
 16 that we referenced?
 17 A. No. I do know that one ordinance -- I don't know
 18 the exact county. One of them had very far setbacks. I
 19 do remember that part.
 20 Q. You're referring --
 21 A. I don't know which county it was for sure.
 22 Q. You're probably referring to the Walworth County
 23 ordinance which has a 2 mile setback?
 24 A. Could be. I don't know, Sherman. I don't know.
 25 Q. Well, that was one that was --

1 A. Uh-huh.
 2 Q. Thank you, Keith.
 3 MR. DE HUECK: Ms. Jenkins, any questions?
 4 CROSS-EXAMINATION
 5 BY MS. JENKINS:
 6 Q. Sir, do you remember me attending one of your
 7 regular meetings?
 8 A. Yes, I do.
 9 Q. Okay. And do you remember what my concerns were?
 10 A. It was health concerns, I believe, with the wind
 11 power.
 12 Q. Okay.
 13 MS. JENKINS: Thank you.
 14 MR. DE HUECK: Ms. Pazour.
 15 CROSS-EXAMINATION
 16 BY MS. PAZOUR:
 17 Q. Good morning, Keith.
 18 A. Good morning.
 19 Q. Do you remember me being at the meetings?
 20 A. Yes, I do. And your daughter.
 21 Q. Do you remember me giving you literature?
 22 A. Yes. As far as the health concerns again on wind
 23 towers, yes.
 24 MS. PAZOUR: Okay. Thank you.
 25 MR. DE HUECK: Commission questions.

1 Commissioner Hanson.
 2 Staff.
 3 MS. REISS: Thank you.
 4 CROSS-EXAMINATION
 5 BY MS. REISS:
 6 Q. Good morning, Mr. Mushitz?
 7 A. Correct.
 8 Q. I have just have a couple of questions for you. If
 9 you could turn your attention to Exhibit 1-22, and that
 10 would be the Affidavit of the Peter Pawlowski.
 11 You mentioned in response to Mr. Almond's questions
 12 that the first time you saw this Affidavit was at the
 13 Commission meeting; is that correct?
 14 A. Yes, ma'am.
 15 Q. Did you speak to Mr. Pawlowski at any time before
 16 this Affidavit was presented at the Commission meeting?
 17 Let me clarify. Did you speak to him about the
 18 terms of this Affidavit?
 19 A. No.
 20 Q. Okay. You mentioned I believe in response to
 21 Mr. Fuerniss's question that the Beethoven project did
 22 not have a similar Affidavit; is that correct?
 23 A. Correct.
 24 Q. Are these affidavits normal practice for Charles Mix
 25 County?

1 A. This is only the two wind projects that ever come in
 2 so what is normal?
 3 Q. All right. But there's not another type of project
 4 that would utilize an Affidavit like this?
 5 A. No.
 6 Q. Okay.
 7 MS. REISS: Okay. No further questions.
 8 MR. DE HUECK: Commissioner Hanson.
 9 COMMISSIONER HANSON: Thank you. Good morning,
 10 Mr. Mushitz -- or Commissioner, I should say.
 11 THE WITNESS: Either way.
 12 COMMISSIONER HANSON: Mr. Chairman, were you
 13 subpoenaed to come here today?
 14 THE WITNESS: Yes, sir.
 15 COMMISSIONER HANSON: You spoke -- as you were
 16 going through the process you said that there were 40,000
 17 acres that you had no control over in the county.
 18 And I'm assuming that's reservation property; is
 19 that correct?
 20 THE WITNESS: Trust lands.
 21 COMMISSIONER HANSON: Trust lands. Okay. And
 22 of course you don't have authority over municipalities
 23 either, do you?
 24 THE WITNESS: No, sir.
 25 COMMISSIONER HANSON: Okay. I think that's all

1 I have. I appreciate your testimony. Thank you.
 2 MR. DE HUECK: Commissioner Nelson.
 3 COMMISSIONER NELSON: Thanks for being part of
 4 the process. No questions.
 5 MR. DE HUECK: Chair Fiegen.
 6 CHAIRWOMAN FIEGEN: Thank you.
 7 MR. DE HUECK: Any redirect.
 8 MR. ALMOND: Briefly.
 9 REDIRECT EXAMINATION
 10 BY MR. ALMOND:
 11 Q. You were asked about the public input process, the
 12 meetings. Was there a meeting, a County Commission
 13 meeting in which you and Mr. Peter Pawlowski left the
 14 meeting to go out in the hallway and have a private
 15 conversation?
 16 A. Yes, sir.
 17 Q. Tell us about that private conversation.
 18 A. Within the meeting maps had been showed of a setback
 19 map. And, of course, I was over here, Mr. Pawlowski was
 20 over there. There was so much comment going on I wanted
 21 a question clarified. We stepped out. I asked him how
 22 many towers would be affected with a 2,000 foot setback.
 23 And the lines were real close on paper. He thought two
 24 and possibly three would be affected the way they were
 25 presented on the paper at that time.

1 We came back in the meeting, and I told the meeting
 2 that that's what we had discussed outside the door.
 3 Q. Was there any other discussion out in the hallway?
 4 A. No, sir. I wanted that question clarified.
 5 Q. Aside from that particular meeting, have you had any
 6 other conversations with Mr. Pawlowski or anyone else
 7 outside of a public meeting?
 8 A. No, sir.
 9 MR. ALMOND: Okay. Nothing further.
 10 THE WITNESS: I was invited to a site and didn't
 11 even go so --
 12 MR. ALMOND: No further questions.
 13 MR. DE HUECK: Recross, Prevailing Winds.
 14 MS. AGRIMONTI: No questions.
 15 MR. DE HUECK: Mr. Fuerniss?
 16 RECROSS-EXAMINATION
 17 BY MR. FUERNISS:
 18 Q. Commissioner Hanson brought up the trust lands in
 19 Charles Mix County.
 20 How does that affect property taxes in Charles Mix
 21 County?
 22 A. There is no taxes on trust land.
 23 Q. So there's 40,000 acres, give or take, that the
 24 county receives no income from.
 25 Did the Commission just for funsies figure out what

1 the projected tax payments to Charles Mix County might
 2 come out to, say, per acre or something like that for
 3 Charles Mix County, taking into consideration all those
 4 trust lands that aren't taxed?
 5 MS. AGRIMONTI: Objection.
 6 THE WITNESS: This is not even relevant to this.
 7 We're on a whole new ground.
 8 MR. FUERNISS: Okay. I'll withdraw the question
 9 it if that's the proper thing to do. Thank you.
 10 MR. DE HUECK: Ms. Jenkins?
 11 MS. JENKINS: No questions.
 12 MR. DE HUECK: Ms. Pazour.
 13 MS. PAZOUR: I have a question but I would like
 14 to ask Ms. Edwards because I'm not sure on how to ask it.
 15 MS. EDWARDS: Can we take 30 seconds. I can't
 16 give legal advice but I can see what you want to know
 17 from me.
 18 MR. DE HUECK: Yep. Go ahead.
 19 (A short recess is taken.)
 20 MR. DE HUECK: Ms. Pazour, go ahead.
 21 CROSS-EXAMINATION
 22 BY MS. PAZOUR:
 23 Q. Did you have any public meetings outside of the
 24 Commission -- Commissioners meetings with Prevailing
 25 Winds?

1 A. No I stepped out of that meeting with Mr. Peter
 2 Pawlowski, but no other meetings, other than public
 3 meetings.
 4 Q. Like in the beginning of August?
 5 A. I did not.
 6 MS. PAZOUR: Okay.
 7 MR. DE HUECK: With that, Mr. Mushitz.
 8 THE WITNESS: Mushitz.
 9 MR. DE HUECK: Mushitz. Thank you for your
 10 testimony, and you may step down.
 11 (The witness is excused.)
 12 MR. DE HUECK: We will move on to Staff's
 13 witness. He was scheduled today so that's why we're
 14 breaking the Order for Mr. Almond at this time allowing
 15 Staff's witness to take the stand.
 16 MS. EDWARDS: Staff calls David Hessler.
 17 David Hessler,
 18 called as a witness, being first duly sworn in the above
 19 cause, testified under oath as follows:
 20 DIRECT EXAMINATION
 21 BY MS. EDWARDS:
 22 Q. Mr. Hessler, welcome back to South Dakota. Will you
 23 please introduce yourself for the record.
 24 A. Yeah. My name is David Hessler. I'm an acoustical
 25 consultant with Hessler & Associates and I've been asked

1 by the public utilities Staff to provide impartial
 2 technical advice on noise for this project.
 3 Q. Did you submit prefiled testimony in this Docket?
 4 A. Yes, I did.
 5 Q. Have you testified before this Commission before?
 6 A. Two previous times.
 7 Q. Have you reviewed the other testimony submitted by
 8 other witnesses in this Docket?
 9 A. Yes, I have.
 10 Q. Both direct and rebuttal?
 11 A. Yes.
 12 Q. Have you also reviewed all responses to data
 13 requests?
 14 A. I believe I've read most of them if not all of them.
 15 Q. Did you rely upon that information when formulating
 16 your opinion?
 17 A. Yes.
 18 Q. Are you familiar with the testimony of Mr. Howell,
 19 Chris Howell?
 20 A. Yes. Mr. Chris Howell, the -- he's the acoustical
 21 engineer for the project.
 22 Q. Would you agree that it is -- based upon his
 23 testimony yesterday would you agree that it is either
 24 inappropriate or impossible to assess the potential noise
 25 impact on the -- strike that.

1 What is your over all assessment of the positions
 2 and arguments advanced by Mr. Howell in his testimony?
 3 A. Well, I think what you were getting at there for a
 4 minute was the first point, which is he contends that
 5 it's impossible to predictor assess the public reaction
 6 to a project, and so their study focused entirely on
 7 simply demonstrating whether the project was going to
 8 meet the 45 dBA Bon Homme County noise limit.
 9 But they did no work or -- evaluating what the
 10 predicted sound levels meant or looked into any kind of
 11 low frequency issues, none of that. So I was critical of
 12 the -- of Mr. Howell's work in that regard.
 13 Q. Now just now when you stated their study are you
 14 referring to that of the Applicant?
 15 A. Yeah. The Applicant's noise study, which was
 16 prepared by Mr. Howell.
 17 Q. Are you familiar with a Mr. Steven Cooper?
 18 A. Yes.
 19 Q. And who is Steven Cooper?
 20 A. He's an acoustical engineer out of Australia who
 21 with relevance here has recently done some experiments
 22 that I find very convincing that demonstrate that people
 23 with certain sensitivities are affected by extremely low
 24 frequency pulsations from wind turbines.
 25 He did a blind study where he recorded sound at a

1 wind farm in Australia and then replicated that sound in
 2 a laboratory setting and people with known sensitivities,
 3 people that lived on the site that were bothered by it
 4 could tell when this completely inaudible sound was
 5 played with 100 percent accuracy; whereas, a group of
 6 other people didn't hear anything.
 7 Q. So then is it your testimony that certain people
 8 would be more sensitive than others?
 9 A. I believe some people do have a sensitivity to the
 10 pulsations produced by all wind turbines really, every
 11 model, every size. It's just the nature of the thing
 12 that it produces a pulse around just under 1 hertz, which
 13 is extremely low and well below the capability of any
 14 conventional sound instrument to measure.
 15 Q. If you had -- based upon your training and
 16 experience, if you had to guess without anybody talking
 17 what's the noise level in this room today?
 18 A. I would say with the fan going it's maybe 40 dBA.
 19 In fact I have a sound level meter on my phone if you --
 20 can I?
 21 Q. I'll take your word for it.
 22 A. Okay. All right.
 23 Q. Are you familiar with Mr. Howell's Rebuttal
 24 Testimony as it relates to the testimony of Mr. Richard
 25 James?

1 A. Yes, I am. And I have to say I agree with
 2 Mr. Howell on his comments there, that in most instances
 3 counter to what Mr. James was putting forward.
 4 Q. How about Mr. Howell's testimony as it rebutted that
 5 of Mr. Jerry Punch?
 6 A. I actually did agree with Mr. Howell there because
 7 what he was talking about was Dr. Punch was recommending
 8 that the noise limit for the project should be expressed
 9 in terms of an LMax statistical noise level.
 10 That sounds good. That makes sense on paper. But
 11 that's coming from someone that's never measured a wind
 12 project.
 13 If we were to put a sound monitor at the site today
 14 when there's no project, the Lmax would go over 40, 45,
 15 or even 50 a thousand times a day. Every dog bark, plane
 16 flying, everything would cause an exceedance of that
 17 level.
 18 So it's not practical to use that to actually
 19 measure a complete project.
 20 Q. Have you read the direct and Rebuttal Testimony of
 21 Intervenor witness professor Alves-Pereira?
 22 A. Yes.
 23 Q. And what is your opinion of that?
 24 A. Well, her area is physiology and that sort of thing.
 25 It's out of my area, but I would -- there was another

1 witness, Mark Hopkins, I believe, who reviewed her
 2 testimony. And he's a physiologist and answered her
 3 point by point, and I had to agree. I found his
 4 testimony very compelling.

5 Q. Would you be referring to Dr. Mark Roberts?
 6 A. Mark Roberts. Thank you. I drew a blank there for
 7 a moment.

8 Q. What statistical descriptor would you associate with
 9 the 40 dBA noise limit?
 10 A. If there were to be a 40 dBA limit on this project
 11 or any other project, the only practical descriptor would
 12 be a long-term average measured over a period of days or
 13 weeks.

14 And the reason for that is that the sound of the
 15 project varies with wind and atmospheric conditions so a
 16 short measurement of 10 minutes wouldn't tell you
 17 anything. The project might not even be operating.

18 So what we found from many years of experience
 19 testing completed projects is that you have to monitor
 20 for usually two weeks and then try to determine what the
 21 project alone level is exclusive of the background level.
 22 The background levels vary significant in these projects.
 23 As as high as the project many times.

24 For example, in our assessments we'll usually
 25 monitor for about two weeks prior to any construction,

1 and what we find is that the sound level is directly --
 2 directly correlates to the wind speed. And so when it's
 3 windy the sound levels 45, 50 dBA before anything's
 4 built.

5 So when the project comes in you have to be careful
 6 not just to accept the level that's measured as being
 7 completely from the project. A lot of times that's only
 8 one component of it. So the difficulty is separating the
 9 two, and that's why a long-term measurement campaign is
 10 needed, supplemented by monitors that are miles from the
 11 project recording the simultaneous background level.
 12 It's not an easy thing to do.

13 Q. Ballpark number, how many wind farms have you
 14 evaluated?
 15 A. Well, one of the Intervenor data requests was
 16 exactly that question so I had to go back and look.
 17 We've measured 15 newly operational projects all over the
 18 country, one in Jamaica, and what we have done in all of
 19 those cases is performed these two or three-week surveys
 20 with background monitors, and it's not easy but you can
 21 tease out what the project level is doing on a long-term
 22 average basis.

23 Now one point I'd like to make about that is when we
 24 do these tests the methodology is kind of up to me
 25 because it's never prescribed anywhere. So what I like

1 to do is we ask the project who has called or complained
 2 or who's upset about this project in any way, and we're
 3 going to monitor at their houses.

4 Now that -- in every case I can think of that's a
 5 number between zero and three. Usually there's about
 6 maybe two people. And most of these projects cover 25
 7 square miles. They involve hundreds of houses, but
 8 that's what we find.

9 So we measure at those locations, and then I pick
 10 five to seven other locations that are on the sound map
 11 the locations of the houses that are receiving the
 12 maximum sound level and so we set up instruments at all
 13 of those locations.

14 In doing that, we can talk to all of those people.
 15 So I've heard the grievances of people that don't like
 16 it, and then I've also talked to the people at all these
 17 other houses that are receiving sound levels of '46 and
 18 47 dBA and most people just say it's -- it's nothing.
 19 You hear it. Nothing.

20 So my impression after 15 wind projects of seeing
 21 that same thing repeated is that there's going to be some
 22 people very upset. It's going to be a small number.
 23 There's a few projects that everybody to my knowledge is
 24 fine with. But most people aren't that bothered. And
 25 that's kind of the facts on the ground.

1 Q. What is your overall recommendation, having heard
 2 the testimony and read all of the filings?
 3 A. Well, the project was designed to the county 45
 4 limit and is meeting that. I think the highest predicted
 5 level at anyone's house right now is 41.9.

6 Now there's been an extraordinary push back from
 7 folks that don't want this project so -- you know,
 8 normally we recommend 45 independent of what the county
 9 says. Now we think 45 is a fair limit for most projects
 10 just based on our experience and seeing how many
 11 complaints there are and what the levels are at those
 12 houses.

13 But, at the same time, we've recommended for many
 14 years that every project should shoot for an ideal design
 15 goal of 40. That would serve to much better protect the
 16 community against complaints and annoyance.

17 Now here, because almost all the houses are already
 18 below 40, it seems to me that it's -- wouldn't be
 19 inconceivable to modify the project slightly so that --
 20 so as to achieve the 40 here. I think there's 11 houses
 21 that are over right now, and many of those are just over
 22 by a tenth or two tenths of a dB, which isn't
 23 significant. So I would like to see the project shoot
 24 for this 40.

25 Q. Were you present in the room this morning for all of

1 the testimony?
 2 A. This morning, yes.
 3 Q. Did you hear the back and forth about whether there
 4 may or may not have been a suggestion for a 35 dBA at
 5 some point?
 6 A. Yes, I did see that, and I did see a copy of that
 7 e-mail the day before yesterday. Basically stating that
 8 the wind turbine developer at that time, that fellow,
 9 Roland Jurgens, I think, said the 35 was a great idea and
 10 that would protect everyone.
 11 Well, that's true. 35's extremely quiet and no one
 12 would be bothered, but I'm not sure he knew what he was
 13 advocating for because the setbacks to achieve that would
 14 be huge and most of the projects I'm familiar with just
 15 wouldn't be viable with that kind of a limit.
 16 Q. When you say huge, what are -- what are you talking,
 17 generally speaking?
 18 A. Did I say huge?
 19 They would be on the order of a mile and a half or
 20 something like that.
 21 Q. Okay.
 22 A. And most projects are not that sparsely populated
 23 that that's doable.
 24 Q. Okay.
 25 A. And I would further add I talked about the

1 background level a few minutes ago. When the wind is
 2 blowing, and the wind has to below for the project to
 3 operate, the background level is fairly high. It's
 4 between 40 and 50. So to design to 35 would be --
 5 there's really no need for that. The background level's
 6 going to cover up the project at that kind of a level.
 7 All you're going to hear is the wind blowing in the
 8 trees. There's kind of a bottom limit to how quiet you
 9 need to make it, and generally speaking we find that's
 10 around 40. Once you go below that there's diminishing
 11 returns. You're not getting any further improvement
 12 really.
 13 Q. Okay. I'm going to draw your attention to Exhibit A
 14 33, which I'll provide for you.
 15 Mr. Hessler, are you familiar with that exhibit?
 16 Take a minute to look at it.
 17 (Witness examines document.)
 18 A. Well, it's the first time I've seen it. Let me just
 19 look at it for a sec.
 20 (Witness examines document.)
 21 A. Okay. Yeah. 45 dBA.
 22 Q. Can you identify what the title of that exhibit is
 23 for the record?
 24 A. The Applicant's proposed conditions.
 25 Q. Is that an exhibit that you -- or a proposal that

1 you weighed in on or had any input on prior to today?
 2 A. I haven't seen this exact document, but I understood
 3 from the beginning that the Applicant had committed to
 4 meeting Bon Homme County 45 noise limit, not only in that
 5 county but the other two counties in which the project
 6 was sited.
 7 MS. EDWARDS: Thank you. No further questions.
 8 I will tender him for cross.
 9 MR. DE HUECK: We're going to take a recess at
 10 this point for our court reporter. Let's come back at
 11 10:30.
 12 (A short recess is taken.)
 13 MR. DE HUECK: We're back in session.
 14 Mr. Hessler is on the stand and now subject to
 15 cross-examination.
 16 And you're still under oath, Mr. Hessler.
 17 Prevailing Winds, you may proceed.
 18 MS. SMITH: Thank you.
 19 CROSS-EXAMINATION
 20 BY MS. SMITH:
 21 Q. Good morning, Mr. Hessler.
 22 A. Good morning.
 23 Q. As I understood your written testimony you did not
 24 take issue with the noise modeling methodology and
 25 assumptions that were used by Burns & McDonnell in

1 preparing their analysis for the project; is that
 2 correct?
 3 A. That's correct. They used the same assumptions and
 4 even modeling software that I used.
 5 Q. Okay. Thank you. And you also agreed that the
 6 modeling showed compliance with the Bon Homme County
 7 requirement of 45 dBA?
 8 A. That's correct.
 9 Q. You mentioned a criticism of not taking into account
 10 community perception. Is that accurate?
 11 A. That's correct.
 12 Q. And community perception would be a subjective
 13 analysis; is that true?
 14 A. In general, yes. But it is possible to make a
 15 judgment as to how impacted people are likely to be.
 16 For example, when we do impact assessments, and
 17 we've done probably over 70, we do a thorough background
 18 study for a matter of weeks and correlate the sound level
 19 to wind speed measured at the top of the met towers to
 20 get the wind speed at the turbine height and then predict
 21 the project level under identical wind conditions. And
 22 it's the differential between what's there now and what's
 23 going to be there at the project that really determines
 24 the possible impact.
 25 Q. And you indicated that ambient noise levels vary

1 from 40 to 50 typically when the wind is blowing in your
 2 Direct Testimony just now; correct?
 3 A. That's right. And the background studies that we
 4 do, we find that just about every site the background
 5 level ranges from 20 to 50, purely a function of wind
 6 speed. So when wind is blowing there's a significant
 7 background noise that's often overlooked by a lot of
 8 people that are opposed to wind turbines. They think the
 9 background is 30 dBA or 25 dBA. But that's when it's
 10 calm and the project is not operating so it's not
 11 relevant.
 12 Q. And as far as community perception when you're
 13 talking about your ideal limits, the concept is to avoid
 14 complaints; correct?
 15 A. That's correct.
 16 Q. Is it true in your testimony that you noted that
 17 there isn't really a regulatory sound level that would
 18 satisfy everyone?
 19 A. Yeah. That's correct. You can never sit back and
 20 be comfortable and everybody be all right with a wind
 21 project.
 22 Q. So someone may complain regardless of how low the
 23 level is that is set; is that correct?
 24 A. I have seen instances of that.
 25 Q. In this case you stated in your testimony, and I

1 believe you restated here, that 45 dBA is an appropriate
 2 reasonably fair noise limit for wind projects at
 3 nonparticipating residences. Is that accurate?
 4 A. Yeah. We consider that a reasonable limit under
 5 normal circumstances. When there's not a lot of
 6 opposition.
 7 Now here I would lean more towards our ideal
 8 recommendation of 40.
 9 Q. And that's just simply based on complaints that have
 10 been lodged in advance of the project being constructed?
 11 A. Those numbers come from our experience at completed
 12 projects. Like I briefly described, we measure at the
 13 Complainant locations and a number of other locations so
 14 we know what the sound level is at the people that are
 15 complaining and that's why we say it's -- the situation
 16 is generally okay up to 45, not ideal, but below 40 we
 17 see very few complaints.
 18 Q. When you in your own testimony, your written
 19 testimony, you indicate that a lot of fear and resistance
 20 to wind projects is created during the development phase
 21 by largely attributable to highly biased even scary aunt
 22 I wind websites. Do you remember that testimony?
 23 A. Oh, yeah. That's absolutely true. All you have to
 24 do is Google wind turbine noise, and it's horrific.
 25 Q. And you noted that once those projects are

1 operational and you also testified here today that most
 2 of those fears are found to be unfounded. Is that
 3 accurate?
 4 A. That has been my experience, yes.
 5 Q. What's been proposed on Exhibit A 33 -- and do you
 6 still have that in front of you? It's that one sheet?
 7 A. Yes, I do.
 8 Q. Of the Applicant's proposed conditions?
 9 A. Yes.
 10 Q. You indicated you had seen similar language before.
 11 Is that accurate?
 12 A. I had seen in the noise study where it summarized
 13 what the applicable regulations were, which was the 45 in
 14 Bon Homme County and then the voluntary agreement to that
 15 in the other two counties.
 16 Q. You also testified on behalf of the Staff in the
 17 Crocker Wind Farm Docket and the Dakota Range Wind farm
 18 dockets; is that right?
 19 A. That's correct.
 20 Q. And in those matters there was a condition agreed to
 21 among Staff at 45 dBA for nonparticipating residences; is
 22 that true?
 23 A. That's correct. And I think on one of them the area
 24 was so sparsely populated that I think all the predicted
 25 levels were below 40 to begin with so the 45 limit was

1 largely irrelevant.
 2 Q. And on this case it would be reasonable for the
 3 Commission to impose a limit of 45. That would be a
 4 reasonable and fair limit in this case as well, would it
 5 not?
 6 A. In what I would call normal circumstances it's a
 7 reasonable and fair limit, but where there's quite a bit
 8 of opposition, as there obviously is here, I think
 9 further consideration should be given to that.
 10 Q. Was there not opposition in the last two dockets?
 11 A. Not to the extent of this case.
 12 Q. And you're basing that on simply numbers? Are you
 13 aware of the number of Intervenors I guess I should ask?
 14 A. I'm basing it on the amount of time it took me to
 15 read all the Intervenor submittals.
 16 Q. So it's based on anticipate tore complaints for the
 17 project?
 18 A. Yes.
 19 Q. With respect to the potential for health effects,
 20 you referenced an article regarding -- or by Steven
 21 Cooper; is that correct?
 22 A. Correct.
 23 Q. And it talked about the potential for a small
 24 minority of people to be susceptible to vertigo and
 25 nausea symptoms due to wind projects; is that true?

1 A. That's correct.
 2 Q. And are you basing your statements regarding
 3 potential health effects solely on that article?
 4 A. That article I found to really put me over the --
 5 I've read a lot of articles and attended a lot of
 6 conferences where this issue has been discussed but I
 7 find that to be pretty unequivocal, that experiment that
 8 he recently did.

9 So to me it's very clear that some people are
 10 susceptible and are very adversely affected, but it's a
 11 very small minority.

12 Q. You're not making a medical judgment here? You're
 13 not speaking as a medical practitioner regarding that top
 14 is that true?

15 A. No, not at all. I'm -- in my mind I'm thinking of
 16 the Shirley wind project in Wisconsin that I went to and
 17 we did a study there to try to figure out what was
 18 driving the complaints there, the nausea and the ill
 19 feeling complaints. And we went to the houses of those
 20 people, we talked to them, we took measurements. They
 21 weren't making it up. And so something's going on.

22 And what we found in that study was that you could
 23 detect the wind turbine blade passing frequency, which is
 24 as I mentioned around 1 hertz but the magnitude of it is
 25 incredibly small and it's really hard to believe that

1 that has any effect but I'm convinced from Cooper's work
 2 that that's what it is.

3 Q. So just to make it clear you're convinced based
 4 solely on Cooper's work that that's the --

5 A. I think he finally made the link. Or demonstrated
 6 the link.

7 MS. SMITH: I don't have any further questions.

8 MR. DE HUECK: Mr. Almond.

9 CROSS-EXAMINATION

10 BY MR. ALMOND:

11 Q. Just following up on that last question, what did
 12 Cooper demonstrate the link between?

13 A. That the extremely low frequency pulsations produced
 14 by wind turbines can be -- they're completely
 15 inaudible -- can be perceived by people who have a
 16 sensitivity to it but not by everybody.

17 Q. And you believe that study gives credence to the
 18 complaints of the Shirley Wind individuals and their
 19 complaints of -- I guess I'll let you say the complaints
 20 because you're the one that was there but --

21 A. Yeah.

22 Q. What were the complaints?

23 A. That they just felt some funny feeling and had a
 24 little dizziness and vertigo and just couldn't take it
 25 and had to leave their houses. They couldn't get relief

1 until they left the project area.

2 And but out of the 15 projects we've gone and
 3 measured that's the only one where that complaint, that
 4 specific kind of complaint, was made. At all the rest of
 5 them it was simply the audible noise, thumping noise.
 6 You could hear it at night. It was bothering me, that
 7 kind of thing. There was no health complaints at any
 8 other site.

9 Q. And did you listen to Mr. Fuerniss's testimony in
 10 this matter?

11 A. I have not heard -- I believe I read the written
 12 testimony? Is that what you're referring to?

13 Q. Are you aware of the physical symptoms and the
 14 complaints that Mr. Fuerniss has been -- has been feeling
 15 the last 18 months? Have you read anything about that or
 16 heard him testify about that?

17 A. No. That's news to me.

18 Q. You stated that you believe that the number of
 19 individuals affected by this inaudible infrasound is
 20 quite small, and that's based off of the fact that you've
 21 studied -- what's that based off of?

22 A. It's based partially off of the sites that I've been
 23 to and talked to everyone, but more than that, it's
 24 there's 90,000 megawatts of wind power in this country
 25 right now. That's over 50,000 turbines. And the only --

1 and we're still talking about Shirley, which was from six
 2 or seven years ago.

3 If this problem were common at all, it would be in
 4 the forefront of every project's Application and would
 5 really be a totally disruptive issue.

6 Q. So if I'm understanding -- maybe I'll just ask you.

7 Are you aware of any literature or research that
 8 discusses people making the same types of complaints as
 9 those made in Shirley in other wind farms around the
 10 world?

11 A. Yeah. I'm only familiar with a handful of sites. I
 12 think Falmouth in Massachusetts. I'm having a hard
 13 time -- I'm thinking there's just a couple.

14 Q. Just so we know about the complaints that were
 15 taking place in Shirley and that you're saying aren't a
 16 national or worldwide significant number of, what are
 17 those complaints specifically?

18 A. Well, as I mentioned, they described it as just kind
 19 of a dizziness, a mild nausea, and it was particularly --
 20 one woman said right here in this corner of the kitchen
 21 in that chair it's real bad so I sat there the whole
 22 night but I couldn't hear anything at all. I couldn't
 23 measure anything. But, you know, she wasn't just saying
 24 that. She must have just had a sensitivity to it.

25 Q. Are you aware of any studies that have actually

1 measured the number of people that have that sensitivity
 2 to infrasound?
 3 A. No. That would be good to know, but, no, I don't
 4 know of any organized or scientific counting.
 5 Q. And given this missing link that was found by
 6 Mr. Cooper, do you anticipate those types of studies will
 7 start being performed in the near future?
 8 A. I think work will continue along those lines because
 9 it's a big issue. And up until that work the discussions
 10 mainly centered around theories about the inner ear
 11 and -- but nothing that was demonstrable. But now I've
 12 found that work to be excellent, and yeah, I would expect
 13 it to continue.
 14 Q. And to date aren't most studies talking about wind
 15 farms and adverse effects, aren't they typically talking
 16 about annoyance?
 17 A. Well, there's really two things going on. There's
 18 audible noise around the mid frequencies, 500 hertz, a
 19 thousand hertz. That's just the sound of the blades
 20 squishing, and it sounds like a -- like a washing
 21 machine, kind of.
 22 And then there's low frequency, and that's
 23 completely at the bottom end of the frequency spectrum.
 24 It's a totally separate issue.
 25 Q. Yeah. As far as your opinion that you don't believe

1 had people are affected by the infrasound and the
 2 sensitivities to it, would you agree that that -- the
 3 population hasn't really been studied -- or the wind
 4 farms haven't been studied to actually determine what
 5 percentage of people are affected by infrasound?
 6 A. Well, I think when they are affected it's -- it
 7 becomes known. And the fact that it does not appear to
 8 be a problem at 95 percent of operating projects tells me
 9 it must be rare.
 10 Q. So you're saying you have knowledge that 95 percent
 11 of projects these complaints of nausea, dizziness,
 12 vertigo haven't taken place, or you just haven't heard of
 13 it?
 14 A. I haven't heard of it.
 15 Q. Okay. And in the academic literature about adverse
 16 effects caused by wind turbines, isn't what people are
 17 asked about annoyance and they aren't specifically asked
 18 about nausea, dizziness? I mean large studies determine
 19 population amounts and -- do you understand the question
 20 I'm asking?
 21 A. It sounds like you're maybe talking about the Health
 22 Canada Study. It was a large study about the Canadian
 23 Health Department.
 24 Q. Well, most of the studies I guess I have read and
 25 again correct me if I'm wrong is that when they go out

1 and study and survey the population they ask them
 2 basically are you annoyed by the project? Would you
 3 agree that that's how most studies are created or the
 4 method most studies that are analyzed for the purposes of
 5 the peer review stuff?
 6 A. I would say that was the case some years ago when
 7 some of the studies in Sweden were -- survey kind of
 8 studies. That's the way their questions were posed.
 9 It wasn't until later that this infrasound issue
 10 started emerging.
 11 Q. Right. So if people responded they were annoyed,
 12 they may have been annoyed because of nausea, dizziness,
 13 whatever or they may have been annoyed because they just
 14 didn't like it; right?
 15 MS. SMITH: Objection calls for speculation.
 16 MR. DE HUECK: Can you rephrase?
 17 MR. ALMOND: Yeah.
 18 Q. Based off your review of the studies that have been
 19 performed and how they've been conducted, isn't it true
 20 that when they've asked whether or not an individual's
 21 been annoyed, there's no distinction about where the
 22 annoyance comes from, whether it's nausea, dizziness,
 23 vertigo, or just they don't like the project?
 24 A. Yeah. I guess I would agree with that.
 25 Q. Can you get Exhibit A 33 back in front of you.

1 A. Okay.
 2 Q. And that's the Applicant proposed condition,
 3 specifically Proposed Condition No. 27. And I want to
 4 talk to you a little bit about the measurement of this
 5 condition. And it's over a two-week period; right?
 6 A. That's how long we normally measure for because then
 7 we're assured of getting periods of high wind, calm wind,
 8 different atmospheric conditions.
 9 Q. Have some of your colleagues suggested a method, an
 10 on off compliance test?
 11 A. I don't know about colleagues but we do that
 12 ourselves.
 13 Q. What's an on off compliance test?
 14 A. When the wind is blowing and the project is
 15 operating at or near capacity, in many cases we'll get to
 16 the test location and then radio in for them to turn off
 17 all the turbines and then take measurements of what's
 18 happening without the project.
 19 And I will add it is amazing that it sounds the
 20 same.
 21 Q. Would you agree that that would maybe be a better
 22 way to measure compliance with a 45 or a 40 or whatever
 23 noise standard?
 24 A. To my mind it's a more -- it's a simpler more
 25 unequivocal way of doing it. The problem is that a lot

1 of projects aren't happy about turning off the turbines.
 2 Q. But it's for a short amount of time to get the
 3 measurements; right?
 4 A. Yeah. I know. That's what I tell them.
 5 Q. Earlier you were testifying about how the background
 6 noise, specifically noise caused by the wind, often masks
 7 the noise created from the turbines.
 8 Do you recall that testimony?
 9 A. Yes. That's what I was just alluding to on these on
 10 and off tests. When you arrive at the site it sounds
 11 tremendously loud. I'm thinking of one case in
 12 particular. And they turned off all the turbines. The
 13 level was the same. It sounded exactly the same. It was
 14 just the trees around the house blowing.
 15 Q. And in terms of complaints from those individuals
 16 living around projects regarding wind turbine noise, in
 17 your experience have you found most often the complaints
 18 come at night?
 19 A. Yeah. Yeah. It's --
 20 Q. Rather than --
 21 A. It's audible at night and I can hear it and it's
 22 bothering me and never heard anything about a daytime
 23 issue.
 24 Q. And is there a reason we would expect more
 25 complaints to happen at night?

1 A. Well, people are trying to sleep and want it to be
 2 quiet.
 3 Q. What about the atmospheric conditions that
 4 frequently exist at night? Can that lead or is that
 5 perhaps an explanation for why we see more complaints at
 6 night?
 7 MS. SMITH: Objection. Vague. I don't know
 8 what he means by atmospheric conditions that frequently
 9 occur at night.
 10 MR. DE HUECK: Either do I, but maybe
 11 Mr. Hessler does.
 12 A. Yeah. Yeah. At night sometimes there's temperature
 13 inversions and things that enhance or allow sound to
 14 propagate more easily. But it's not every night.
 15 Sometimes that happens.
 16 But, no. I don't think that's the reason. It's
 17 just at night people have the expectation of quiet. If
 18 they have the windows open and they hear -- it sounds
 19 like a washing machine going, they don't like it.
 20 Q. What are stable atmospheric conditions?
 21 A. That's when it's cold or above the service warmer --
 22 excuse me. I always get this mixed up. It's hot above
 23 and cold below.
 24 Q. And in stable atmospheric conditions is the wind
 25 typically stronger the higher you go up?

1 A. No. Actually to get truly stable conditions you
 2 need very low wind speeds to stratify the atmosphere
 3 thermal lie. But in stable conditions it's warmer above
 4 so that the speed of sound is faster so it refracts the
 5 sound waves so they travel more easily.
 6 But in windy conditions that kind of atmosphere can
 7 exist and windy conditions are when turbines run.
 8 Q. Is it common for the atmospheric conditions to exist
 9 where it's calm at ground level but there are strong
 10 enough winds at the height of a turbine that the wind
 11 turbine's still operational?
 12 MS. EDWARDS: I'm going to object simply because
 13 we did not proffer him as a meteorological expert.
 14 MR. DE HUECK: I'm going to overrule your
 15 objection, allow you to answer.
 16 A. That does happen, but I wouldn't call it common. I
 17 think it happens seasonal lie, more commonly than other
 18 times, but it's not an every day or every week
 19 occurrence, I don't think.
 20 Q. And in a given year how frequently?
 21 A. It depends on the site and everything else.
 22 Q. And under that scenario the sound around a residence
 23 would be -- the sound created from the wind at least
 24 would be relatively quiet or nonexistent because the wind
 25 wouldn't be blowing at ground level; right?

1 A. Yeah. That scenario is brought up in every project.
 2 That happens occasionally, but I wouldn't base the entire
 3 design on that or anything.
 4 Q. And during these very quiet ground levels and if --
 5 MR. ALMOND: Well, you can strike that, Cheri.
 6 Q. If you have a rural community like we have here in
 7 this project and if those conditions exist, what would
 8 you expect would be the largest generator of noise?
 9 A. It would depend on how far away you're observing the
 10 turbines. If you're very far away, the turbine sound
 11 signal's so weak that it doesn't make any difference. If
 12 you're very close at a 1,000 foot setback, then you'd
 13 notice. You'd notice it more strongly.
 14 Q. And at what distance would you be able to start
 15 noticing the turbines?
 16 A. I can't say.
 17 Q. Can you give us a rough distance?
 18 A. Are you asking when they first become fairly audible
 19 over the background as you approach a project, for
 20 instance?
 21 Q. Yes.
 22 A. I'm going to say -- it's hard to put a specific
 23 number on. When we do operational surveys we put
 24 monitors that are minimum of two miles away from the
 25 nearest turbine to get the background noise, and that's

1 what we get. There's no turbine influence at that level.
 2 And so maybe a mile. You might be able to discern
 3 the project under certain conditions.
 4 Q. In changing gears here, during your testimony
 5 earlier you said that one and a half mile setbacks
 6 basically -- generally make projects not viable. Do you
 7 recall that testimony?
 8 A. Yes. Yes.
 9 Q. Have you analyzed this project to determine whether
 10 or not a mile and a half setback is viable for the
 11 project?
 12 A. No.
 13 Q. Okay. And have you seen any evidence in the record
 14 that suggested that if anyone tried to implement a mile
 15 and a half setback to this project?
 16 A. No.
 17 Q. So just as a general notion, mile and a half
 18 setbacks aren't typically that viable?
 19 A. Yeah. Most project sites are fairly densely
 20 populated and there's just not that much room between
 21 houses.
 22 Q. Do you think it would be more viable if you were to
 23 separate a mile and a half setback or distinguish a mile
 24 and a half setback for nonparticipants versus
 25 participants?

1 A. I would like to see that. In fact, I thought about
 2 advocating for that here, but that would create a
 3 precedent for all future projects. All to do is be an
 4 Intervenor and you can get all kind of elbow room so it's
 5 not really a practical suggestion.
 6 Q. But you thought about advocating for a mile and a
 7 half setback?
 8 A. 2 mile.
 9 Q. You thought about advocating for a 2 mile setback
 10 for --
 11 A. For Intervenor but that's not a practical
 12 suggestion.
 13 Q. Well, if there was a waiver system that allowed
 14 nonparticipants to waive the setback requirement, what
 15 would be impractical about it?
 16 A. Yeah. I'm not sure I follow the question. But what
 17 I was suggesting was that for those that were clearly
 18 unhappy with this project, I thought it was a good idea
 19 if the project -- if we could appeal to the project to
 20 try to increase -- to maximize those setback distances
 21 for those individuals that -- on further reflection you
 22 can't give special treatment to certain people. It's
 23 just -- it would set such a precedent that it would
 24 happen in every future project.
 25 Q. But a situation in which a two mile setback with

1 waivers existed wouldn't give preferential treatment to
 2 certain people, would it?
 3 A. I'm not sure I follow the waiver aspect of that
 4 question. What waiver?
 5 Q. Well, if an individual can waive that setback, for
 6 example. In this project I don't know if you're that
 7 familiar with it but certain individuals have waived
 8 setback requirements. Have you seen that?
 9 A. Not here, but I know of that.
 10 Q. You're aware of the wind industry there are
 11 agreements where individuals waive setback requirements?
 12 A. Yeah.
 13 MS. EDWARDS: Objection. This is outside the
 14 scope of his direct. He didn't testify about setbacks.
 15 MR. DE HUECK: Sustained.
 16 MR. ALMOND: In his direct this witness has
 17 testified about proposed regulations. He's given
 18 opinions on some distances, setback distances, et cetera.
 19 I think talking to him about setback distances
 20 in this hearing and setback distances with other
 21 projects, especially given that he's testified at other
 22 projects are what he's using as support -- partially as
 23 support for some of his opinions, is fair game to talk
 24 with him about his experience with those setbacks.
 25 MR. DE HUECK: Which I think you've done, and

1 now we've moved into some sort of abstract personal
 2 feeling regarding outside the scope of Direct Testimony.
 3 Q. In your past experience looking at wind projects,
 4 are you aware of -- are you of good neighbor agreements?
 5 Do you know what that term is?
 6 MS. SMITH: Objection. This is also outside the
 7 scope of his testimony.
 8 MR. DE HUECK: Correct.
 9 Q. With the Applicant's medical experts there was a lot
 10 of discussion about that Massachusetts study. Are you
 11 familiar with the Massachusetts study?
 12 A. Which Massachusetts study?
 13 Q. Talking about health effects of wind turbines, the
 14 Massachusetts government got a panel together to study
 15 wind turbines. Are you familiar with that Massachusetts
 16 study?
 17 MS. SMITH: Objection. This is outside the
 18 scope of his testimony as well. He's not testifying as a
 19 health expert.
 20 MR. ALMOND: I'm merely asking if he's familiar
 21 with the study.
 22 MR. DE HUECK: Are you familiar with the study?
 23 THE WITNESS: Somewhat.
 24 Q. And we heard from Dr. Roberts and Dr. Ellenbogen
 25 that study the Massachusetts government got everyone

1 together and studied wind farms and the purpose of which
 2 was to see what regulations should be put in place.
 3 My question to you because nobody else has been able
 4 to answer it is what is Massachusetts regulations as far
 5 as noise limits on wind farms?
 6 A. The Massachusetts noise -- state noise limit is to
 7 measure the background L90 statistical. That's the near
 8 minimum background level. And then the project can be
 9 10 above that.
 10 So it starts at a very low level, and then they have
 11 a big adder. It's unusual.
 12 Q. So whatever the L90 level; the project can go 10
 13 above that?
 14 A. That's right.
 15 Q. How far does the type of infrasound and low
 16 frequency noise that Steven Cooper was studying travel?
 17 A. That's a good question. It travels very far.
 18 Miles.
 19 Q. Miles?
 20 A. Yeah.
 21 Q. Again, shifting gears, going back to this Shirley
 22 project that you've studied, what was the regulatory
 23 limit in that Shirley project?
 24 A. I don't recall. And the reason is it was irrelevant
 25 to the problems there. They were merely about the low

1 frequency content, which isn't represented or captured in
 2 any way by the A-weighted limit.
 3 Q. If I were to give you the report that was generated
 4 from that project, would that help refresh your
 5 recollection?
 6 A. As to what the A-weighted limit was?
 7 Q. Yeah.
 8 A. I think it's in the report. I don't know if it was
 9 mentioned.
 10 Q. After conducting your study in Shirley did you give
 11 a recommendation? What was the body that was overlooking
 12 the Shirley project, the governmental body?
 13 A. The Wisconsin Public Service Commission. By the
 14 way, that study was -- the whole impetus of that study
 15 was from my recommendation to study it during a hearing
 16 for another wind project. They planned to use the same
 17 turbines and people from the Shirley site were at this
 18 hearing saying, you know, look at our site. You know,
 19 watch out and don't let this happen again.
 20 So I said, well, it sounds like, you know, we need
 21 to investigate what's going on at Shirley, so that was
 22 the impetus for the study and that it was, I think,
 23 funded by the Public Service Commission.
 24 And it was a very unique test in that it was done
 25 cooperatively by four different acoustical consulting

1 firms, some with kind of known opposition views.
 2 Q. So just so I understand correctly, the Wisconsin
 3 Public Service Commission was considering whether or not
 4 to approve a wind farm project. And before it was doing
 5 that -- before it would do that you recommended that we
 6 should go study this other project?
 7 A. That's right. And what I expected to find was that
 8 the low frequency signal was extremely strong at that
 9 site or something odd was happening there. But the
 10 signal was detected but at incredibly low amplitude.
 11 Q. I just handed you a document titled The Cooperative
 12 Measurement Survey and Analysis of Low Frequency Sound
 13 and Infrasound at the Shirley Wind Farm in Brown County,
 14 Wisconsin.
 15 Is this the report that was generated following the
 16 study of the Shirley Wind Farm we've been talking about?
 17 A. I think this was the final version. There was a lot
 18 of drafts.
 19 Q. And if you turn to page 8, please.
 20 A. Okay.
 21 Q. What ultimately did you recommend to the Wisconsin
 22 Public Service Commission in terms of a noise limit?
 23 A. I don't really remember recommending much of
 24 anything. We couldn't really determine what was going on
 25 at that site.

1 Q. Do you see the third paragraph where it says Hessler
 2 associates recommends approval of the Application if the
 3 following noise condition is placed on approval?
 4 A. Okay. Oh, that's right. Yeah. We -- this number
 5 comes from talking with Paul Schomer who was one of the
 6 other guys there.
 7 Yeah. It's 39 and a half is the number in here,
 8 which is essentially 40 or the 40 limit that we've been
 9 recommending all along as an ideal goal.
 10 Q. I want you to flip to page 9. Is that your
 11 signature there on the bottom?
 12 A. Halfway down, yes.
 13 MR. ALMOND: At this time I'd like to offer and
 14 move for the admission of Exhibit I 36, the document
 15 entitled Cooperative Measurement Survey and Analysis of
 16 Low Frequency and Infrasound at the Shirley Wind Farm in
 17 Brown County.
 18 MR. DE HUECK: Any objection?
 19 MS. SMITH: No objection.
 20 MS. EDWARDS: No objection.
 21 MR. DE HUECK: And I have no objection other
 22 than I think maybe next time hand a copy to me. That
 23 would be good.
 24 MR. ALMOND: Very sorry.
 25 MR. DE HUECK: No. It's okay.

1 So I 36, is that what you said?
 2 MR. ALMOND: Yeah.
 3 MR. DE HUECK: Will be admitted. Thank you.
 4 Q. Let's step away from the Shirley project.
 5 I want to talk a little bit about what you started
 6 with Ms. Edwards talking about in terms of the community
 7 response to a project. Do you remember that part of your
 8 testimony?
 9 A. Yes.
 10 Q. And there are ways in which to gauge how a
 11 community's going to respond to a project when it comes
 12 to noise and how that noise is going to affect the
 13 community; right?
 14 A. I believe so, yeah.
 15 Q. And are those -- and do the ANSI standards talk
 16 about what calculations should be done to gauge community
 17 response to a project?
 18 A. There is an ANSI standard that addresses that, but
 19 it wasn't written with wind turbines in mind. It was
 20 picturing some coal plant or a gas turbine or something,
 21 which is a much simpler situation.
 22 Our approach is, as I went through before, was to do
 23 an initial survey, find out what the background is going
 24 to be at the wind speeds required to operate the project,
 25 and then see how the predictions under those same wind

1 speeds compare. And depending on that differential, you
 2 can get an idea of whether it's going to be very audible
 3 or inaudible.
 4 Q. Has that type of study been conducted for this
 5 project?
 6 A. No. No. That's completely missing from the
 7 Applicant's noise study.
 8 Q. And you would like to see that type of study in
 9 order to gauge the community's response to a project;
 10 correct?
 11 A. I think it's the duty of the engineer to do that. I
 12 don't know why it keeps getting left out of these. This
 13 is the third one in a row.
 14 Q. And without doing that, do you think we're able to
 15 gauge whether or not this project's going to injure the
 16 social condition of those living in it?
 17 MS. SMITH: Objection. Calls for a legal
 18 conclusion.
 19 MR. ALMOND: It's a question.
 20 MR. DE HUECK: Well, you're basically asking it
 21 will comply with that regulation.
 22 MR. ALMOND: And experts are capable of
 23 testifying to that.
 24 MS. SMITH: He's not a legal expert he's here to
 25 talk about sound studies in his analysis that he's

1 conducted.
 2 MR. ALMOND: It's an ultimate conclusion
 3 opinion. Experts are offered to provide ultimate
 4 conclusions, ultimate opinions. That's what I'm asking
 5 him to do.
 6 MR. DE HUECK: But not as to whether or not they
 7 will be in compliance with a particular law.
 8 MR. ALMOND: I have not asked him about a law.
 9 I've asked him a question.
 10 MR. DE HUECK: It sounds like it.
 11 Ask again, Reiss. Or maybe --
 12 MR. ALMOND: Cheri, can you just repeat the
 13 question so we can hear what I asked again.
 14 (Reporter reads back the last question.)
 15 MR. DE HUECK: So asking if it will comply with
 16 the law.
 17 Can you --
 18 MR. ALMOND: I have not referenced the law. I'm
 19 not asking if it complies with the law. I'm asking that
 20 question.
 21 MS. EDWARDS: I guess I would just object as
 22 vague and ask maybe the inquirer to be more clear on the
 23 social condition.
 24 MS. SMITH: And I'm going to object because it
 25 is --

1 MR. ALMOND: I'll rephrase the question.
 2 MS. SMITH: May I object?
 3 It's basically stating 49-41B-22.1 -- or 2.
 4 Excuse me. And so he's basically asking him to opine on
 5 the statute compliance.
 6 MR. DE HUECK: Yes. So let's sustain the
 7 objection.
 8 Ask another question.
 9 Q. How the community responds to a project deals with
 10 the social well-being of the community; right?
 11 MS. SMITH: Objection. That's not why he was
 12 brought here to testify, on the social feelings of the
 13 community.
 14 MR. ALMOND: He's been testifying about
 15 community response I'm just trying to figure out why
 16 we're curious about the community response and why it's
 17 important to look at that. He's offered opinions that
 18 this Applicant should have done that. I'm curious as to
 19 why.
 20 MR. DE HUECK: Just go ahead and answer this
 21 one.
 22 A. Well, when I do an assessment I think the purpose of
 23 it is to assess what's going to happen, not just to find
 24 out if it's going to be in compliance with some
 25 regulatory limit. That's one paragraph from our 26-page

1 report normally.

2 No. I think you want to model the project, see what

3 the sound levels are going to be at people's houses. And

4 I always say I think -- I think there's going to be a

5 problem or I think it's a low probability of complaints,

6 a high probability, whatever it is goes into my report.

7 My clients aren't often happy with my reports, but

8 that's the purpose of an assessment.

9 Q. All right. Shifting gears again, you've reviewed

10 the modeled limits provided by Burns & McDonnell;

11 correct? Mr. Howell?

12 A. Yeah. I looked at the -- at the noise prediction,

13 the sound contour map, yes.

14 Q. Yeah. That was a poorly asked question.

15 A. I knew what you were talking about.

16 Q. The predicted sound measurements.

17 A. Yeah.

18 Q. Would you agree that the modeled levels can have

19 spikes in the order of 15 to 20 dBA above the model

20 levels?

21 A. Yes.

22 Q. So if you're looking at a modeled level of 35, you

23 could experience spikes up to 55 dBA?

24 A. Well, not 20, but -- yeah. Wind turbine noise is

25 highly variable. And depending on, you know, the wind's

1 not blowing in a nice laminar manner, it's turbulent, it

2 changes all the time.

3 That's why in every test you can only test over a

4 long-term average. You can't capture every exceedance.

5 Q. Well, the on/off condition test we don't need to

6 measure over a long period of time; correct?

7 A. No. No. Most of the time the noise is fairly

8 steady but it does -- it certainly does vary over time.

9 Q. Have you written a paper on recommended noise level

10 design goals for wind turns?

11 A. Yes.

12 Q. And what was the purpose of that paper?

13 A. To recommend noise design goals, which namely are 45

14 under most normal circumstances and an ideal target of

15 40.

16 Q. And you didn't attach that paper to your testimony,

17 did you?

18 A. No. I don't think so.

19 (Exhibit 37 is marked for identification.)

20 Q. I'm going to hand you what has been marked as

21 Exhibit I 37. What is exhibit -- what is -- I just

22 handed you what has been marked Exhibit I 37. What is

23 that?

24 A. You know, it's an article that I wrote in

25 collaboration with my dad who's also in the company in

1 2010 that was published in the noise control engineering

2 journal January 2011.

3 MR. ALMOND: At this point I'd like to move for

4 the admission of Exhibit I 37.

5 MS. EDWARDS: No objection from Staff.

6 MR. DE HUECK: Any objection?

7 MS. SMITH: No objection.

8 MR. DE HUECK: It will be admitted as I 37.

9 Q. Can you turn to page 97 of that paper for me. What

10 is that table 1 at the top of that page?

11 A. It's titled typical worldwide wind turbine noise

12 limits.

13 Q. And it looks like the different jurisdictions are

14 all outside the United States in that table. Would you

15 agree?

16 A. They are, yes.

17 Q. And if you flip back to the previous page, it states

18 "wind turbine development in usual even countries and

19 other parts of the world has been proceeding for some

20 time now while widespread development has only started in

21 the U.S. within the last five years or so do you see that

22 language?

23 A. Yes. Uh-huh.

24 Q. So would you agree that it would be appropriate to

25 look to other jurisdictions and European and other

1 countries to see what's going on when it comes to wind

2 regulations?

3 A. Yeah. That's why we did that, this paper.

4 Q. Precisely.

5 And looking at table 1 for one example, for example,

6 at the very top is Alberta, Canada. It says, "Criteria

7 values, 50D/40N. What does that mean, the 50D/40N?

8 A. 50 during the day, and 40 at night.

9 Q. And the D and N, is that what it means for the

10 entire list of --

11 A. Yeah.

12 Q. Are you aware of any regulations on this project

13 that deal with infrasound or low frequency noise?

14 A. No. There are none on this project or any other

15 project I can think of.

16 MR. ALMOND: Thank you, Mr. Hessler. I don't

17 have any other questions for you.

18 THE WITNESS: All right. Thank you.

19 MR. DE HUECK: Mr. Fuerniss.

20 CROSS-EXAMINATION

21 BY MR. FUERNISS:

22 Q. Hello, Mr. Hessler. You and I have one thing in

23 common. At least we both have had the privilege to work

24 with our fathers in the business that's kind of a neat

25 thing don't you think?

1 A. I think it's great. I just have one question. This
 2 goes way back earlier in your testimony. You talk about
 3 some people being much more sensitive than others.
 4 Does that sensitivity -- can that increase with
 5 prolonged exposure, or do you have a level of sensitivity
 6 and that's it or --
 7 A. I'm not sure that's really known or understood. I
 8 think I've seen papers speculating or thinking that maybe
 9 the more exposure the more sensitivity would develop.
 10 But I don't know myself.

11 MR. FUERNISS: Thank you.
 12 THE WITNESS: Sure.
 13 MR. DE HUECK: Ms. Jenkins.

CROSS-EXAMINATION

14 BY MS. JENKINS:
 15 Q. Yes. I have some questions. On your Direct
 16 Testimony, your prefiled I was looking at your resume and
 17 at the very end of that section is you talked about a
 18 project in Maine? Freedom, Maine?
 19 A. Was it Clinton, Maine?
 20 Q. Freedom.
 21 A. Freedom.
 22 Q. It was called the Beaver Ridge Wind Project. Maybe
 23 let's find the exhibit. It's Exhibit D M H-1 in his --
 24 MR. ALMOND: S 3.

1 MS. EDWARDS: S 3.
 2 A. Okay. All right. It's pretty bad when I have to be
 3 reminded of my own resume. Yeah. Yeah. I remember that
 4 project. That was in the town of Clinton, Maine, I
 5 believe.
 6 Q. Can you just tell a little bit about what your -- it
 7 looks like you appeared before the Maine State Government
 8 of energy and utilities committee. It says a peer review
 9 of operational sound testing by others:
 10 A. Oh, yeah. I remember that one now. Yeah. I was
 11 engaged by the state, very similar to this case, to look
 12 at somebody else's Application, the noise study for an
 13 Application for this wind project and give my opinion on
 14 it.
 15 Q. And do you remember any specifics like the size of
 16 the project?
 17 A. I think it was fairly small. All I remember was the
 18 panel. It looked like a bunch of satisfy captains up
 19 there in Maine.
 20 Q. Can I refresh your memory?
 21 A. Please do. The whole project is kind of vague to me
 22 now.
 23 Q. Okay. I believe it was three turbines?
 24 A. Yeah.
 25 Q. By patriot renewables?

1 A. Okay.
 2 Q. Maybe they built it and sold it. I'm not sure.
 3 Starting to sound familiar?
 4 A. Go on.
 5 Q. Well, my understanding that there were four
 6 different -- I believe it was four, might have been three
 7 different residences that were experiencing either health
 8 concern or not being able to sleep on their top floor.
 9 And so a sound study was done there, and that must be
 10 this study that you peer reviewed?
 11 A. What I recall is it was a noise study prepared for
 12 the permitting Application, and I just reviewed it and
 13 commented on its shortcomings or good parts. That's all
 14 I remember about it really.
 15 Q. Okay. The project was built in 2008, and the
 16 study -- your peer review was in 2013.
 17 A. Okay.
 18 Q. Still nothing?
 19 A. Yeah. That just goes to show how many wind turbine
 20 projects I've been mixed up in.
 21 Q. Okay.
 22 A. Yeah. I'm not recalling the situation you're
 23 talking about with people having problem -- I don't
 24 remember anything about that.
 25 Q. Okay. The reason it came up was -- when I saw you

1 were going to testify, I was looking for your most recent
 2 note on your resume, and that was in 2014. And so I
 3 researched it a little bit?
 4 A. Yeah.
 5 Q. And the reason I bring it up now is that you said
 6 that it was just a handful of people that are having
 7 health concerns. And in this -- in my research I just
 8 went to the --
 9 MS. SMITH: I'm going to object. At this point
 10 it sounds like Ms. Jenkins is testifying. Unfortunately,
 11 I think we have to interrupt.
 12 MR. DE HUECK: Yeah. Go ahead, Staff.
 13 MS. EDWARDS: I guess since it's my witness I
 14 should probably attempt to weigh in.
 15 Because we are a neutral party I attempt to
 16 afford a great deal of latitude. I would say this is
 17 impeachment but going down that track going a little too
 18 far.
 19 MR. DE HUECK: So, Ms. Jenkins, it is as if
 20 you're introducing your own testimony as to what you
 21 think happened out in Maine into the record now so we
 22 want to avoid that.
 23 Additionally the witness has basically told you
 24 he's got no clue and doesn't look very successful in
 25 remembering it.

1 MS. JENKINS: Okay. So I'll just summarize
 2 that, that you earlier said that you have witnessed only
 3 a handful of people with health effects, complaints, and
 4 out of all the projects in the United States.
 5 A. Yeah.
 6 Q. And you don't remember this project, your latest one
 7 that you reviewed. I'm sorry. I'm not trying to be
 8 unkind. I I'm just trying to --
 9 A. No. You have every right. I'm so sorry I can't
 10 remember that project.
 11 Q. Okay.
 12 A. It was a very small project and I think I just
 13 looked over someone's work and testified for 10 minutes
 14 on it. I never went to the site or anything. I don't
 15 know too much about it really.
 16 Q. So to do a sound study or to peer review a sound
 17 study you don't need to see the site or know the
 18 complaints or anything?
 19 A. I'm fairly certain that this study had nothing to do
 20 with the complaints. I don't remember anything about
 21 that. I would remember that. If there was problems,
 22 somebody went out, did a survey, tried to understand the
 23 problems. That doesn't ring any bells at all to me.
 24 Yeah. I'd have to pull out the file for this
 25 project, and I just don't remember it.

1 MR. DE HUECK: Ms. Jenkins, do you actually have
 2 a copy of what it is you're referring to?
 3 MS. JENKINS: Well, I could go to the website
 4 where the -- where the people in the community were
 5 attempting to get their sound levels up to the state
 6 level.
 7 MR. DE HUECK: Okay. I think we have just a bit
 8 of confusion going on. I'm not sure. But I think we
 9 should just move on.
 10 MS. JENKINS: Okay. Let me just make sure
 11 there's nothing else I can ask.
 12 MR. DE HUECK: Go ahead.
 13 (Pause.)
 14 Q. Okay. I think my last question would be just to
 15 understand the process, if you do a sound study you don't
 16 necessarily -- or peer review a sound study, you don't
 17 necessarily have to go to the project site?
 18 A. No. Like in this case there wasn't a whole lot of
 19 need to go to the site.
 20 Q. And can you tell me how you can deduce that if you
 21 don't remember the project?
 22 A. Well, the noise study is supposed to explain and
 23 show you what the site is like. Like in our reports we
 24 put a site description. We have maps. We show what's
 25 going on at the site, where the houses are, where the

1 turbines are. You know, it's supposed to explain it to
 2 the degree where you don't have to go out there and find
 3 out for yourself.
 4 Now this report was very vague on that. The sound
 5 contour map was printed on a White paper, there was no
 6 map. I couldn't tell where the houses were, whose house
 7 was which, so it was a shortcoming of the study.
 8 Q. Okay. And you don't remember testifying before the
 9 board or at that hearing -- before the Maine State
 10 Government Energy, Utilities, and Technology Committee on
 11 behalf of Patriot Renewables and the Beaver Ridge Wind
 12 project in 2014?
 13 A. Yeah. I remember being there and I remember what
 14 the room looked like but I forgot what the substance of
 15 the testimony was about.
 16 Q. Okay. So you don't really remember the case?
 17 A. I don't remember the case. It was --
 18 MS. JENKINS: Okay. Thank you.
 19 MR. DE HUECK: Ms. Pazour.
 20 MS. PAZOUR: No.
 21 MR. DE HUECK: That will bring us over here to
 22 Commission questions. I'm down here with Commissioner
 23 Nelson. I have a quick question if that's okay.
 24 Help me understand this because the Cooper
 25 study's got me thinking. And I think I recall you saying

1 that often -- whether on or off, the wind turbines, the
 2 sound can be the same just due to the wind itself.
 3 So a noisy night, you could turn off the
 4 turbines and you're still going to be at, say, 45 dBA
 5 just based on the wind itself. And the turbines don't
 6 run unless it's windy; correct.
 7 THE WITNESS: That's absolutely correct. It was
 8 surprising even to me.
 9 MR. DE HUECK: Yeah. That is. So does wind
 10 itself carry these sound we can't hear, infrasounds?
 11 THE WITNESS: They're not carried on the wind.
 12 They just radiate out from the source.
 13 MR. DE HUECK: So could tell wind itself be the
 14 source of infrasound?
 15 THE WITNESS: No. For example, in the Shirley
 16 study we used very specialized instrumentation to be able
 17 to detect the blade passing frequency. And that's every
 18 time a blade goes bit tower of the three blades so that
 19 the frequency of that is about .7 to 1 hertz. And that
 20 was detectable.
 21 And I think it's the repeated pulsations of
 22 that, those waives going out, that some people are
 23 sensitive to. It's like on a boat, you know, and satisfy
 24 sick. Just kind of that low rocking. I think it's
 25 related to that.

1 MR. DE HUECK: I understand that it could be
 2 related to that. But so does the wind -- let's say we
 3 remove the turbines and we still have -- it's a windy
 4 night and could infrasounds from the wind --
 5 THE WITNESS: No. No. It takes this specific
 6 source to generate it. No. Wind noise is very
 7 broadband.
 8 MR. DE HUECK: Okay. Thank you.
 9 THE WITNESS: Okay.
 10 COMMISSIONER NELSON: Thank you, Mr. Hessler for
 11 being here to help us sort this out.
 12 THE WITNESS: Always a pleasure.
 13 COMMISSIONER NELSON: Looking at your Direct
 14 Testimony on page 8, there was a question about -- I
 15 think Mr. Fuerniss had recommended that sound levels be
 16 measured using satisfy weighted sound levels, and you
 17 said, no, no, no, that that would be inappropriate.
 18 So my ultimate question is how is infrasound
 19 measured? What is the scale? What is the
 20 instrumentation? Have you done it? Help me understand
 21 all of that.
 22 THE WITNESS: Yeah. No. That's a very good
 23 question.
 24 You know, it's extremely difficult to even
 25 detect. That's why there's no practical way to put a

1 regulatory limit on it. C-weighting only goes down to 10
 2 hertz, and this is happening at less than 1 hertz. So
 3 it's off the chart. So C-weighting is not going to
 4 capture it or do anything.
 5 How it is measured is to use very specialized
 6 low frequency microphones that can measure down to less
 7 than 1 hertz and very specialized instrumentation. It's
 8 also complicated by the fact that whenever you try to
 9 measure sound in windy conditions the wind blowing over
 10 the microphone creates a false signal, and that happens
 11 in the low end of the frequency spectrum. So it's very
 12 easy for any kind of measurement to get completely
 13 covered up by nonrelated, self-generated noise. Very
 14 difficult to measure.
 15 So there's no way I could think of to place a
 16 regulation or a limit on it.
 17 COMMISSIONER NELSON: So we've heard reference
 18 to dB(G). Is that the measurement that is used for
 19 infrasound?
 20 THE WITNESS: It can be. That's essentially not
 21 putting any weighting on the frequency spectrum, not
 22 subtracting some number. But it's very very difficult in
 23 practical terms to even detect. In that Shirley
 24 constituted we had to measure in the middle of the night,
 25 inside the houses, out of any wind. And even then it was

1 hard to pick up.
 2 COMMISSIONER NELSON: And so you have attempted
 3 to measure it. Is that --
 4 THE WITNESS: Oh, yes.
 5 COMMISSIONER NELSON: Do I take it from your
 6 testimony that using the Shirley example that you weren't
 7 comfortable that you accurately captured what was going
 8 on?
 9 THE WITNESS: Yeah. You could see a little
 10 blip, but it was so small that we said how is this a
 11 problem. It's orders and orders of magnitude below the
 12 threshold of human perception. But evidently it's the --
 13 the frequency of the pulses that go out apparently have
 14 an effect.
 15 COMMISSIONER NELSON: Within the last week I saw
 16 a presentation on the folks that are trying to capture
 17 neutrinos and when I read through this I for some reason
 18 thought of that. And we're trying to capture something
 19 that's apparently very difficult.
 20 THE WITNESS: Yeah. It is.
 21 COMMISSIONER NELSON: Did you read through
 22 Dr. Roberts's Rebuttal Testimony?
 23 THE WITNESS: I did read through it, yes.
 24 Q. Could you pull out Exhibit A5-1, which is Exhibit 1
 25 attached to his Rebuttal Testimony.

1 COMMISSIONER NELSON: Yes. A 5-1. And if you
 2 could go to page 10.
 3 THE WITNESS: Okay.
 4 COMMISSIONER NELSON: In the lower left corner
 5 there's a bullet point, and this is talking about the
 6 results of some work that was done in Germany. And that
 7 bullet point says, "At a distance of 700 meters from the
 8 wind turbines it was observed by means of measurements
 9 when the turbine was switched on the measured infrasound
 10 level did not increase or only increased to a limited
 11 extent."
 12 And then it says infrasound was generated mainly
 13 by the wind and not by the turbines.
 14 There's two things here that contradict what you
 15 have said already today. And I'm trying to sort this
 16 out. I mean, at some point infrasound has to dissipate.
 17 This study seems to indicate that by 700 meters it has
 18 dissipated. I heard you testify today that infrasound
 19 travels for "miles."
 20 So that's my first question.
 21 THE WITNESS: Okay.
 22 COMMISSIONER NELSON: Help me understand how far
 23 this travels.
 24 THE WITNESS: Well, it can travel for long
 25 distances. Not always. The conditions have to favor it

1 and so on.

2 COMMISSIONER NELSON: So help me -- unpack that.

3 THE WITNESS: Yeah. Well, I can see in the

4 picture here, in the lower left picture titled C they've

5 got a black dome sitting on the ground on a white circle.

6 Do you see that?

7 COMMISSIONER NELSON: Yes.

8 THE WITNESS: That is a method that we use to

9 measure wind turbines outdoors where the microphone is

10 laying horizontally on this reflective surface and then

11 this huge wind screen is put over it.

12 Now that only works to a certain extent, and it

13 does not allow measurements down at one hertz. That's

14 all covered -- even with this set up the measurements are

15 blown away by wind self-generated wind noise. Because

16 I've used this exact equipment before.

17 That's why they say all they measured was wind.

18 Because you really can't pick it up. But no. I think it

19 can travel 700 meters or more under other circumstances.

20 Let me see. At Shirley one of the houses was

21 very far from any turbines, miles away. We did measure

22 inside of that house out of the wind to avoid this

23 contamination. I don't think we were able to detect

24 anything at that house, though.

25 COMMISSIONER NELSON: So I'm --

1 THE WITNESS: That doesn't --

2 COMMISSIONER NELSON: -- going to press you a

3 little harder because this is terribly important to me.

4 So somewhere between 700 meters and your quote, "miles",

5 this dissipates. So help me understand what's going to

6 determine how far it goes and what causes it to dissipate

7 and how can we quantify that?

8 THE WITNESS: It travels a long distance. I

9 can't put a number on it for you. These are the kind of

10 frequencies that like elephants communicate with each

11 other over huge distances, if you've ever heard about

12 that. This is as low as it gets in terms of frequency.

13 So in theory it takes a very long time. Now how

14 far, I don't know. Can't help you.

15 COMMISSIONER NELSON: Well, ultimately I have to

16 make a decision here based upon how far this could travel

17 and how far it's going to affect folks, if it affects

18 folks. I mean, that's a whole nother question.

19 THE WITNESS: Right.

20 COMMISSIONER NELSON: I'm trying to just figure

21 out how far does it actually go.

22 THE WITNESS: I wish I could give you a figure

23 on that. I know it would be useful to you.

24 COMMISSIONER NELSON: Okay. Thank you for that.

25 Shifting gears just a little bit. Can a sound

1 be heard without that sound changing the ambient dBA

2 level?

3 THE WITNESS: Yes. If the sound has a

4 distinctive character to it, then you can identify and

5 pick it out even though the magnitude of it, whether it's

6 on or off may be about the same.

7 COMMISSIONER NELSON: Like a wind turbine.

8 THE WITNESS: Yeah. Which has a -- that washing

9 machine sound. Yeah.

10 COMMISSIONER NELSON: So we had -- well,

11 Ms. Jenkins, Intervenor, testified yesterday, again

12 contrary to what I heard from you this morning, that her

13 house is 3 miles away from a wind turbine and inside of

14 her house she can hear the wind turbine 3 miles away.

15 THE WITNESS: That's surprising to me.

16 COMMISSIONER NELSON: Okay. So we'll set that

17 aside. But it would be -- let's say you're outside. It

18 may be possible to actually hear a wind turbine because

19 of the unique sound even though it doesn't raise the dBA

20 level. Is that accurate?

21 THE WITNESS: Right. If you're able to identify

22 that distinctive sound and you know what you're listening

23 for and so on.

24 COMMISSIONER NELSON: Just so I'm clear,

25 changing again, you've recommended for this project an

1 ideal design goal of 40 dBA and that would be measured

2 over the two-week period that the Applicant has proposed;

3 is that correct?

4 THE WITNESS: Right. I don't know of any other

5 way to do it.

6 COMMISSIONER NELSON: You talked earlier about

7 the fact that that might impact 11 different receptors

8 based on their sound study. I just quickly looked at

9 their revised sound study, and it looks like it would

10 only impact two of the nonparticipants.

11 Did you separate out participants and

12 nonparticipants as you looked at that.

13 THE WITNESS: At least in my copy it doesn't

14 distinguish between who was who.

15 COMMISSIONER NELSON: And were you looking at

16 the revised -- the latest sound study?

17 THE WITNESS: Yes. I saw one Intervenor house

18 identified in the table in the back but that's the only

19 one. And that's what I was looking for when I wrote my

20 Direct Testimony. I wanted to know what the levels were

21 at the Intervenor's house but I couldn't tell which house

22 was which.

23 COMMISSIONER NELSON: I think -- I hate to let

24 you go but I think that's all -- only because what I

25 really want to know I haven't found out but that's all

1 the questions I've got. Thank you.
 2 THE WITNESS: You're welcome. Sorry I couldn't
 3 help you with that one.
 4 MR. DE HUECK: Chair Fiegen. No questions.
 5 Commissioner Hanson, any questions?
 6 COMMISSIONER HANSON: Yes, I do.
 7 Good almost afternoon, Mr. Hessler. You came
 8 out swinging in your remarks at the beginning. At least
 9 on page 3 you faulted the Applicant for the graphical
 10 presentation, called it fairly primitive, and said you
 11 can't even distinguish -- identify where the specific
 12 residence are.
 13 You faulted the study for focusing entirely on
 14 the noise limit of 45 dBA rather than assessing,
 15 addressing in any way. So you said, Focusing entirely on
 16 the dBA and not assessing or addressing in any way the
 17 other aspects, potentially low frequency and sound
 18 emissions. And I appreciate the questions that
 19 Commissioner Nelson asked in regard to that and the
 20 others.
 21 I'm curious. You said -- I also appreciate the
 22 way you tried to be fair. I think that you placed a lot
 23 of weight on the other side of the scale as well, almost
 24 to the point to which you seemed to favor wind farms and
 25 wanted to support them and so I -- I'm trying to figure

1 out where that scale lands but --
 2 You said you sat in a home I believe it was in
 3 Wisconsin, was it, and listened -- sat there all night
 4 or -- I don't know if it was all night --
 5 THE WITNESS: Hours.
 6 COMMISSIONER HANSON: And that the husband could
 7 not hear it, you could not hear it, but the wife could
 8 hear it.
 9 THE WITNESS: That's right.
 10 COMMISSIONER HANSON: I don't want to sound
 11 misogynistic here, but isn't it somewhat typical
 12 especially on a farm that work with machinery -- even
 13 though wives work beside their husbands on farms and
 14 such, is that men typically lose their hearing a little
 15 bit before women do?
 16 THE WITNESS: Well, this wasn't audible sound
 17 from the project. It was just a sensitivity to a feeling
 18 of low pressure, low frequency pulsations. Nobody could
 19 hear anything. Everybody admitted that. It was the
 20 sensing of it.
 21 COMMISSIONER HANSON: Interesting.
 22 My wife is 220 miles away and she can hear my
 23 thoughts right now.
 24 THE WITNESS: I know. Mine too.
 25 COMMISSIONER HANSON: She'll call me up and tell

1 me I'm wrong without --
 2 Are you familiar with kids in school who carry
 3 phones and they have the frequency dialed so that people
 4 over 40 or 50 years old cannot hear the frequency but
 5 they can?
 6 THE WITNESS: I did hear about that.
 7 COMMISSIONER HANSON: And that's fairly typical.
 8 So kids would be more sensitive -- would one assume than
 9 adults would to the challenges that low frequency would
 10 have from wind turbines? I mean that's just one premise
 11 but --
 12 THE WITNESS: Well, it's -- the phone thing is
 13 ultrasound. It's very high frequency sound, and that is
 14 usually the first thing to go as people age. So that's
 15 why there's a built in advantage there to that whole
 16 concept.
 17 But we're talking about the other end of the
 18 frequency spectrum, and that typically does not decay
 19 with age.
 20 COMMISSIONER HANSON: Interesting. So higher
 21 frequency, have you studied that from wind turbines,
 22 from --
 23 THE WITNESS: No. There's no high frequency.
 24 COMMISSIONER HANSON: There's no high frequency.
 25 THE WITNESS: No. Most of the noise, the

1 churning sound, is about 500 hertz to 1,000 hertz.
 2 That's in the middle of the audible frequency range.
 3 Above that there's no significant noise.
 4 COMMISSIONER HANSON: Interesting. Appreciate
 5 that.
 6 You spoke also at adverse health effects such as
 7 sleep disturbance and vertigo which really can be
 8 crippling to people from the standpoint of going through
 9 their lives.
 10 THE WITNESS: Yeah.
 11 COMMISSIONER HANSON: What about children with
 12 ADHD? Have you studied any of that or familiar at all
 13 with those effects?
 14 THE WITNESS: No. I don't know about that but I
 15 wouldn't be surprised.
 16 COMMISSIONER HANSON: You wouldn't be surprised
 17 what.
 18 THE WITNESS: If they were sensitive to it or
 19 affected by it.
 20 COMMISSIONER HANSON: You state about the very
 21 small minority of the people and that it is extremely
 22 rare, small handful of sites, quite rare, et cetera.
 23 Again, very small. And yet it's very real. At least you
 24 express that it's very real.
 25 So in balancing that are we to assume that for

1 the greater good some people are going to suffer?
 2 THE WITNESS: Yeah. That's -- that's up to you
 3 guys. Yeah. Well, just to reiterate, you know, if this
 4 commonly happened, it would be all over the news. It
 5 would be well understood, and everyone would know that a
 6 new wind project was going to cause this.
 7 But that's not the case. It's only occurred at
 8 certain specific sites out of many, many, many projects.
 9 So based on that alone, I'm concluding that it must be a
 10 rare sensitivity.
 11 COMMISSIONER HANSON: Commissioner Nelson would
 12 love to sit and chat with you an extended period of time,
 13 enjoy the conversation and what we're learning here.
 14 For folks who have lived out in the country for
 15 a long long time and just simply enjoy the -- enjoy the
 16 sound of the wind going through the trees, granted
 17 turbines may be at a similar volume but of a different
 18 pitch and so they hear it instead of the -- it starts to
 19 irritate them.
 20 For those folks who live out in the country I'm
 21 going to assume they would be far more susceptible to
 22 hearing noises and problems and being discomforted by
 23 them than folks who live in the city.
 24 THE WITNESS: Well, every wind project that I
 25 can think of that we worked on has been in a rural area.

1 COMMISSIONER HANSON: Right.
 2 THE WITNESS: Probably very similar to this.
 3 COMMISSIONER HANSON: So is my assumption
 4 correct that folks who live out in the country are going
 5 to be bothered more by noise -- by a new introduction of
 6 a new noise than folks in the city, for instance?
 7 THE WITNESS: Oh, yeah. Definitely.
 8 COMMISSIONER HANSON: I grew up three houses
 9 away from a railroad track, and I can sleep through the
 10 horns and a thunderstorm and everything else but a clock
 11 ticking on the wall or a water dripping really bothers
 12 the heck out of me.
 13 So with that type of a challenge I can go move
 14 that clock. I can fix the water faucet do. We suggest
 15 ear plugs for the folks out in the country?
 16 THE WITNESS: No. And, as I mentioned, there's
 17 always -- I can't -- there might have been one or two
 18 that there were no reported complaints. But there's
 19 always a few people that are bothered, and they're really
 20 bothered, really bothered.
 21 COMMISSIONER HANSON: In your experience, do
 22 most of the people who are bothered at first adapt to it?
 23 We're talking about the people who are really bothered.
 24 Do they ever adjust to it or do they, as you suggested,
 25 some people move?

1 THE WITNESS: I think people end up getting used
 2 to it like your railroad, but I don't know. I've never
 3 done any follow up study to see if people are still upset
 4 about it years later. I don't know.
 5 COMMISSIONER HANSON: All right. Thank you very
 6 much for your testimony. Appreciate it. And enjoyed it.
 7 Thank you.
 8 THE WITNESS: Okay.
 9 COMMISSIONER NELSON: And an additional
 10 question. If I'm standing a mile away from an operating
 11 wind turbine, I can hear the whoosh and I know what it
 12 is. I know where the whoosh is coming from.
 13 If you're measuring infrasound or attempting to
 14 measure infrasound, how can you tell the origin of it?
 15 Or can you?
 16 THE WITNESS: Well, this infrasound has a
 17 distinctive frequency signature. It would be a .7 hertz,
 18 which corresponds to the -- how often the blades go by
 19 the tower. So you would look -- you would see it in the
 20 industry.
 21 COMMISSIONER NELSON: Thank you.
 22 THE WITNESS: Yeah.
 23 MR. DE HUECK: Well, I think -- Reece, how long
 24 is your -- well, okay. Do you have -- how long would
 25 your redirect be? How long -- a while? Should we break

1 for lunch? Okay. It's 12:07. 1:30 we come back?
 2 MR. ALMOND: As we discussed earlier this
 3 morning we were hoping to have the telephonic witnesses
 4 start right after lunch so we can get them set up during
 5 the lunch break. If we don't want to finish I get that
 6 we can take a break but --
 7 MR. DE HUECK: Well, okay. That will work.
 8 MR. ALMOND: I don't have very much.
 9 MR. DE HUECK: Okay. Let's go ahead and do some
 10 redirect and recross.
 11 MS. EDWARDS: All right.
 12 REDIRECT EXAMINATION
 13 BY MS. EDWARDS:
 14 Q. Mr. Hessler, you stated there is a lot of opposition
 15 to this project. Was that based off of your knowledge of
 16 other projects you've worked on?
 17 A. Yeah. I would say there was a high level of
 18 apprehension about this project just by the sheer volume
 19 of all the testimony and Intervenor witnesses and so on
 20 compared to other projects.
 21 Q. You also stated once this morning that Mr. Cooper
 22 had finally demonstrated a link. Did you have reason to
 23 believe prior to that study that link was already there,
 24 or was this all new to you?
 25 A. Prior to that study I thought something was

1 happening but wasn't entirely convinced what was going
 2 on, and that study kind of put me to the other side where
 3 it's pretty clear that those pulsations can be perceived
 4 by certain people. I mean, I thought that before, but
 5 there was never any evidence, although there's been many,
 6 many studies and papers about it.
 7 Q. So with that in mind and with your testimony in
 8 response to Commissioner questions that it's a fairly
 9 small number of people, would you -- in the project that
 10 you've worked on have you seen it just -- people be
 11 irreparably split in the community and just fight in the
 12 streets forever or --
 13 A. Yeah. It is very did I advice I have, yeah. Almost
 14 all projects, especially before they're built. At this
 15 stage there's a lot of dread and apprehension about it.
 16 That's mostly attributed to -- attributable to the
 17 internet sites.
 18 Q. In response to Ms. Jenkins's questions about that
 19 study in I believe it was Maine?
 20 A. Yeah.
 21 Q. There was some confusion about what your role was.
 22 Could there have been another sound expert that was
 23 involved that would answer what she was getting at and
 24 that was outside of your role?
 25 A. Well, what I do know about that is it was somebody

1 else's work that I was asked to look at. I didn't do the
 2 study or anything. I just was commenting on it.
 3 Q. Do you recall based upon the noise assessments you
 4 reviewed what the max dBA was at a receptor?
 5 A. You mean what was the highest predicted on any other
 6 project?
 7 Q. This project.
 8 A. On this project. Okay. Right now I believe it's
 9 41.9, which I would call 42.
 10 Q. Would you expect 42 dBA would, in your experience,
 11 cause people to change their daily lives and behavior?
 12 A. Hard to say. That's a pretty low level getting down
 13 towards the ideal point of 40. But there's still a
 14 possibility of complaints in between 40 and 45 there's a
 15 definite possibility of complaints.
 16 MS. EDWARDS: Thank you very much. I have no
 17 further questions.
 18 MR. DE HUECK: Recross. Prevailing Winds.
 19 MS. SMITH: No, I don't have any. Thank you.
 20 MR. DE HUECK: Mr. Almond.
 21 MR. ALMOND: Briefly.
 22 RE-CROSS-EXAMINATION
 23 BY MR. ALMOND:
 24 Q. I think you were talking with Commissioner Hanson
 25 about the number of complaints with the physical symptoms

1 of nausea, dizziness, et cetera that you talked about
 2 Shirley or attributed to this infrasound, that there are
 3 wind farms all around the country, you've studied 15 of
 4 them or maybe more but you haven't heard many complaints.
 5 Wouldn't you expect that the number of complaints
 6 might be skewed if there are confidentiality provisions
 7 and certain contractual provisions that would prevent
 8 people from living around turbines from making such
 9 complaints?
 10 MS. SMITH: Objection. This is outside the
 11 scope of his testimony.
 12 MR. DE HUECK: I agree.
 13 A. I would say that I've seen cases --
 14 MR. DE HUECK: Dr. Hessler, I'm sorry. Don't
 15 answer the question.
 16 THE WITNESS: Okay.
 17 Q. Your opinion on the quantity of people affected by
 18 infrasound is based off of those -- is based off
 19 complaints that people have made; correct?
 20 A. It is based off of our experience at Shirley and our
 21 experience at all other projects where we did not hear
 22 about that, and the fact that I have -- I'm not aware of
 23 any other projects where that was an issue, out of 50,000
 24 wind turbines out there in this country.
 25 Q. Are you aware of your other projects whether or not

1 anyone was prohibited from making complaints I don't
 2 know, but my understanding is that participants --
 3 MS. SMITH: Objection. This is speculation.
 4 THE WITNESS: Yeah. Yeah. I would agree with
 5 that.
 6 MR. ALMOND: Based on that, I don't have any
 7 other questions for you, Mr. Hessler.
 8 MR. DE HUECK: Mr. Fuerniss.
 9 RE-CROSS-EXAMINATION
 10 BY MR. FUERNISS:
 11 Q. Yes. Commissioner Nelson is trying to get at the
 12 bottom of how far this could go, the infrasound
 13 especially.
 14 Could that be affected or enhanced by more or less
 15 hilly terrain, valleys, so forth? Would that make a
 16 difference?
 17 A. In theory if the turbine were on a hilltop and there
 18 was a value I in between and your house or some point of
 19 observation was on the next hill, you would -- there
 20 would be a loss of ground absorption attenuation because
 21 of the value I in between so the sound would get over
 22 there more than it would over flat ground.
 23 However, I don't think ground absorption has any
 24 real effect at that low end of the frequency spectrum.
 25 So now that I've reasoned it out in my head as I was

1 talking, I would say it doesn't make too much difference.

2 Q. Okay. When you're talking 40 dBA or 45 dBA, which

3 metric are you using? Are you talking L90?

4 A. Well, that's interesting you should say that because

5 that is the descriptor that we use to actually try to

6 measure an operating project because it filters out cars

7 going by and sporadic contaminating events and gets out

8 the underlying steady -- and it is more or less steady

9 sound level.

10 So we use the L90 at houses and then the L90 miles

11 away as a background, and then we subtract the two to get

12 what is the project doing. And if you try to use any

13 other statistical like the average, the Leq or the L10 or

14 the Lmax, you're getting progressively worse in your

15 ability to detect the project alone and you're only

16 detecting other things that are unrelated to the project.

17 Q. Okay.

18 A. That was a good question.

19 Q. Would it be appropriate to recommend different

20 levels for time of day, daytime, evening, nighttime?

21 A. Well, the trouble with that, it's not practical to

22 change the noise emissions in the project. They are what

23 they are 24 hours a day. There's no way to substantially

24 change the sound at night, for instance, to lower it,

25 other than possibly putting some or all of the units in a

1 low noise mode.

2 But the improvement in doing that isn't all that

3 dramatic, in my experience.

4 Q. Are there some jurisdictions that do, in fact,

5 require different levels from day and night?

6 A. Yeah. Many, many ordinances are -- expresses day

7 night. But when it comes to wind turbines you just have

8 to take the nighttime level as the design and forget

9 about the daytime. Because like I said, the sound level

10 is the sound level, and you don't have any control over

11 it really.

12 Q. Okay. One last question. Are you familiar with

13 bone attached hearing aids and if you are -- one question

14 at a time.

15 Are you familiar with those?

16 A. I'm familiar with hearing aids. My wife really

17 relies on them but I'm not an expert on it.

18 Q. Okay. So you wouldn't be able to address that for

19 us then?

20 A. I don't think so.

21 MR. FUERNISS: Thank you.

22 MR. DE HUECK: Ms. Jenkins.

23 MS. JENKINS: Just a couple questions.

24

25

RE-CROSS-EXAMINATION

1 BY MS. JENKINS:

2 Q. I'm sorry, but I missed. The Shirley Wind Farm when

3 you visited that, what year was that?

4 A. 2010 -- it's right here. December 24, 2012.

5 Q. Thank you. Can infrasound be measured inside a

6 house?

7 A. That's probably the only place it can be measured.

8 Q. Okay.

9 A. Because you're out of the elements there.

10 Q. And was your -- the main project that I mentioned

11 earlier, was your role at that project the same as your

12 role is here? Did you review this sound study?

13 A. I reviewed a sound study. What it was about, I

14 can't recall. I'm taking it off my resume.

15 Q. I'm sorry. You could just refresh your memory

16 because you might need it again.

17 A. I'll have to pull the folder out back at the office.

18 Big embarrassment.

19 Q. Yeah. When you do a sound study or when a sound

20 study is ordered is it done at a certain time of year or

21 how do you choose when you're going to do a sound study?

22 A. You typically want to do them during the cold

23 weather season of the year when the leaves are off the

24 trees just to minimize the contamination from leaves

25

1 rattling and -- and summertime you get crickets and all

2 kinds of stuff that messes up the measurements. So

3 during the winter.

4 Q. Okay. When you do a sound study is there -- do you

5 get a report from the -- like the operation maintenance

6 facility of how the wind turbines are operating, meaning

7 are they operating at the speed of the conditions or are

8 they -- do you have proof of that?

9 A. Yeah. We get a log of what the megawatt output was

10 for all the units as a function of time over the survey

11 so we can identify if there's any down for maintenance or

12 anything else.

13 Q. And can you tell whether they're operating at the

14 normal level they would when they just do it on their

15 own?

16 A. Yeah. Because we also get the wind speed throughout

17 the survey and once the wind speed gets above usually 7

18 meters per second, they're at full power.

19 Q. Okay. I think there's just one more.

20 MS. JENKINS: No. I have no more questions.

21 Thank you.

22 THE WITNESS: All right. You're welcome.

23 MR. DE HUECK: Ms. Pazour.

24

25

RE-CROSS-EXAMINATION

1
 2 BY MS. PAZOUR:
 3 Q. I have a question for you. Like infrasounds next to
 4 a wind turbine, like with somebody that's sensitive to
 5 noise, would that be more bother some for them?
 6 A. If that person had this particular sensitivity that
 7 we've been talking about, then yes.
 8 Q. Like somebody with like a -- like a hearing aid.
 9 A. No. No. I don't think that would make any
 10 difference.
 11 Q. With the ear or nothing?
 12 A. Huh-uh.
 13 MS. PAZOUR: Okay.
 14 MR. DE HUECK: Did you have anymore questions?
 15 CHAIRWOMAN FIEGEN: She can just word it, and
 16 you'll make a decision.
 17 MR. DE HUECK: Just throw it out there. Throw
 18 it out there.
 19 Q. I guess is it possible between infrasounds and
 20 reversible systems that the inner ear could feel
 21 infrasounds?
 22 A. That sounds like a question for one of those doctors
 23 mixed up in this thing.
 24 MS. PAZOUR: Okay.
 25 MR. DE HUECK: Okay. Mr. Hessler, thank you for

1 your testimony. You're excused.
 2 (The witness is excused.)
 3 MR. DE HUECK: We'll break for lunch and plan on
 4 getting things rocking at 1:45.
 5 (A lunch recess is taken.)
 6 MR. DE HUECK: Welcome back, everyone. We're
 7 going to get back in our proper order. We're back in
 8 session in EL18-026. I guess we are missing an
 9 Intervenor but I'm sure she'll be here soon. And we'll
 10 let Reiss continue with his case in chief and call his
 11 next witness.
 12 MR. ALMOND: Intervenors call Rick James.
 13 MR. DE HUECK: Mr. James, we can see you up
 14 there on the Skype TV. And welcome to South Dakota James
 15 James thank you.
 16 MR. DE HUECK: My name is Adam de Hueck. I'm
 17 the hearing examiner for this proceeding and I'm going to
 18 go ahead and swear you in.
 19 (The oath is administered by Mr. de Hueck.)
 20 MR. DE HUECK: You are sworn in. Go ahead,
 21 Mr. Almond.
 22 DIRECT EXAMINATION
 23 BY MR. ALMOND:
 24 Q. Mr. James, can you introduce yourself to the
 25 Commission and briefly describe your education and

1 experience?
 2 A. My name is Richard James. I go by the name Rick for
 3 all practical and business persons, Rick James. I'm an
 4 acoustician who has been working in the field of
 5 measurement noise and the impact of noise on people since
 6 the late '60s, officially 1972 after I formed a new
 7 company.
 8 I started working for Chevrolet motor division and
 9 left them to form my own company in 1972.
 10 In the intervening years my companies -- and I had
 11 two -- became the consultants who were considered the
 12 subject matter experts for noise to corporations like
 13 General Motors, good year, Anheuser-Busch, major
 14 corporations who had both employee issues and who desired
 15 to keep their names out of the newspaper for noise
 16 complaints with community noise.
 17 So my focus has always been on how do you design a
 18 new project or how do you operate a project so as to
 19 minimize the adverse impacts on a community and on
 20 workers although it's less of an issue here. And I am
 21 very much a pro business acoustician but my focus is not
 22 on getting the project done one way or the other. It's
 23 getting a project done that's compatible with a host
 24 community.
 25 In 2006 due to some serious health issues with my

1 heart, my partner and I closed my old company, James
 2 Anderson and associates and I decided that I would go
 3 into semi retirement. Shortly thereafter, actually
 4 almost immediately there after I started getting calls
 5 from people in Michigan where wind projects had been
 6 proposed. One of those wind projects is actually one
 7 that Mr. Hessler worked on back in the late 2000s.
 8 My first analysis of that was these machines don't
 9 belong in quiet rural areas. They're going to cause a
 10 problem. And I presented that to the County
 11 Commissioners but they decided to build the project my
 12 way.
 13 Since then I have focused mainly on wind turbine
 14 noise, although I do other types of complaint driven
 15 noise generally as an expert related to hearings like
 16 this or lawsuits. I don't seek out just general
 17 business. At 70 years old I need a little bit of time
 18 off.
 19 Over the past 10 years I've really become very
 20 interested in one issue of why is it that wind turbines
 21 which don't produce high levels of audible noise as
 22 measured on a dBA scale generate so much complaints and
 23 why are we seeing symptoms such as dizziness, tinnitus,
 24 migraines, pressure, odd sensations that have nothing to
 25 do with audible sound? And so that's led me into the

1 area of kind of going into detail into infrasound.
 2 **Q.** I think that's a good recap of your experience
 3 unless you want to add anything in addition to that that
 4 you think --
 5 **A.** Well, I was just going to add one thing. In 2009 I
 6 had an opportunity to use very high end acoustical
 7 equipment, and that was the first time we managed to
 8 measure the infrasound pulses from wind turbines.
 9 The measurement methods that I used were the same
 10 ones that the Shirley Wind study team used. And since
 11 then I have focused basically on that type of
 12 measurement, along with micro barometers.
 13 So I'll open it up for any of your questions,
 14 Mr. Reiss.
 15 **Q.** Thank you, Mr. James. Did you prepare prefiled
 16 testimony in this matter?
 17 **A.** Yes, I did.
 18 **Q.** And that prefiled testimony has been marked as
 19 Exhibit I-1. I understand you want to make a change to
 20 that testimony?
 21 **A.** Yes, I do.
 22 **Q.** And what change to the testimony do you want to
 23 make?
 24 **A.** This is on page 1, line 24. The question is, "what
 25 experiences have you had that qualify you as an and it

1 currently reads health expert in cases involving wind
 2 turbine noise."
 3 I would ask that the words "a health" be scratched
 4 out and be replaced with "an acoustical." So it would
 5 read what experiences have you had that qualify you as an
 6 acoustical expert in cases involving wind turbine noise.
 7 **Q.** Are there any other changes to your prefiled
 8 testimony that you'd like to make?
 9 **A.** None that are substantive.
 10 **Q.** And long with your prefiled testimony were there
 11 exhibits attached to that?
 12 **A.** Yes, there were. There were five exhibits.
 13 **Q.** I count six?
 14 **A.** Six. Excuse me.
 15 **Q.** And those have been marked as Exhibits 1-1 A through
 16 F.
 17 **A.** That's correct.
 18 **Q.** And during the course of this proceeding did you
 19 have an opportunity to respond to some questions raised
 20 by the PUC Staff via a data request?
 21 **A.** Yes, I did.
 22 **Q.** And I don't know if you have Exhibit I-34 in front
 23 of you.
 24 **A.** Yes, I do.
 25 **Q.** Okay. And are those the responses that you provided

1 in response to questions raised by PUC Staff?
 2 **A.** Yes, they are.
 3 **Q.** At least responses next to your name?
 4 **A.** Yes.
 5 **Q.** And if I were to ask you all of the questions that
 6 are included in your prefiled testimony, as well as those
 7 questions that the PUC Staff asked you, would you give
 8 the same answers today?
 9 **A.** Yes, I would.
 10 **MR. ALMOND:** At this time I'd move for the
 11 admission of Exhibit I-1 as well as exhibits I-1 A
 12 through F.
 13 **MS. EDWARDS:** No objection from Staff.
 14 **MR. DE HUECK:** I'll hear any objection from
 15 Prevailing Wind.
 16 **MS. SMITH:** No objection.
 17 **MR. DE HUECK:** So admitted, Mr. Almond.
 18 **Q.** Mr. James, were you listening in to the testimony
 19 from earlier this morning?
 20 **A.** I was able to hear parts of it.
 21 **Q.** And there was some discussion about the measurement
 22 of infrasound, how to do it, et cetera. Have you ever
 23 measured infrasound?
 24 **A.** Yes, I have.
 25 **Q.** And how far have you measured infrasound -- let me

1 ask you a different question.
 2 Have you ever measured infrasound generated by a
 3 wind turbine?
 4 **A.** Yes, I have. Very specifically I understand turbine
 5 from a sound as contrasted to other types of infrasound
 6 from wind. Low frequency trucks, et cetera.
 7 **Q.** And in your -- how many times have you measured
 8 infrasound generated by wind turbines?
 9 **A.** I probably measured infrasound in over 50 homes
 10 ranging from projects here in the U.S., ridge top
 11 projects out west to -- in Oregon, New York,
 12 Massachusetts, Maine, West Virginia, Michigan, Wisconsin,
 13 Illinois. Pretty much almost all of the states.
 14 And those measurements are always inside a home
 15 because it is almost impossible to get an accurate
 16 infrasound measurement outside of a home.
 17 **Q.** And in your experience -- and I think a question was
 18 asked earlier, approximately how far infrasound from a
 19 wind turbine can travel, can you answer that question?
 20 **A.** Yes. And if you'd give me permission, I'd like to
 21 reference one of my exhibits, which gives a visual
 22 depiction, and that is -- I guess it would be my Exhibit
 23 5, which was three pages of densely annotated color
 24 charts.
 25 **Q.** And I think you're referring to what your Exhibit 6

1 was which was Exhibit I-1 F. And it's a three-page
 2 exhibit with colorful graphs. Is that what you're
 3 referring to?
 4 A. That's what I'm referring to, yes. Colorful graphs.
 5 Q. Okay.
 6 A. Pictures.
 7 If we could look at page 3 of that exhibit, I'll
 8 explain it because I'm sure that it's not
 9 self-explanatory to most people.
 10 These two graphs, the top one and the bottom one,
 11 represent measurements using a micro barometer and that's
 12 an instrument designed specifically to measure infrasound
 13 that was left in a home. In both cases -- the one on top
 14 represents a home that's actually the same home that
 15 Mr. Hessler was talking about, R-1 from Shirley Wind,
 16 where the people living in it were very sensitive to the
 17 infrasound, and the top one shows a period of about, oh,
 18 let's say 12 hours or so from the left to the right.
 19 The bottom one is a home 4 miles away over much of
 20 the same period. If you look at the big circle with --
 21 the big white circle with the dashes, those two correlate
 22 to the same time period.
 23 What we're looking at in the top graph, you'll see
 24 these horizontal bands of light blue lines. Those are
 25 the spikes or the tones produced by the wind turbine

1 blade as it passes in front of the tower, releasing the
 2 energy causing a pulse. And when we look at it over
 3 compressed into like a 12-hour window they begin to look
 4 like narrow bands. This is actually specific enough in
 5 this case you can see where the solid circle is on the
 6 top, you can see the waive. And that shows that the wind
 7 turbines that were being measured were changing in RPM.
 8 So we can trace -- using this kind of a method we
 9 can trace very specifically the sound from a wind turbine
 10 as contrasted to other sounds.
 11 If we look over at the right-hand side of that
 12 graph, just to the right of the white solid circle, we
 13 see a period where wind turbines aren't operating. And
 14 so the comparison between what's happening in the home
 15 when the wind turbines are operating within that dashed
 16 circle and then when they're not is dramatic. We see
 17 that there's no longer any tones. There's also a lot
 18 less scatter on the bottom, the red and yellow spikes
 19 along the bottom.
 20 We come down to the bottom graph, this shows a home
 21 for the same period of time roughly four miles away. And
 22 we can see within the dashed circle there that even at 4
 23 miles these horizontal bands which represent the wind
 24 turbine tones are still distinctive.
 25 So what this shows is that even at a distance of 4

1 miles infrasound inside a home is measurable, and the
 2 occupant of that home, the reason we were there was
 3 reporting to the Brown County board of health that she
 4 was suffering headaches whenever the wind turbines
 5 operated.
 6 Now when I investigated the home I found that it was
 7 impossible to see the wind turbines from their home.
 8 They're actually down in a little valley with a hill
 9 separating them from the wind turbines so there wasn't
 10 even a line of sight.
 11 My point here is that people who say that wind
 12 turbine noise blends in with the background, infrasound
 13 or that it's not measurable beyond a short distance,
 14 really that's a result of them not having the right tools
 15 and not having the right analysis methods, properly
 16 analyzed a simple instrument like a micro barometer
 17 produces very clear graphs.
 18 And this has now become a norm within measuring wind
 19 turbine from a sound micro barometers are the preferred
 20 tool because of their simplicity and the durability of
 21 infrasound sonic microphone is very delicate, very
 22 expensive. A micro barometer is durable enough you can
 23 drive a truck over it if you need to.
 24 So that's my explanation for how far. And also to
 25 show just how clearly wind turbine from a sound can be

1 defined when properly measured.
 2 Q. And have you had the opportunity to review that
 3 German study that was attached to Dr. Roberts's Direct
 4 Testimony?
 5 A. Yes, I did.
 6 Q. That discussed the measurement of infrasound and
 7 seemed to suggest that infrasound dissipated at 700
 8 meters?
 9 A. Yes.
 10 Q. Do you have a response for that?
 11 A. Yes. And I believe this corresponds fairly well
 12 with what Mr. Hessler said this morning.
 13 When you have a microphone outside, any air movement
 14 over that microphone will generate what's called pseudo
 15 noise. It looks like noise but it's really just the air
 16 movement causing the microphone diagram to move. So it's
 17 not surprising that they were doing tests outside and
 18 couldn't find any difference between the wind turbines on
 19 or off because they weren't measuring -- they weren't
 20 measuring wind turbine infrasound. They weren't
 21 measuring ambient wind turbine sound or nonwind turbine
 22 sound. They were really just measuring the artifact of
 23 wind blowing over the microphone.
 24 This is a common mistake. I've seen it in
 25 Australian studies I've seen it in others. The other

1 mistake in that report is that they started with the
 2 premise that unless the sound pressure levels were
 3 sufficient to be audible -- this is the threshold of
 4 audibility -- that they weren't of any significance.

5 And what we have found in fact we've known since the
 6 1980s when Dr. Neal Kelly first did an experiment using
 7 pressure pulsations what we found is when the infrasound
 8 is pulsed, when it occurs as a whoomp whoomp whoomp
 9 although you feel it rather than hearing it, **that the**
 10 **human vestibular system can pick that up.**

11 And the sensations when they're picked up, when
 12 people have that sensitivity -- we can get into
 13 Dr. Schomer's paper later that explains how that happens.
 14 But **when the vestibular system is triggered the body**
 15 **tends to produce nausea. It's an impact caused by the**
 16 **eyes are giving a certain input. The body sensations**
 17 **don't pick up movement. But we have vestibular data**
 18 **saying something's moving.**

19 **The end result of that is people get dizzy or they**
 20 **get nauseous or they have headaches.**

21 Q. Thank you, Mr. James.

22 Q. Are you familiar with the Steven Cooper study that
 23 we've been discussing quite a bit this morning?

24 A. Yes. I've worked with Steven Cooper since my first
 25 paper in 2010 demonstrating how to measure the infrasound

1 sonic pulses. Steve modeled his study at Cape
 2 Bridgewater after the design that we used at Shirley and
 3 at other studies.

4 I also helped him in his analysis of his data and
 5 I'm quite familiar with it.

6 Q. And did you hear testimony from Mr. Hessler this
 7 morning that said once he saw this Cooper study it really
 8 linked up in his opinion the issue of infrasound and the
 9 complaints related there to? I guess can you just expand
 10 on that or comment on that and how that relates to
 11 everything you've just been talking to about infrasound?

12 A. Okay. Yes. I can expand upon it.

13 As I said back in the 1980s Dr. Neal Kelly working
 14 for the Department of energy and NASA did a study of
 15 early model wind turbines and the complaints **of -- the**
 16 **similar complaints of dizziness, nausea, tinnitus,**
 17 **headaches, et cetera, and he concluded that it was from**
 18 an infrasound sonic pulse caused by the blade passing in
 19 front of the tower.

20 The wind industry was aware of that. It was
 21 presented at conferences but has chosen instead to argue
 22 and do so very effectively that unless the pressure
 23 pulses exceed the threshold of audibility that they can't
 24 be perceived. The source of that is an acoustician in
 25 Brittain called Dr. Jeff Leventhal who said if you can't

1 feel it you can't hear it. I mean, if you can't hear it,
 2 you can't feel it.

3 The problem here is Dr. Kelly moved him wrong four
 4 years after he made that statement. But that concept of
 5 that infrasound has to exceed the thresholds of
 6 audibility has been promoted very heavily through other
 7 acousticians who have picked up on it, not done the
 8 proper research and have repeated test after after test
 9 saying well I've tested wind turbines in Australia and
 10 they don't exceed the threshold of audibility so there
 11 can't be any problem.

12 But there is a problem. In fact, the German paper
 13 you referenced earlier made an interesting comment. They
 14 said they noticed some tones at the very low frequent
 15 infrasound but those didn't matter. Actually those are
 16 the ones that matter. So that whole German paper and
 17 many of the others that are similar to it have
 18 consistently ignored the place where the problem is,
 19 looked at places where the problem is not and then
 20 concluded there is no problem, which whether for the
 21 purposes of pleasing a client or through improper
 22 research has led to the confusion we have.

23 We know that -- we know that infrasonic pulses can
 24 be perceived. My home office where I'm sitting right now
 25 is on the flight path between Detroit and Lansing for

1 helicopters. The Governor comes in and out of this area
 2 all the time. I can hear that helicopter coming thump
 3 thump thump of its blades long before it's audible.

4 I've had many people who were combatants in either
 5 Vietnam or the Iraq wars who said they can also feel
 6 infrasound long before it's audible. With people --

7 I wrote a paper in 2012 often sick building
 8 syndrome, the other evidence, when people are in large
 9 buildings and the large high-rise buildings, knowledge
 10 worker high-rise offices, if the fan is a little bit out
 11 of balance, it causes a pulse **and people begin to make**
 12 **the same complaints.**

13 Acousticians who have dealt with these low frequency
 14 problems over the years have no problem understanding why
 15 people in homes in wind projects are having complaints.
 16 It's the acousticians who have not dealt with that who
 17 seem to be causing the confusion.

18 Q. Thank you, Mr. James. I want to switch topics now
 19 away from infrasound and focus -- talk a little bit more
 20 on your prefiled testimony, page 3 and the ANSI standard
 21 ASA S 12.9 and this notion of modeling the community's
 22 response to a new project.

23 And I think we heard some testimony earlier from
 24 Mr. Hessler so if you could just explain how that concept
 25 ties into this project.

1 A. Well, there are standards that we follow as
 2 acoustical professionals to try to guide our work. One
 3 of them is the standard ANSI ASA -- I'm reading line 69
 4 of page 3, S 12.9 part 4, noise assessment and prediction
 5 of long-term community response.
 6 This is a standard designed, for example, when I was
 7 designing noise for new automotive plants that I would
 8 refer to as a way to determine what would be the type of
 9 levels that would be acceptable.
 10 That standard includes a caution in part 4 of
 11 appendix F that says F 3.4.4 "in newly created situations
 12 especially when the community not familiar with the sound
 13 source in question higher community annoyance can be
 14 expected and that difference is worth up to 5 dB."
 15 Also if there's in quiet rural communities there's a
 16 greater expectation for piece and quiet worth 10
 17 decibels. And if you take the two factors and for a
 18 project like Prevailing Winds both would apply what this
 19 is saying is that guidelines that would be compatible in
 20 the Suburban environment for example 45 dBA need to be
 21 reduced either by 10 or 5 dB to result in the same level
 22 of annoyance for a quiet rural environment.
 23 And it's this part of -- it's this part of our
 24 professional standards that seem to be routinely ignored
 25 by people like Mr. Howell. We can't quibble -- we can't

1 equate annoyance potential for a community that is rural,
 2 residential to one that is more adjusted to noise. If
 3 people come to the wind turbine project, then they have
 4 no expectation of quiet. But they move there with the
 5 expectation of peace and quiet. The project's coming to
 6 them. Therefore, the burden should be on the project
 7 developer to not increase annoyance.
 8 And levels of 40, 45 dBA, as I show in my testimony
 9 with the Health Canada will result in about one out of
 10 every 10 people -- one out of every 15 people people
 11 being highly annoyed. **And highly annoyed means they're**
 12 **annoyed enough that over a long-term we have health**
 13 **effects, whether the annoyance is due to sleep or due to**
 14 **dizziness or nausea, whatever the high annoyance may be,**
 15 **the result is that over periods of weeks or months it**
 16 **leads to deteriorating health.**
 17 And that's what this whole section of ANSI is trying
 18 to avoid. When you have people whose live style is for
 19 quiet -- they sleep with their windows open. They enjoy
 20 the outdoors, then a new noise source that may have been
 21 more than acceptable in an urban environment or Suburban
 22 environment becomes a serious source of complaints.
 23 Q. And have you seen the ambient measurements taken for
 24 this project area?
 25 A. Yes, I have.

1 Q. And what are the -- what's your opinion in terms of
 2 this area and the ambient measurements of the area?
 3 A. Well, I looked at the table that Mr. Howell
 4 presented. I know he summarizes it as ranging from 21 to
 5 45 dB. And the only columns on those that are of
 6 significance for background sound are those labeled L90,
 7 the 90th percentile. The LEQs are of little use for
 8 anticipating annoyance. But he says the range is 21 to
 9 45.
 10 Well, 45 dB is an outlier. There's no way that a
 11 normal, rural community background sound would be that
 12 high. But if we look at the table for trends we can see
 13 that even at 10 o'clock in the morning, 5 o'clock in the
 14 afternoon, and at midnight the sound levels in most of
 15 those measurement sites were between 22 dB and maybe 28,
 16 29 dBA. And that's what I find in rural communities.
 17 The other thing is that that includes the sound of
 18 normal wind. Not high winds. And then I heard
 19 Mr. Hessler this morning talking about wind noise masking
 20 wind turbines. That's not the time when people have
 21 their complaints. They complain about it when it's a
 22 quiet night, no wind at the ground and the wind turbines
 23 overhead are whooshing away.
 24 So this background sound level issue is critical.
 25 We know that if -- we know that if the project was

1 designed to not increase that level significantly then
 2 we'd have few complaints but we see a project here that
 3 looks like it's going to raise the levels anywhere from
 4 10 dB or higher at many of these homes and that is --
 5 that is just a prescription for complaints once the
 6 project is permitted and operating. There will be
 7 complaints.
 8 Q. And just to be fair, you've never been to the
 9 project area, have you?
 10 A. No, I haven't but I've been to many similar projects
 11 in Iowa, Illinois, Indiana. All over the -- principally
 12 east of the Mississippi. But I've also been involved in
 13 projects out in Oregon. And in many of these cases
 14 because they were parts of formal proceedings I was privy
 15 to the data that the opposing parties' acousticians had
 16 taken and able to re-analyze it.
 17 And based upon what I have seen in those studies and
 18 what I can see about Prevailing Winds, I think I have a
 19 reasonably good understanding of the Prevailing Wind
 20 project.
 21 Q. And you said there was no way that one measurement
 22 was 45 -- and to be fair to Mr. Howell you don't know
 23 exactly what was there next to that measuring tool.
 24 There could have been a grain elevator or something like
 25 that. But you're exaggerating when you say no way;

1 right?

2 A. Well, no way that that's a background sound. A

3 truck could have driven by that had a bad muffler. When

4 we're taking averages with a sound level meter a single

5 loud noise has a very significant impact.

6 So let's say the sound level was 30 and a truck

7 drives by at 55 but it's only there for a minute, that

8 could easily give you a 45 average over the limit or an L

9 90 could mean that they parked the truck and was there

10 for the full 90 percent of the time.

11 Either way a 45 dBA sound level at -- in a rural

12 community means that something not related to the

13 background sounds -- background sounds are those things

14 you hear from a distance they're not the things up close.

15 They're when you walk outside at night you can hear

16 the barking dog in your neighbor's farm a quarter mile or

17 a half-mile away. Those sounds that you hear are the

18 background sound and that's what our auditory system uses

19 as the basis for assessing annoyance. It's always

20 comparing the sound it's hearing to those quiet periods.

21 And that's why when you put a noise source into a quiet

22 community you can expect complaints.

23 Q. And the question was raised earlier about whether or

24 not once a noise source is introduced to a quiet area if

25 the area will just get used to that noise source. Can

1 you respond or answer that question?

2 A. Yeah. I can respond to that. I'll first respond

3 with a study that was done in Britain back in the 2000s

4 in which they found that given time, complaints don't

5 decrease. They increase. Or the people become so

6 resolved to the fact that no one will listen to their

7 complaints that they what I say suffer in silence. Or

8 they abandon their homes.

9 Ontario where there are many projects designed to

10 meet a 40 dBA criteria now have abandoned homes all over

11 the rural communities because people have just left them.

12 Or they were elderly and when they passed away the family

13 just left them to deteriorate.

14 Having the experience of dealing with people who are

15 the -- who are living in wind projects and who find

16 something objectionable, I call them the complainant, has

17 made me really sensitive to how the ANSI standards about

18 expectation of peace and quiet come into play. And so --

19 I'll see if that answered your question.

20 Q. Thank you, Mr. James.

21 Were you listening in when Mr. Hessler opined on the

22 number of people who have complained about infrasound or

23 complained about the symptoms that they believe were

24 caused by infrasound and that he believes that the number

25 of people who -- you know, who have that sensitivity to

1 infrasound is very small? Did you hear that testimony?

2 A. Yes. Yes, I did.

3 Q. Do you want to respond to that?

4 A. Well, many of the projects that I've studied are

5 projects that Mr. Hessler and his father developed. And

6 while he may not be aware that complaints occurred, I am

7 constantly in contact, usually as the recipient of

8 e-mails saying here's another day when I couldn't take

9 it.

10 What happens in the communities -- in the Wisconsin

11 communities in the middle of the state have had wind

12 projects now for almost 10 years. A, the complaints have

13 not stopped. B, the complaints have increased. And, C,

14 the reason why nobody does anything about it is once a

15 project is permitted no one has the funds to contest it.

16 In Brown County, for example, they declared a 2 and

17 a half mile radius around Shirley Wind as a human health

18 hazard. That's a Wisconsin legal definition for an area

19 that has a problem and they want to notify the public.

20 When the operator of Shirley Wind was asked to

21 respond to that they just denied that there was any

22 problem. That denial has gone on now for almost eight

23 years leaving the Brown County board of health having

24 monthly meetings on noise and concluding that even the

25 city of Green Bay and the town of -- the County of Brown

1 do not have the funds to pursue a lawsuit against the

2 utility.

3 So what answer is there? The answer is it needs to

4 be done right the first time. Once that project is

5 permitted, if the complaints occur, there is no solution

6 that is economically viable, and the I am balancing of

7 funding between the operators and the local communities

8 or for that matter a complainant trying to file a lawsuit

9 is so unbalanced that there will be very little chance of

10 success.

11 Get it right the first time or you live with it

12 forever.

13 Q. And have you seen how the Applicant wants this

14 project to be measured in order to comply with a 45 dBA

15 limitation? Have you seen that?

16 A. I don't know if I remember. I heard Mr. Hessler

17 talking this morning about several weeks worth of

18 measurement and an average level or something like that.

19 Q. Yeah. The measurement is over a two week level.

20 A. Yes. That completely misses the point annoyance.

21 Is not about a long-term average --

22 MS. SMITH: I'm going to object. I'm not sure

23 what the witness has seen what is being asked. And I

24 would also say is going far beyond the scope of the

25 Direct Testimony.

1 MR. DE HUECK: I was thinking the same thing,
2 that we're having new Direct Testimony introduced on
3 today's date. Though I appreciate you fleshing out some
4 of the unanswered questions just as the Applicant does
5 when they call a witness as well. This one just talks a
6 lot more.

7 So just keep in mind that we don't need new
8 filed testimony today orally. And, additionally, if you
9 could clarify how sound will be measured for this project
10 before we go any farther.

11 Q. Do you have access to Exhibit A 33, the PUC's web
12 portal in front of you?

13 A. I will pull it up here. Prefiled exhibits. It's
14 A --

15 Q. 33. It's proposed condition --

16 A. A 33. Okay. Proposed conditions.

17 Q. Yep. Number 27. If you could read that quickly,
18 please.

19 A. Okay. That was basically what I understood.

20 Q. And if you could explain whether you believe that's
21 an appropriate way to measure any limitation on noise and
22 why or why not.

23 A. That is not an appropriate way to measure wind
24 turbine noise. The reason being that if you measure over
25 a period of at least two weeks the average level will

1 always be low because there's periods when the wind
2 turbines don't operate.

3 And the condition that we're trying -- or the
4 characteristic of wind turbines that cause annoyance have
5 nothing to do with the long-term average. They have to
6 do with short-term fluctuations. If for example we did a
7 long-term average and it came out to 40 dBA Leq but we
8 then looked at how the sound fluctuated around that, we
9 would see that there were periods when it might have been
10 55, periods where it might have been 35. It's these
11 fluctuations above and below the average that cause the
12 annoyance, cause sleep disturbance and are the root of
13 the complaints.

14 So using a long-term measurement as a criteria is
15 essentially an open door to the project creating
16 annoyance and there being no method whatsoever then to
17 ask for mitigation because over a two-week period it will
18 always average less than 45, particularly if we're
19 looking at a project that was designed where we now say
20 the maximum levels are 42, let's say dBA Leq.

21 It's the fluctuation that is important, and that's
22 why in my testimony I referenced the use of Lmax or an
23 L10 or some other measurement that looks at the peaks.
24 When someone describes a wind turbine -- and Mr. Howell
25 did -- a whooshing sound.

1 A whoosh when you describe it means that there is a
2 sound that rises and then falls. What we should be
3 trying to do is eliminate that whooshing sound by
4 controlling how much it can rise. And in our Michigan
5 cases which I think Dr. Punch referenced we said 45 dBA.

6 Q. I think you've answered the question.

7 And I've got to push back on you here a little bit
8 because if you read Condition No. 27, it actually I think
9 calls to not take into account when the wind turbines are
10 operational.

11 If you can look at line 4.

12 A. Yes, it does. But wind turbines operate over a
13 broad range.

14 Mr. Hessler, for example, in his Narooft (check)
15 document said that measurements will be plus or minus 5
16 dB around the predicted mean. So there will be periods
17 during that two weeks where that wind turbine -- let's
18 say it was 40 -- is running at 35, and there will be
19 periods where it's running at 45. And the complaint
20 times are when it's running at 45, not the average over
21 those times.

22 If we were going to use an Leq or an average as a
23 criteria, it should be a short-term average, a 10 minute
24 average, because anything else is not looking at the
25 characteristic we're trying to control, which is the

1 fluctuating low frequency noise.

2 MR. ALMOND: Thank you, Mr. James. I don't have
3 anymore direct for you. We will turn this witness over
4 for cross.

5 MR. DE HUECK: Mr. James, I'm now going to turn
6 you over for cross-examination, and we'll begin with the
7 Applicant, Prevailing Winds.

8 THE WITNESS: Okay.

9 MR. DE HUECK: We're just going to move our
10 video camera over to the attorney who will be questioning
11 you.

12 (The camera is adjusted.)

13 THE WITNESS: I have no audio on this end.

14 MS. SMITH: I think we're all just very quiet
15 Mr. Hessler -- or Mr. James. I apologize.

16 CROSS-EXAMINATION

17 BY MS. SMITH:

18 Q. Mr. James, my name is Mollie Smith. You will see
19 me. I'm raising my hand, if you can see me. I'm over
20 here.

21 Do you have anyone in the room with you?

22 A. No, I don't.

23 Q. And do you have any documents in front of you other
24 than your filed exhibits or the filed exhibits in this
25 case?

1 A. No, I do not.
 2 Q. You haven't conducted any acoustic modeling related
 3 to the Prevailing Winds project; is that correct?
 4 A. No, I have not.
 5 Q. And I would -- that was not part of the scope of
 6 your work why you were retained?
 7 A. No, it was not.
 8 Q. And you also did not conduct any analysis of
 9 existing sound levels at the project site; is that
 10 correct?
 11 A. That is correct. I relied upon the information from
 12 Mr. Howell.
 13 Q. And you did not conduct any site specific surveys of
 14 either low frequency or infrasound for the project area.
 15 Is that also correct?
 16 A. I relied upon the information from Mr. Howell's
 17 reports.
 18 Q. In your testimony you indicate that the purpose of
 19 your testimony is to provide your opinion regarding
 20 appropriate thresholds for audible and inaudible wind
 21 turbine sound at nonparticipating properties; is that
 22 correct?
 23 A. That would be fair to say, yes.
 24 Q. So given, as you just noted that you didn't conduct
 25 any site-specific studies, you're relying solely on the

1 information that's either provided by others in this
 2 Docket -- you're not relying on your own data for the
 3 project; correct?
 4 A. As I explained earlier, I have studied many projects
 5 similar conditions with similar wind turbines, and I
 6 relied upon that plus Mr. Howell's data.
 7 Q. Okay. In your testimony you indicate that you
 8 believe the noise limit should be imposed at the property
 9 line; is that correct?
 10 A. That's correct. The reason for that is so that
 11 the --
 12 Q. You did not cite -- excuse me.
 13 You didn't cite any specific data to support that,
 14 did you, in your testimony? Did you cite any specific
 15 data in your testimony to support that statement?
 16 A. I stated that -- yes, I did, in my testimony.
 17 Q. Can we go to your testimony, please.
 18 MR. ALMOND: Can the witness be allowed to
 19 answer the questions without being interrupted.
 20 MR. DE HUECK: Everything's fine as is.
 21 A. Page 6, line 174?
 22 Q. Yes. And so I'm looking at the first lines -- 175
 23 through 177. It says "I am a strong supporter of
 24 property rights and believe that noise that exceeds known
 25 safe levels should not be imposed on people just because

1 they live near a neighbor who wishes to host wind
 2 turbines. This position influences my response to this
 3 question."
 4 There's no citation here for any source to support
 5 that statement, is there?
 6 A. Just my belief that I've grown up in the
 7 United States where property rights are protected by the
 8 government.
 9 Q. So that's your personal opinion?
 10 A. I think that's personal and legal.
 11 Q. You're not testifying as a medical expert, is that
 12 true?
 13 A. That's correct.
 14 Q. And you're not a licensed physician. Is that also
 15 correct?
 16 A. That would be obvious, yes.
 17 Q. And you are not testifying as an economics expert.
 18 Is that also true?
 19 A. That's correct.
 20 Q. And you're not testifying as a psychology expert.
 21 Is that also true?
 22 A. Only to the extent that acousticians are cross
 23 trained in both health and psychology because otherwise
 24 when you investigate complaints you are hampered.
 25 I have 45 years of investing complaints, and I've

1 learned a lot about people and psychology that would not
 2 be tossed in a court. So, yes, I have some background,
 3 but it's experience.
 4 Q. It's experience. You're not a licensed
 5 psychologist?
 6 A. That's right.
 7 Q. And yet in your testimony you provide statements
 8 regarding health effects from wind turbines. Is that
 9 true?
 10 A. That is correct. Because as an acoustician I've
 11 been trained to read medical journals to interpret them
 12 for my purposes.
 13 Q. Object. I didn't ask -- you offered health effects
 14 testimony in your written testimony; is that true?
 15 A. Only those within the scope of my profession.
 16 Q. Are your opinions based on complaints that you have
 17 heard from people?
 18 A. My opinions are based upon complaints and my own
 19 personal experiences.
 20 Q. And again, you're not a medical doctor; is that
 21 true?
 22 A. That's true. But I don't see the relevance to your
 23 question.
 24 Q. So you have not conducted a medical examination on
 25 any of the people that have provided complaints to you;

1 is that also a fair statement?
 2 A. No. But I've reviewed the medical records that the
 3 doctors provided.
 4 Q. I only asked you if you --
 5 Did you rely on other people's work for this as
 6 well, other people's studies for your opinions?
 7 A. Yes. The reports from medical doctors who have
 8 examined my clients.
 9 Q. Would you agree that anyone who is relying on other
 10 people's work that the -- what they're relying on has to
 11 also be credible?
 12 A. That is true. But that's the -- that's the purpose
 13 of an expert to make that decision --
 14 Q. I'm just going to ask you, Mr. James, if you can
 15 just answer my question because I don't -- you'll have
 16 your opportunity to elaborate if your counsel so chooses
 17 to ask you additional questions.
 18 You provided some exhibits with your testimony; is
 19 that correct?
 20 A. That is correct.
 21 Q. And I believe -- and I may have not the same
 22 numbering so I will try to look at the versions that are
 23 online. Mine are sort of 5 and 6 to your testimony,
 24 which may be -- I'll see if I can find yours.
 25 So I think it is listed as maybe I 1 E and I 1 F.

1 It may also be 5 and 6 on yours. I have two different
 2 labels.
 3 A. Okay. Just give me the titles. I'll be able to go
 4 from there.
 5 Q. Let's see here.
 6 So I believe that 5 -- what I'm looking at is -- one
 7 was one that you referenced previously with the colored
 8 charts, so I think that was the last exhibit to your
 9 testimony.
 10 A. Okay.
 11 Q. Then the one right before that one, which also has a
 12 wind turbine and a chart.
 13 A. Those are the two you're looking at now?
 14 Q. Yes.
 15 A. Okay.
 16 Q. Neither of those exhibits address health effects; is
 17 that correct?
 18 A. They explain the --
 19 Q. Do they address health effects?
 20 A. No, they're not on health effects. No, they're not.
 21 Q. Okay. Thank you. And if you look back one exhibit,
 22 so that would be 3 or D, I believe -- so this is a
 23 possible criterion for wind farms.
 24 A. Okay.
 25 Q. That also does not address health effects, does it?

1 A. Indirectly it does.
 2 Q. It does not directly address health effects, does
 3 it?
 4 A. The recommendation from Dr. Schomer included the
 5 consideration of health effects. He mentions the Health
 6 Canada Study, which is about health effects --
 7 Q. Does this paper itself address health effects? Not
 8 the citations? Does the paper itself address health
 9 effects? Do they offer any opinions on health effects in
 10 this document?
 11 A. Without having to read it very carefully, I'll say
 12 it was not directly about health effects. It was about
 13 the criteria needed to prevent them.
 14 Q. If we look then at the noise wind farms article so
 15 that would be 2 or B to your --
 16 A. Okay.
 17 Q. If you could turn to the last page in that article.
 18 And I -- hold on. I think it would be actually page 13.
 19 A. Yes.
 20 Q. Make sure I'm looking at the correct one here.
 21 So if we look under conclusions at the -- I'm going
 22 to read the last sentence of the first paragraph under
 23 the conclusion. It says, "Unfortunately then for
 24 policymakers there appears to be no proportional
 25 relationship between wind turbine noise levels and health

1 as these outcome factors will be influenced by
 2 characteristics associated with both the noise and the
 3 listener."
 4 Is that accurate?
 5 A. That is an accurate way of stating a complex set of
 6 relationships, not just --
 7 Q. I'm just asking if that is an accurate recitation of
 8 the statement in the article.
 9 A. It can't be answered yes or no.
 10 Q. Are those the words on the page?
 11 A. Those are the words on the page, yes.
 12 Q. And if you'll turn then to Exhibit 4, this may also
 13 be D. This is called a theory to explain some
 14 physiological effects of the infrasonic emissions at some
 15 wind farm sites.
 16 A. Okay. I'm going to that now.
 17 Q. And if you'll look at pages 1,364 I think it is,
 18 Section 6, it says, "Additional research and data
 19 collection recommendations."
 20 A. Okay.
 21 Q. If you look under that it says, "research to date
 22 does not tend to just study the effects on humans
 23 reported anecdotally in what is probably a minority of
 24 wind farms."
 25 Is that an accurate statement?

1 A. I think Dr. Schomer believed that at the time he
 2 wrote the paper. Since then he's seen Steve Cooper's --
 3 Q. I'm just asking about the --
 4 (Discussion off the record.)
 5 MS. SMITH: Mr. de Hueck, for Cheri's sake and
 6 mine, could you direct the witness to please answer my
 7 questions.
 8 MR. DE HUECK: Yes.
 9 Mr. James, I know you want to elaborate on every
 10 single question that's asked of you, but in order for our
 11 court reporter to adequately capture this, we can't talk
 12 over each other. And I believe Ms. Smith would just like
 13 you to specifically answer her questions as asked.
 14 Thank you.
 15 THE WITNESS: Okay.
 16 Q. Mr. James, in that section under additional research
 17 and data collection recommendations they're actually
 18 making recommendations for additional research to do
 19 regarding reports; is that correct?
 20 A. That is correct.
 21 Q. And they provide even a test case in their Appendix
 22 A; is that true?
 23 A. That is correct.
 24 Q. Mr. James, you've been retained as an expert witness
 25 in other proceedings; is that correct?

1 A. That is correct.
 2 Q. I believe you mentioned that you participated in a
 3 case in Oregon; is that true?
 4 A. That's correct.
 5 Q. So would that be Williams versus Invenergy, LLC?
 6 A. That is correct.
 7 Q. I'm going to -- Ms. Agrimonti is going to send
 8 you -- and maybe we can hand this out too.
 9 Give us just a second, Mr. James. We're just
 10 handing out -- and Ms. Agrimonti is sending to you what
 11 I'm referencing as Exhibit A 36.
 12 And, Mr. James, if you can let me know when you
 13 receive it.
 14 A. I have it up in front of me.
 15 Q. Okay. And this is an Opinion and Order from United
 16 States District Court, District of Oregon case; is that
 17 true?
 18 A. That is correct.
 19 Q. From 2016?
 20 A. That is correct.
 21 Q. In this case were you excluded from testifying
 22 regarding the causal health effects from wind turbines?
 23 A. I was excluded from testifying to the cause and
 24 effect of wind turbines only to the extent of not having
 25 supporting literature because we weren't able to submit

1 it.
 2 Q. Can you turn to page 11 of the case.
 3 A. I assume these are numbered sequentially?
 4 Q. Yes. I believe it's in the lower right-hand corner
 5 that you'll see the number.
 6 A. Yes.
 7 Q. And if you'll look at the very last two sentences of
 8 the page -- so the initial -- you'll see a 13. It says
 9 James. And that James, is that you that it's reference?
 10 A. Yes, it is. Yes.
 11 Q. I'll read the bottom. It says, "He has a long
 12 career studying the noise and sound pressure produced by
 13 industrial wind turbines. However, he is not a doctor or
 14 epidemiologist. As a result, he does not have the
 15 training to opine that the infrasound and audible noise
 16 created by wind turbines activates physiological
 17 mechanisms in the body which produce adverse health
 18 effects."
 19 Do you see that language?
 20 A. Yes, I do.
 21 Q. And we were discussing the information that had been
 22 submitted. The Court also noted that the documentation
 23 that you were relying on for your opinions was also not
 24 credible; is that true?
 25 A. I don't -- I don't remember that specifically. Can

1 you point to that?
 2 Q. Certainly. So if we look first at -- let's stay on
 3 the same page. I believe you had referenced in your
 4 earlier testimony a Dr. Kelly; is that true?
 5 A. That's right. I referred to him earlier in my
 6 testimony today, Dr. Neal Kelly.
 7 Q. And so if we look down at the bottom of page 11 over
 8 on the left-hand column towards -- at the very bottom,
 9 the bottom paragraph, it says, "However, like James's
 10 other sources, the Kelly study has significant scientific
 11 shortcomings. First, Kelly takes data from only seven
 12 subjects. He admits that the experiment would have to be
 13 repeated with a much larger number of evaluators
 14 population to confirm his results as scientific
 15 knowledge. Moreover, there's no evidence that Kelly's
 16 study was published in a reputable scientific journal or
 17 that it was subject to any manner of peer review."
 18 And I'll skip down to the last sentence. "The study
 19 does not support the proposition that wind turbine
 20 infrasound is capable of producing broader adverse health
 21 effects, including anxiety, panic attacks, and
 22 sleeplessness."
 23 Is that accurate?
 24 A. That's what it says.
 25 Q. And if you'll turn back to the prior page, there's a

1 reference to the Cape Bridgewater study as well. And I
 2 believe that's on page 10. Do you see that?
 3 A. That is correct. Yes.
 4 Q. If you look at page 9, it also addresses the Cape
 5 Bridgewater study and Mr. Schomer's review of the Cape
 6 Bridgewater study on pages 8 and 9. Do you agree?
 7 A. I agree there's that -- they're talking about it but
 8 what are you pointing to?
 9 Q. If you look at the bottom of page 8, it says "The
 10 Court agrees with defendants that the Schomer documents
 11 do not represent reliable scientific knowledge which
 12 James may use as a foundation for his expert
 13 conclusions."
 14 Is that accurate? It's at the bottom of page 8.
 15 MR. ALMOND: Objection. Vague. Are you asking
 16 if it's -- the statement's accurate, or you're accurately
 17 reading the statement or --
 18 MS. SMITH: Yes. I apologize. I should be
 19 clearer.
 20 Q. Am I accurately reading the statement on the bottom
 21 of page 8?
 22 A. You're accurately reading it. I don't agree with
 23 the Court's agreement, but that's fine. Dr. Schomer is
 24 the Emeritus Director of the Acoustical Society of --
 25 Q. I think that's all. I just needed to know if I read

1 it correctly.
 2 Mr. James, have you been excluded or had your
 3 testimony in part excluded in any other cases?
 4 A. Not in any significant manner other than issues
 5 where it treads into medical.
 6 Q. So any -- would it be fair to say that you have been
 7 disqualified as an expert from testifying regarding
 8 health effects?
 9 A. Only those that are medical. Not health effects
 10 that are visually confirmable.
 11 Acousticians have to be able to listen to the
 12 complaints --
 13 Q. I'm just going to stop you there.
 14 MS. SMITH: And I would say that at this point I
 15 would move to strike any testimony by Mr. James regarding
 16 health effects attributable to wind turbines.
 17 MR. DE HUECK: I'll allow Mr. Almond to respond
 18 and Staff if you so wish.
 19 MR. ALMOND: Yeah. In Mr. James's Direct
 20 Testimony, written Direct Testimony, he discusses an
 21 acoustician's responsibility to be aware of vague health
 22 effects -- the general health effects caused by certain
 23 wind turbines, facilities, et cetera when looking at
 24 projects.
 25 Specifically he talks about -- I mean, it's all

1 throughout his background in his prefiled testimony.
 2 Certainly he can't make any medical diagnosis. He's not
 3 doing so here. I don't think he's given the opinion that
 4 he's making any diagnoses or anything like that.
 5 So I'd need to know exactly what opinion it is
 6 or what statement Mr. James has made that Ms. Smith is
 7 looking to strike, I guess.
 8 MS. SMITH: Mr. James is making assertions of a
 9 causal relationship between wind turbines and health
 10 effects. He is not qualified to do so. He is not --
 11 As his own testimony, he is not a medical
 12 doctor. He's not an epidemiologist. He's not a
 13 psychologist. There's no basis for him. The literature
 14 he's relying on is not supportive of that either, as
 15 we're seeing. He doesn't have any basis to make those
 16 statements.
 17 MR. DE HUECK: Go ahead, Staff.
 18 MS. EDWARDS: As much as I would like to speed
 19 it along, I would argue it goes to weight, not
 20 admissibility, and it's an issue that's -- I would intend
 21 to brief in my prehearing brief -- posthearing.
 22 MR. DE HUECK: Just in terms of Mr. Fuerniss
 23 Mr. Jenkins and Ms. Pazour, I'm assuming you're in
 24 agreement with Mr. Almond?
 25 Ms. Smith, I'm going to agree with you. He

1 should not be testifying about any health effects or
 2 rendering any expert opinion regarding medical causation
 3 or -- along the lines of what you've stated.
 4 However, I'm concerned what is it that we're
 5 going to strike and who's responsible for pointing that
 6 out? Certainly it's not Cheri to go back through the
 7 transcript and strike it out. So how do we actually deal
 8 with figuring out what statements need to be stricken?
 9 To some degree I'd like to allow some of the
 10 exhibits he relies on because they're based on
 11 infrasound. Not necessarily saying I want to allow it to
 12 show that it's causing health effects, but the guy's an
 13 expert in infrasound and measuring that type of stuff as
 14 an acoustician -- thank you.
 15 MS. SMITH: I can address the exhibits.
 16 From my read of the exhibits, I don't believe
 17 that those would support the causation assertion anyway.
 18 So to the extent that I'm not -- I don't have a problem
 19 with the exhibits themselves coming in, but his
 20 testimony -- and I would be happy to propose in a written
 21 format -- take his testimony and strike the portions that
 22 I believe should be stricken and provide that tomorrow.
 23 MR. DE HUECK: Let's do that.
 24 MS. SMITH: Would that be appropriate?
 25 MR. DE HUECK: That would be appropriate. So

1 I'm going to go ahead and sustain your objection and your
 2 motion to strike, grant that, and we'll figure it out at
 3 that point in time.

4 MS. SMITH: All right. Thank you.

5 MR. DE HUECK: And then also I'd like to
 6 prohibit any -- oh, Commissioner Hanson.

7 COMMISSIONER HANSON: No. I was waiting for
 8 you. I was just signaling you that I had something to
 9 say pertaining too before you made your final decision
 10 here.

11 I think that he certainly should be allowed to
 12 provide us with his opinion of observable health effects.
 13 Certainly not any medical. And I'm parsing it here, but
 14 even I would be able to say that Commissioner Nelson was
 15 obviously happy to hear something because that's
 16 observable.

17 I wouldn't be able to say what physical reaction
 18 he had within his body, any medical effects from it and
 19 hearing or things of that nature, but anyone can talk
 20 about the health effects that are observable, readily
 21 observable.

22 So I know that makes it more difficult.

23 MR. DE HUECK: It doesn't make it too much more
 24 difficult. I just don't want to get into the gray water
 25 of allowing an expert testifier to enter into lay witness

1 testimony and start elaborating on matters of common
 2 knowledge because that's not why he's been here to
 3 testify.

4 COMMISSIONER HANSON: Excellent.

5 MR. DE HUECK: So, with that, where did we leave
 6 off? You're in the middle of cross-examination.

7 MS. SMITH: That probably concludes my
 8 cross-examination at this point.

9 MR. DE HUECK: So we'll move over to
 10 Mr. Fuerniss. Did you have cross-examination?

11 MR. FUERNISS: No.

12 MR. DE HUECK: Ms. Jenkins.

13 MS. JENKINS: No.

14 MR. DE HUECK: Ms. Pazour?

15 MS. PAZOUR: No.

16 MR. DE HUECK: Staff.

17 MS. EDWARDS: Yes.

18 CROSS-EXAMINATION

19 BY MS. EDWARDS:

20 Q. Earlier you stated that you were discussing I
 21 believe it was somebody else's study, that there were
 22 other types of infrasound from wind that needed to be
 23 parsed out.

24 Did I understand that right?
 25

1 A. The term I used was pseudo noise, I believe. When
 2 air -- microphone on a sound level meter is very, very
 3 sensitive. If air moves over that microphone and causes
 4 a false sound, pseudo noise.

5 That's why we put these foam balls on top of the
 6 microphones, to try to block that wind. Infrasound goes
 7 right through the foam balls. So any movement of air
 8 around the microphone generates a false signal,
 9 particularly in the infrasonic range.

10 So when they're measuring outside even after they
 11 take all of their cautions with foam balls, it's very
 12 common to see no difference between wind turbine on or
 13 off just because what they're really measuring is the air
 14 moving over the diaphragm.

15 And then Mr. Hessler, I think, agrees with me on
 16 this. The proper place to take an infrasound measurement
 17 if you want to avoid that is inside the home where the
 18 complainant says when I sit in this chair I feel these
 19 sensations.

20 Q. Okay. Earlier you stated that one out of 15 people
 21 are -- and correct me if I misstate this. Are at risk of
 22 being annoyed; is that correct?

23 A. Yes. The Health Canada Study found that when the
 24 model sound levels were 35 dBA and below, 2 percent of
 25 the population were highly annoyed. Between 35 and 40,

1 10 percent were highly annoyed. And between 45 and
 2 above, 14 percent and higher.

3 That's where I got my numbers from and that's from
 4 the Health Canada Study and there was a chart in my
 5 testimony graphing those results.

6 Q. Okay. So you anticipated my next question and
 7 answer which was where did the number come from.

8 Would you say that the majority of your experience
 9 with wind turbine noise and its effects on people comes
 10 from firsthand observations and measurements at
 11 operational projects?

12 A. For my own?

13 Q. Correct. Firsthand.

14 A. Yes. Yes. But I've corroborated that. I have a
 15 number of colleagues who do similar work and we compare
 16 our notes, we compare our findings and we compare our
 17 methodologies.

18 Q. Have you ever --

19 A. And we corroborate each other's work.

20 Q. Okay. Have you ever conducted a sound monitoring
 21 survey of at least one week at an operational wind
 22 project?

23 A. No. Because I find it pointless. If you -- if you
 24 aren't standing at the microphone -- or standing in the
 25 area where the microphone is located so you can hear at

1 your own ears -- that's called an observed measurement --
2 then you have no idea what caused the high as, the lows,
3 the in-betweens.

4 Unobserved monitoring, which is what is used for two
5 week measurements, requires an awful lot of guesswork
6 afterwards. Whereas, if you're on site and you're
7 measuring the sound, you have your own senses to
8 corroborate the meter's measurements. You know whether
9 there's wind. You know whether there's insects. You
10 know whether a car went, by dogs barked. And, therefore,
11 observed measurements are the preferred measurement in
12 acoustics, as codified in ANSI 12.93, measurements with
13 an observer present. And I focus on that kind of
14 measurement.

15 As to whether that measurement represents other
16 conditions, I rely upon operational data for the noise
17 source, whether it's a wind turbine or a machine in a
18 factory, to let me know other times when that noise might
19 have been in a similar operating mode.

20 Q. Have you ever worked on a wind turbine project for
21 any group or individual that was not opposed to or
22 complaining about the project?

23 A. No. And that is because when I wrote my first paper
24 in 2008 the wind industry decided I was persona non
25 grata. They don't hire consultants that recommend 35

1 was also -- I was also appointed by the PSC to do a peer
2 review of that test, and I submitted that to the PSC with
3 data showing the pulsations in all three homes, although
4 strongest at the home R-1, I believe, the N's farmhouse
5 that Mr. Hessler also focuses on.

6 Q. You just said you were appointed by the PSC. You
7 were hired by the Commission?

8 A. Part -- yeah. Part of the agreement between the PSC
9 and my clients to have access to their house was that I
10 have access to all of the data from the test that
11 Schomer, Hessler, Rand, and Walker conducted and have
12 that for my own review and then report back to the PSC on
13 what I found.

14 Q. Was the PSC your client?

15 A. No. The client was the Intervenor but the PSC was
16 the coordinator for the -- I guess for initializing the
17 project. And my clients would not allow anyone in their
18 homes unless I had an opportunity to review the work of
19 the study team.

20 Q. But you did not actually participate in the study;
21 correct?

22 A. No. Because since they were my clients I had
23 already done testing in the homes. I knew what would be
24 found. It would have been inappropriate for me to be one
25 of the testers. Everyone would have said it was biased.

1 Leq. I don't even get the offers.

2 Q. Thank you.

3 On page 7 of your Direct Testimony you refer to a
4 sound study that was carried out at the Shirley Wind Farm
5 in Brown County, Wisconsin.

6 Are you familiar with what I'm talking about?

7 A. Oh, yes. That was at my client's home.

8 Q. You indicated that this same study alluded to by
9 Mr. David Hessler who just testified for PUC Staff in his
10 Direct Testimony -- is that correct?

11 A. That is correct.

12 Q. You --

13 A. That's the same study -- when he made the suggestion
14 to the Public Service Commission that a study be done my
15 clients contacted me, the attorney for them contacted me,
16 and we developed the protocols and we selected the
17 acousticians and Hessler & Associates is one of the
18 companies that I recommended be involved in that test
19 along with Schomer, Walker, and Rand.

20 Q. You also indicate that you -- you also indicate that
21 you essentially orchestrated the study and developed the
22 test protocol for it; correct?

23 A. Yes. The test protocol was based on my 2011 or 2012
24 paper showing the need for certain types of instruments
25 and measurement techniques to detect the infrasound. I

1 MS. EDWARDS: Thank you, Mr. James. No further
2 questions.

3 THE WITNESS: Okay. Thank you.

4 MR. DE HUECK: Okay, Mr. James. This is where
5 we go to Commission questions, meaning the Commissioners
6 get to cross-examine you so while Katlyn comes up here to
7 move the camera down to Chairman Fiegen I'll just go
8 ahead and kickoff with the only question that I have.

9 And it is you've testified a lot and reported to
10 a lot of commissions and governments across the
11 United States. You've done that in situations such as
12 this when the wind farm has yet to be built; correct.

13 THE WITNESS: That is correct.

14 MR. DE HUECK: And so are you aware of any
15 Commission or government that has created a condition to
16 encapsulate your theories on infrasound?

17 THE WITNESS: Infrasound is still something that
18 hasn't been addressed in any regulatory setting.

19 And there's a reason for that. Before we
20 started putting wind turbines in quiet rural areas there
21 was never a source of infrasound that caused pulsations
22 so it's not studied. It hasn't been studied. The
23 funding is not available and it is just now as with
24 Mr. Cooper's work we're beginning to develop the methods
25 where we can duplicate the sensations in a laboratory.

1 It's very much an unstudied area, but it's one that from
2 my point of view should be a major concern since the
3 people who are affected are severely affected.

4 Some of my clients, for example, the people that
5 owned the house that Mr. Hessler tested in, have left it.
6 That house has sat vacant for years. And they only
7 return when there's a need to do another test.

8 MR. DE HUECK: Okay. Thank you.
9 So to date you're not aware of any permit being
10 denied based on infrasound?

11 THE WITNESS: Not infrasound specifically.

12 MR. DE HUECK: Okay. Thank you. And now I'm
13 going to move over to Chairman Fiegen to allow her to
14 cross-examine you.

15 CHAIRWOMAN FIEGEN: So it seems like you have
16 been in the field for a while, although in the U.S. --
17 you know, wind development has really increased the last,
18 I don't know, five to 10 years. I mean, if you look at
19 the chart, it certainly has increased quickly. Yet
20 there's not a lot of research done and so do people
21 mostly -- do people in the U.S. mostly look at research
22 in foreign countries and has -- and I know I can't
23 introduce new evidence so -- yeah. I guess that's my
24 question.

25 THE WITNESS: I guess to your first question

1 about wind turbines are new, yes, they're new. But
2 because of serendipity and a number of other factors,
3 I've been intimately involved in many of the early wind
4 projects in Maine, New Hampshire, Vermont, out in the
5 east, and have tracked at what's happened at those. Also
6 in Wisconsin we started a wind project in 2008 the one
7 that Mr. Hessler and his company worked on.

8 So my experience I think is somewhat unique.
9 There's three other acousticians in the country that I
10 would say have similar experience. But all of this has
11 been funded by local families. There is no research
12 money available to fund my work. Steve Cooper is in the
13 same boat. His whole lab and everything else was funded
14 out of his own money.

15 Research money doesn't go to people who have
16 ideas that may inhibit current government policies and
17 with the current government policy promoting wind the
18 chance of getting funding for the kind of work I do is
19 nil so that also means that there's limited research
20 available.

21 CHAIRWOMAN FIEGEN: Okay. Thank you.

22 MR. DE HUECK: Mr. James, up next will be Vice
23 Chairman Hanson.

24 THE WITNESS: Okay.

25 COMMISSIONER HANSON: Good afternoon, Mr. James.

1 THE WITNESS: Good afternoon.

2 COMMISSIONER HANSON: I want to look at the
3 witness box when I'm talking to you.

4 On page 5 of your prefiled testimony online 153
5 you state, "While it may appear that the difference is
6 only a few decibels, it is important to remember that a
7 3-D B change in sound levels represents a doubling or
8 halving of the acoustic energy."

9 So obviously to a layperson -- and we've had
10 these in previous wind dockets, discussions of a variety
11 of different dockets and projects. However, it's always
12 curious to me, in your example then of moving down to a
13 40 dBA you state that it's equivalent to turning off half
14 of the wind turbines in a project designed to meet the 40
15 dBA.

16 If three dBA change is doubling or halving, what
17 is the -- going from a 45 to a 40 dBA? Do you know that?

18 THE WITNESS: Well, it's 5 decibels. It could
19 be the equivalent of somewhere between a quarter, maybe a
20 third. These are logarithms. I can't do them in my
21 head, but it would be a very significant change.

22 And that's why these debates get so heated
23 between a 40 or 45 dBA limit. It represents a big change
24 in the number of wind turbines that can be put into any
25 given area of a project.

1 COMMISSIONER HANSON: Well, you just stated that
2 it would be a change of about a quarter?

3 THE WITNESS: It would be about a third of the
4 wind turbines. Let me give you a simpler example.

5 If I have a noisy fan in front of me and I have
6 my sound level meter and the noisy fan is 40 dBA and I
7 have another noisy fan right alongside of it and I turn
8 that on, then the sound level's going to go up 3 decibels
9 to 43.

10 If I started out with four noisy fans and they
11 were 45 and I cut them in half, turned two off, then it
12 would drop to 43. So when we talk about small changes in
13 decibels we're talking about big changes in acoustic
14 energy. And that's the point I was trying to make.

15 And it's also why I think the answer to this is
16 having nonparticipants negotiate agreements in easements
17 and get compensation for the noise pollution.

18 There's no easy way to site a wind turbine at
19 levels that are going to satisfy everybody. So the
20 proper method in my mind is to set criteria that are safe
21 and then allow monetary negotiations to occur for
22 easements.

23 COMMISSIONER HANSON: Okay. Now thank you. I
24 understand that. But I'm not quite following. I thought
25 originally you said a change of 45 to 40 was a quarter.

1 And then I believe you said that it was a change of a
 2 third -- of turning off one-third of the machines. Am I
 3 hearing you incorrectly?

4 THE WITNESS: Well, like I said, the
 5 relationships are logarithmic. So as long as we move in
 6 3 decibel moves, it's easy to estimate but when you have
 7 a 5 dB, I'd say that's harder. I would say it's
 8 equivalent to turning off one out of every --
 9 one-third -- that would be equivalent to turning off
 10 about two-thirds of the machines to drop 5 decibels. Or
 11 to increase the setbacks greater, which is really the
 12 answer. To increase the distance.

13 COMMISSIONER HANSON: Okay. Intuitively I'm
 14 having a little bit of a challenge with that because if
 15 you're shutting off -- did you just say two-thirds of the
 16 machines to turn off 5?

17 THE WITNESS: To have an equivalent drop in
 18 sound level -- or to have a wind project -- the average
 19 sound level over the whole wind project because we're
 20 talking about not just one location but the whole
 21 project, to get a reduction of 5 decibels would require
 22 turning off about two out of every three of the machines.
 23 And then not being measured -- not taking a measurement
 24 right near one of the currently operating machines.

25 My point -- my point in that statement was to

1 show how difficult it becomes to put wind turbines into
 2 rural residential areas as the limits are reduced unless
 3 there is a safety valve to compensate people for the
 4 noise and allow them to enter into separate negotiations
 5 for an easement across their property.

6 COMMISSIONER HANSON: Thank you. And I -- I
 7 appreciate your clarifications and explanations as you've
 8 gone through this. However, if you're at 45 dBA and you
 9 decrease by 5 to 40 dBA and in order to accomplish that
 10 you have to eliminate two-thirds of the machines, that
 11 means one-third of them are creating the 40 dBA. And I
 12 know -- I understand it's not quantity there necessarily.
 13 One machine could produce 40 dBA.

14 THE WITNESS: If you're close to it.

15 COMMISSIONER HANSON: Correct. But you're also
 16 saying that you're eliminating those that are closest to
 17 the receiver by --

18 THE WITNESS: In my example I wasn't being that
 19 precise. I was trying to give an example of the over all
 20 magnitude of the problem of putting a large number of
 21 wind turbines into an area and why a couple decibel
 22 difference in the criteria makes a big difference to the
 23 Applicant.

24 COMMISSIONER HANSON: Thank you. And you're
 25 certainly not advocating that the Applicant should remove

1 two-thirds of their machines.

2 THE WITNESS: No. I'm advocating that those
 3 machines that are up -- in the model we see some levels
 4 about -- above 40. But they seriously look at getting
 5 those levels down into 40. And that for the people who
 6 are in the impacted range that are nonparticipants, that
 7 they work out easement agreements.

8 COMMISSIONER HANSON: I understand that. Thank
 9 you for your participation and information. Appreciate
 10 it.

11 THE WITNESS: Okay. Thank you.

12 COMMISSIONER NELSON: Mr. James, this is
 13 Commissioner Nelson.

14 I understand that you heard most of
 15 Mr. Hessler's testimony this morning; correct?

16 THE WITNESS: I heard probably 80 percent of it,
 17 yes.

18 COMMISSIONER NELSON: Did you hear the portion
 19 where he explained to me that from his perspective it is
 20 very, very very difficult to measure infrasound?

21 THE WITNESS: Yes. But he's been doing that
 22 with instruments with microphones.

23 As illustrated in the example I gave and
 24 described earlier with all the blue lines and colors I've
 25 moved over to using a micro barometer which is much less

1 sensitive to air movement et cetera and it makes it much
 2 easier to get clear readings.

3 With the right instruments infrasound is easy to
 4 measure. With the standard acoustical instruments it's
 5 very complicated and very expensive.

6 COMMISSIONER NELSON: So we've been talking
 7 about this whole issue of the test or study of the
 8 Shirley Wind Farm and you developed the testing protocols
 9 but apparently he didn't use your testing protocols; is
 10 that correct?

11 THE WITNESS: No. No. They followed the
 12 testing protocols exactly and that was to use infrasonic
 13 rated microphones, make recordings and use what's called
 14 narrow band analysis to do the subsequent analysis of
 15 that data. And they executed the methods that I had
 16 recommended exactly.

17 COMMISSIONER NELSON: And so why didn't you
 18 recommend using the micro barometer.

19 THE WITNESS: Because at that time I wasn't
 20 aware that it was a much less expensive tool. It became
 21 clear to me after that when I had calls from people to
 22 come do testing that I needed a different way. So doing
 23 some research into how other fields of science test
 24 infrasound particularly for weather detection, tsunami
 25 detection, et cetera that micro barometers are available.

1 They're highly reliable, very durable and relatively
2 inexpensive and not subject to the same artifacts that a
3 microphone was.

4 COMMISSIONER NELSON: So help me understand just
5 a little bit about how a microbarometer works. I
6 understand a typical barometer measures pressure.

7 THE WITNESS: That's correct.

8 COMMISSIONER NELSON: And so a microbarometer
9 does the same thing.

10 THE WITNESS: Except that it measures the little
11 ripple -- the pressure you see when someone says the
12 pressure outside is X inches of mercury is the overall
13 pressure.

14 A microbarometer is designed to measure the
15 little ripples that occur at that pressure level. It's a
16 variant on a standard barometer with the exception that
17 instead of measuring the overall pressure it just
18 measures the rapid pressure changes as a breeze goes by,
19 for example, or a pressure pulse from a wind turbine is
20 picked up. And it has very little sensitivity to audible
21 sound, literally no sensitivity to audible sounds.

22 It's measuring the pressure changes that rise
23 above and below the barometric pressure at any given
24 point.

25 COMMISSIONER NELSON: In the charts you were

1 lines that show the specific frequency -- or the specific
2 rotation speeds of the wind turbines and in this
3 particular case I think that was .7 hertz. .7, .75
4 hertz.

5 COMMISSIONER NELSON: So what is the scale of
6 measurement of the infrasound?

7 THE WITNESS: Well, the scale of measurement's
8 on the right-hand side. That's in decibels just like we
9 would measure other sounds but without any A-weighting
10 without any G-weighting, without any filtering of the
11 sound we're just looking at all of the sounds 0 to 20.

12 The analysis method called Fast Fourier
13 Transform, narrow band analysis, allows us to take that
14 long string of pressures -- it samples 50 times a second,
15 and convert it into frequencies as we can see depicted in
16 the chart in the upper right-hand corner. We can see the
17 little graph with the spikes and then the arrows pointing
18 to where those traces are in the spectrogram.

19 And it is only by using these kind of tools that
20 you can detect those pulses. Not that the pulses are
21 that faint because they're up in the 50 -- maybe 50 to 60
22 dB range. But those are sufficient as -- as Steve
23 Cooper's study presented, those are inaudible but some
24 people will pick those up and feel a pressure pulse or
25 they'll get a migraine or they'll get dizzy. They will

1 pointing out to us very early on in your discussion I
2 will be honest when I saw those exhibits when they were
3 initially submitted they looked Greek to me so I didn't
4 study them.

5 Now that you've explained them I'm going to go
6 back and study them and if I remember correctly, one of
7 the axis on there talked about different frequencies; is
8 that correct?

9 THE WITNESS: That's correct.

10 COMMISSIONER NELSON: And so does the
11 microbarometer test various frequencies and if so what
12 frequency range?

13 THE WITNESS: The microbarometer I'm using tests
14 between 0 and 20 hertz.

15 COMMISSIONER NELSON: So you can identify the
16 specific sources of the infrasound that you're testing;
17 correct?

18 THE WITNESS: That's right. Because -- and it's
19 only because wind turbines turn at the same RPM which
20 means the blade moves in front of the tower at the same
21 point.

22 Usually within the wind project they operate at
23 similar RPMs. And when you take the microbarometer
24 readings and you compress hours worth of this data and
25 plot them as I have, what you get are these horizontal

1 have these symptoms that can't be explained --

2 Excuse me. Turn those off.

3 Can't be explained by normal audible sound
4 effects.

5 COMMISSIONER NELSON: And I'm not looking for a
6 medical conclusion because I don't think you're qualified
7 to do that, but of individuals that you have observed
8 that have made these type of complaints and where you
9 have measured the level of infrasound in their home, what
10 level of infrasound have you associated with complaints.

11 THE WITNESS: When the average sound pressure
12 level of the tones gets over 50 dB then we see people
13 with serious complaints. The most sensitive people can
14 respond at 40 but I'm talking about average.

15 Remember I said it's a pressure pulse so if we
16 have a wind turbine blade coming down and it creates a
17 pulse, there's a high-rise much above 50 -- in fact let's
18 say the average was 50. The pulse would probably be 65
19 to 70 and then a long period without anything. So the
20 average doesn't look that high. It's the peak or the
21 crest of the pulse that's triggering the physiological
22 response.

23 COMMISSIONER NELSON: And so, again, so the
24 pulse at 50 dB is where you have received or observed
25 complaints; correct?

1 THE WITNESS: Yes. Yes. There are some that
 2 are very sensitive who even at 40 average will have
 3 complaints, but when it gets to 50 people start
 4 complaining. And in homes where you get over 60 they
 5 start talking about leaving their home when it's over 60
 6 by any significant amount on a regular basis they will
 7 leave their home and it's because they just give up.
 8 COMMISSIONER NELSON: Thank you. I appreciate
 9 going through that discussion.
 10 I want to shift now to the dBA measurements that
 11 are being proposed for this wind project. And you
 12 indicated that -- and you explained why you don't believe
 13 a two week measurement works. You've suggested a
 14 10-minute average. Is it correct that you would only do
 15 that 10-minute average when the turbines are at full
 16 speed.
 17 THE WITNESS: That would be the point of making
 18 the measurement, yes. That's why the -- Mr. Hessler was
 19 asked this morning about an on/off test. The proper way
 20 to take a test of a machine like a wind turbine is to
 21 find an ANSI S 12.9 Part 3 compliance test, and on a day
 22 when the wind turbines are operating at full power and
 23 there's no wind at the ground -- this is a stable
 24 atmospheric condition. It's very common in the Midwest,
 25 the national renewable energy labs has done studies in

1 prairie states saying it's roughly two out of every three
 2 nights where this condition occurs with calm winds with
 3 high upper-level winds. So the wind turbines running but
 4 there's no leaf rustle to mask them.
 5 You take that condition. You have the wind
 6 turbines operating. They're turned off. Another reading
 7 is taken and as long as there's a 6 decibel or so
 8 difference between the on and the off, you can be fairly
 9 sure in saying that the on condition measurement was the
 10 wind turbines not background sound. If it's over 10,
 11 then it's absolute, if there's a 10.
 12 And as long as we have Mr. Hall's data showing
 13 that levels in the community are 22 to 28 at night, if
 14 the wind turbine sound was 40 and it was turned off I
 15 would expect the sound then to drop to 28 and we would
 16 know then the contribution of the wind turbine without
 17 any concern over whether other things had contaminated or
 18 affected the sound.
 19 There's operational data, SCADA data S C ADA,
 20 that I have used in hearings where I can correlate my
 21 readings with the exact operating mode, the speed, the
 22 blade angles, the power output, et cetera, and all of
 23 that can be brought to bear for a simple on/off test to
 24 make sure that the test is fair and assesses only wind
 25 turbine noise and not other types of noise. And it can

1 all be done in one night, not two weeks.
 2 COMMISSIONER NELSON: But from what you're
 3 explaining to me it's got to be the right night and
 4 nobody really knows when that is going to be; correct?
 5 THE WITNESS: That's right. It may mean that we
 6 set up the instruments and we have to spend some evenings
 7 waiting for the conditions to be right, yes. But that's
 8 still a lot less time than two weeks.
 9 COMMISSIONER NELSON: The condition that you
 10 described, windy up above, still down below, so I'm a
 11 South Dakotan for my entire life. Wind in
 12 South Dakota -- we've got a windy state. Is the
 13 phenomenon that you described, is that something that
 14 occurs everywhere? Because I know that wind is not the
 15 same everywhere.
 16 THE WITNESS: It's a phenomena created by solar
 17 heating. Let me explain how that happens.
 18 During the day the sun warms the ground. The
 19 warm ground causes air near it to rise and this mixes
 20 with the upper-level winds creating a smooth gradient.
 21 The wind speed increases. The more you go from the
 22 ground up the wind speed goes up.
 23 At night when the sun goes down the ground
 24 cools. Now we have cool air at the bottom, warm air up
 25 above and cool air sinks so we have this layer of maybe

1 100 feet deep. Sometimes less than that. Sometimes you
 2 can see the top of the trees wiggling but there won't be
 3 enough breeze at the ground to induce leaf Russell.
 4 The National Renewable Energy Lab study and I
 5 think one of the places they did the test was
 6 South Dakota, either that or one of the other plain
 7 states showed that that occurs about two out of three
 8 nights during the warm season. And it is a
 9 characteristic that meteorologists in other cases where
 10 I've testified have agreed. And in acoustics we use that
 11 condition as the best test condition.
 12 For example, the model, the ISO model that Mr.
 13 Hall used for his prediction makes the assumption that
 14 the weather conditions are calm wind at the ground and if
 15 you'll read it, it will say a stable atmospheric
 16 environment. That is the ideal condition for testing
 17 noise and that is what I'm saying would be the condition
 18 for testing wind turbines knowing from my own experience
 19 and from what I have learned about meteorology over my 45
 20 years that there will be many nights when the wind
 21 turbines will be at full power even though the wind at
 22 the ground level is moderate.
 23 COMMISSIONER NELSON: I think the last -- and I
 24 appreciate that discussion. I think the last question.
 25 You made the statement in relation to infrasound and you

1 said, and I think I quote this correctly, "it's unstudied
 2 but a major concern."
 3 How can we make sound decisions on something
 4 that is unstudied?
 5 THE WITNESS: You can't. All you can do is --
 6 the precautionary principal says that we err on the side
 7 of safety. If we know that we have people complaining
 8 about the distances of a mile and a quarter or two miles,
 9 then we have to take that into consideration until the
 10 science those us that that isn't a problem.
 11 And this is something that's always baffled me.
 12 Why are the project -- why are we permitting projects
 13 near homes when there's still other areas where we could
 14 have wind turbines out at greater distances while the
 15 research goes on.
 16 So my position has been under the precautionary
 17 principal that until we know enough about why these
 18 problems occur, that we should be more cautious in
 19 allowing wind turbines near residential homes.
 20 COMMISSIONER NELSON: Thank you.
 21 MR. DE HUECK: Commissioner Hanson.
 22 CHAIRWOMAN FIEGEN: Go ahead. I have one more
 23 question whenever.
 24 MR. DE HUECK: We'll go down to Commissioner
 25 Fiegen. And I'll just announce for the room Cheri really

1 needs a break. She's been at it for a long time. So
 2 when we're done with Commission questions we're going to
 3 take a recess.
 4 CHAIRWOMAN FIEGEN: In your testimony,
 5 Mr. James, your written prefiled testimony, you talk
 6 about Michigan and Ohio and a noise trespass.
 7 Have they used that in relation, the noise
 8 trespass in Michigan and Ohio?
 9 THE WITNESS: In Michigan, yes. A number of
 10 communities have passed ordinances that encourage that to
 11 happen. Basically encourage -- they set restrictive
 12 limits, 45 not to exceed, for example. That's an Lmax.
 13 And then they let the developer negotiate with the
 14 landowners for easements.
 15 CHAIRWOMAN FIEGEN: And they haven't used it in
 16 Ohio.
 17 THE WITNESS: I don't know. Ohio's still
 18 arguing over things that -- actually in a case that
 19 Mr. Hessler and I were involved in called Buckeye Wind
 20 back in the early 2000s. They're still arguing over that
 21 case.
 22 CHAIRWOMAN FIEGEN: Thank you.
 23 COMMISSIONER NELSON: My apology to Cheri. I
 24 have another couple of questions.
 25 Help me understand how infrasound dissipates

1 over distance, if it does.
 2 THE WITNESS: Infrasound is a -- I'll call it
 3 infrasound is not absorbed by air. The energy
 4 infrasonic rate is not absorbed by air as the audible
 5 sounds are.
 6 The farther you get away from a high frequency
 7 noise, even speech, not only is distance a factor but
 8 that energy's being absorbed by ear molecules.
 9 Infrasound doesn't do that. Infrasound isn't
 10 blocked by physical things, for example. It goes through
 11 a house as though the house wasn't even there. And I
 12 believe that Mr. Hessler's work at Shirley Wind showed
 13 that the levels outside the house and inside were almost
 14 roughly the same.
 15 Infrasound is a particularly long propagating.
 16 But elephants for example in Africa use infrasound to
 17 communicate, a deep bellow. And they can communicate
 18 over hundreds of kilometers. We use infrasound to detect
 19 distant nuclear bombs, for example. The micro barometer
 20 that I use is used by the U.S. government with detectors
 21 to detect when bombs are set off halfway around the
 22 world.
 23 An infrasonic pulse if it's sufficiently strong
 24 enough can go around the world and have almost as much
 25 intensity as afterwards. There's anecdotal evidence when

1 Krakatoa erupted microbarometers all over the world went
 2 off and they showed the echo of that eruption propagating
 3 around the earth several times. So infrasound is just
 4 one of those things that is hard to stop.
 5 And even though wind turbines aren't like a
 6 nuclear bomb, the sound is more than sufficient to
 7 propagate miles. I have measured infrasound tones at
 8 distances of 6 miles. I have colleagues who have
 9 measured in the distances of 50 miles. Where you can
 10 clearly see the tones that we see in my examples.
 11 And, again, this depends on how many wind
 12 turbines. One wind turbine isn't going to be detectable
 13 50 miles away. But a bank of 200 wind turbines will be
 14 clearly distinguishable at much greater distances than
 15 the single one. And when we start talking about these
 16 projects getting larger and larger we get to the point
 17 like we have up in Ontario where there's no place within
 18 southern Ontario where we can't put up a microbarometer
 19 and detect wind turbine tones.
 20 COMMISSIONER NELSON: So when you measured
 21 infrasound at 6 miles what was the level?
 22 THE WITNESS: It was down around 40. Average
 23 40.
 24 COMMISSIONER NELSON: And so presumably as you
 25 would move further out it would ratchet down and at some

1 point hit zero.
 2 THE WITNESS: No, it doesn't hit zero. It just
 3 blends into the other infrasound that's there. I mean
 4 just the fact that the earth is rotating and friction in
 5 the atmosphere produces some infrasound. So you get to
 6 the point where there's a background infrasound even when
 7 you don't have wind gusts and other things triggering it.
 8 But at this point when I'm asking what is the distance we
 9 should be concerned of, the board of health in Brown
 10 County, which has debated this for eight years now
 11 basically has said that the radius of the human health
 12 hazard is 2 and a half miles around the wind project.
 13 And that seems to encapsulate most of the people who are
 14 sensitive and it takes people who are really sensitive
 15 beyond that, one of which I have an example in my
 16 exhibit, to sense it. But for practical purposes, any
 17 time you're within a mile is going to be very significant
 18 and even at 2 and 2 and a half miles we'll have people
 19 who if they are sensitive will report those sensations.
 20 Whether it triggers, you know, an adverse reaction or not
 21 depends on them. I have an acoustician friend Dr. Malcom
 22 Swinbanks who has published papers about his own
 23 sensitivity. And he uses his sensitivity to infrasound
 24 pulsations as an expert for the U.S. Department of
 25 Defense in protecting our military against infrasound.

1 Because he can feel it, he doesn't have to look at his
 2 meter to know whether it's present.
 3 I know three other acousticians who also can
 4 sense these pressure pulsations. It's not as rare as
 5 Mr. Hessler might like to make it out. If my limited
 6 number of acousticians friends include three that are
 7 using it as tools, then it's more prevalent in the
 8 population than we might expect.
 9 COMMISSIONER NELSON: Thank you.
 10 COMMISSIONER HANSON: Mr. James, all of the
 11 positions and thoughts and premises that you're using
 12 seem to boil down to a conclusion, and I would like to
 13 read what I believe is your conclusion. I've written
 14 that down, and I -- it may be a little bit lengthy, but
 15 I'd just like you to pause and wait until I ask you if
 16 that is correct or not.
 17 You're obviously a strong supporter of property
 18 rights. And on page 6 line 174 there's a question
 19 pertaining to that. And all this seems to boil down to
 20 your position that sound levels that are generated from
 21 the wind turbines may not exceed the ambient sound level
 22 existing at the property line of nonparticipants unless
 23 the utility developer operator is willing to provide
 24 compensation for the what you call noise trespass -- or
 25 the what I would call sound as opposed to noise; is that

1 correct?
 2 THE WITNESS: That's close. You're probably --
 3 you're probably right sound trespass but noise means
 4 unwanted sound. If a person didn't bother them, then it
 5 wouldn't be a trespass.
 6 What I'm concerned about is uncompensated
 7 easements. And when we begin to have government bodies
 8 set a standard that goes to a home, not to the property
 9 line, it results in uncompensated easements. And that's
 10 what concerns me.
 11 COMMISSIONER HANSON: I'm a strong believer in
 12 property rights as well. But there's -- and semantics
 13 aside from noise and sound, when you get into something
 14 of that nature, does my air conditioning unit outside my
 15 house, do I need to compensate my neighbor for the noise
 16 that that creates or the airplane that flies overhead or
 17 the street construction work or on and on and on that
 18 take place throughout the world daily in everyone's life.
 19 I mean, that just seems so extraordinarily
 20 unworkable and unrealistic. It's when the noise is -- is
 21 really in a trespass sense. And I know you're trying to
 22 get to that point, but I just don't see that you're
 23 reaching that.
 24 THE WITNESS: You know, I -- I understand the
 25 issue of air conditioners but let me use that as an

1 example.
 2 The air conditioning industry since I was a
 3 young kid back in the '50s has done extensive work in
 4 making the sound of an outdoor air conditioning condenser
 5 compatible with community noise standards or community
 6 lifestyle.
 7 When I bought my new air conditioner a couple of
 8 years ago it came with all sorts of noise data showing
 9 the impact on my neighbor and how that impact would be
 10 acceptable. Also in my community there are other sounds
 11 at night that raise the level up to about 30, 35 dBA. So
 12 my expectation here is that the -- my neighbor if they
 13 put in a wind turbine -- or an air conditioner will also
 14 put in one that has been designed to be compatible with
 15 the acoustic environment of the community.
 16 Wind turbines haven't been designed for that.
 17 Wind turbines are still in their early years. That
 18 doesn't mean that some day they won't have one. It just
 19 means that right now a wind turbine is like an old air
 20 conditioner in 1950 with a noisy fan or noisy pump and
 21 other mechanical sounds, that until they can design wind
 22 turbines that are more compatible with being close to
 23 homes, they should put their hardware out in areas where
 24 people aren't there. Or if a person willing to accept
 25 the noise compensate them.

1 In my career with workers, there are a number of
2 jobs where the noise was unbearable, but my employers --
3 or my clients who were their employers would pay them
4 extra and they would take that extra money as
5 compensation for the noise.

6 People have a -- people have a right to privacy,
7 but if you say are you willing to exchange it for X
8 number of dollars a year, there willing to do it. And
9 that allows each property owner to participate in the
10 process to the extent they want. And that's why I kind
11 of lean towards it.

12 COMMISSIONER HANSON: Thank you.

13 THE WITNESS: Yeah. If wind turbines were air
14 conditioners, it may be different.

15 COMMISSIONER HANSON: Thank you, Mr. James. I
16 understand that we have moved a great deal with, for
17 instance, automobiles or -- you can hardly even hear them
18 when you're standing right next to them.

19 THE WITNESS: That's right.

20 COMMISSIONER HANSON: And there's been a great
21 deal of -- however, you would have to accept that there
22 have been significant advances in the wind turbines of
23 today as compared to 20 or 30 years ago. I won't take
24 exception with your premises and argue those premises
25 that's up to the other folks here. But I'll give it as

1 much weight as I can to what you've said where I feel
2 that it's justifiable to do so. So thank you for your
3 presentation.

4 THE WITNESS: Okay. Well, thank you.

5 MR. DE HUECK: We will recess until 4 o'clock.

6 (A short recess is taken.)

7 MR. DE HUECK: We are back in session.

8 Mr. James is on the witness stand.

9 Mr. James, you're still under oath. We finished
10 with cross-examination first round. We're going back to
11 Mr. Almond for redirect.

12 REDIRECT EXAMINATION

13 BY MR. ALMOND:

14 Q. First question, Mr. James. Have you ever been
15 permitted to testify in the United States Court to give
16 opinions on noise generated by wind turbines' effects on
17 people?

18 A. Yes.

19 Q. And can you provide a citation to the Commission of
20 what that case was?

21 A. The case --

22 Q. Maybe not the citation but can you tell us the case
23 name and where it was located at?

24 A. Yeah. The case was here in -- well there's been
25 many cases where I've been qualified but there's one

1 where I went through a Daubert hearing in a court here in
2 Michigan. It was McBain, Michigan I can get the specific
3 reference for the record later I don't have it in my
4 hands but in that case I was -- after the Daubert hearing
5 I was qualified as an acoustician.

6 In fact, if everyone would turn to my Exhibit 1, my
7 bio materials, I have the exact quote from that decision
8 on that page so that people can follow along. It's the
9 page bio materials for Richard R. James, November 8,
10 2017.

11 At the bottom of that page there is a table showing
12 some of the example qualifications and at the very bottom
13 is the Michigan court case where I went through a Daubert
14 hearing, and the judge concluded that I was an
15 acoustician with expertise in measurement of wind turbine
16 noise and its effects on people and I was qualified to
17 opine that the Plaintiff's symptoms were caused by the
18 Defendant's wind turbines after that special Daubert
19 hearing.

20 In Alberta, Canada I've also been simply qualified
21 to speak to not only the noise but also human response to
22 noise, and that is the typical qualifications that I have
23 been granted in other jurisdictions.

24 Q. And what was the name of that Michigan case?

25 A. I will have -- it was -- I remember my clients'

1 names. If you want -- let me pull it up here. I can get
2 it.

3 Q. Well, no. Let's not do that. Unless the Commission
4 would like him to.

5 MR. DE HUECK: Just provide it to us later.

6 Q. We'll just provide it later. Okay?

7 A. I will.

8 MR. ALMOND: I don't have any other questions
9 for you, Mr. James.

10 THE WITNESS: Okay. Thank you.

11 MR. DE HUECK: Mr. Fuerniss, any
12 cross-examination based on Commission questions?

13 MR. FUERNISS: No.

14 MR. DE HUECK: Ms. Jenkins.

15 MS. JENKINS: No.

16 MR. DE HUECK: Ms. Pazour.

17 MS. PAZOUR: No.

18 MR. DE HUECK: And Staff.

19 MS. EDWARDS: Briefly.

20 RECROSS-EXAMINATION

21 BY MS. EDWARDS:

22 Q. Can you turn to Staff Exhibit S-5? Do you have all
23 the exhibits in front of you?

24 A. I will get them up here again. Let's see. Staff
25 exhibit -- S 4, S 5 additional data requests.

1 Q. Yes. S 5.
 2 A. Okay. Opening it up here. I think everyone else is
 3 opening it too because it's slow to respond.
 4 Q. Just let me know when you get there.
 5 A. I will. It's opening slowly.
 6 Okay. I have the document open.
 7 Q. Okay. And I would like to?
 8 A. Which page?
 9 Q. Direct your attention to page 8 of 27.
 10 A. Okay. Is that 2-8? Or 2-7? Is that the page with
 11 question 2-7?
 12 Q. Right.
 13 A. Or 2-8.
 14 Q. I'm looking at the question before that which would
 15 be 2-6 but I'm looking at the answer so --
 16 A. Okay. Okay. Okay. I believe that was the response
 17 by Dr. Alves-Pereira.
 18 Q. Correct. And do you see at the very end there where
 19 she responded that there are currently no scientifically
 20 valid studies providing numerical data on safe distances
 21 that can effectively protect families against ILFN
 22 contaminated homes?
 23 A. That is very true because acousticians have ignored
 24 low frequency and infrasound since the '70s when I
 25 started out and they concluded that audible -- A-weighted

1 sounds would be the focus of regulations. We've
 2 underserved the communities by ignoring the low frequency
 3 end of the spectrum.
 4 Q. How could you set a limit if there's no
 5 statistically reliable data?
 6 A. Well, to be very honest, the same way we set the
 7 criteria back in the 1970s. Acousticians who were
 8 familiar with different types of problems got together
 9 and pooled their data and came up with, for example, the
 10 EPA has an L D N on 55 for urban environments. It was
 11 based upon consensus among acousticians and their
 12 experiences in the field. And acousticians have plenty
 13 of experience with IFLN but governments don't because
 14 they've all focused on dBA criteria.
 15 Q. Okay. You testified, and I don't remember in
 16 response to which Commissioner question that there's
 17 nowhere you can go in Ontario and not be subject -- or
 18 not be able to pick up infrasound; correct?
 19 A. I said southern Ontario. Basically if you go from
 20 the western edge of southern Ontario on lake Huron over
 21 to the east of Toronto along Lake Eerie any area along
 22 there there is I think 1,700 wind turbines in that area.
 23 Anywhere in that area you will measure the tones from
 24 wind turbines as long as you don't have such high wind
 25 levels, et cetera, that they mask them.

1 Q. And earlier you testified that 15 percent of the
 2 population would be susceptible to infrasound. So would
 3 not then 15 percent of the population of southern Ontario
 4 be ill?
 5 A. No. That was 15 percent were subject to the audible
 6 sound. 15 percent found levels of 40 Leq and higher were
 7 susceptible.
 8 In my -- let's look at Shirley Wind. When Shirley
 9 Wind -- when the Brown County Health Department began to
 10 explore it the initial complaints were three families.
 11 By the end of their investigation they had 70 families
 12 that had reported either audible sound or infrasound
 13 related symptoms. And this was for a small project with
 14 eight wind turbines in a relatively small dairy farming
 15 community.
 16 So what is the percentage that are affected? We
 17 don't know. Health Canada, for example, their study
 18 found that at one and a quarter mile -- so we're talking
 19 2 kilometers they asked people within that distance if
 20 they had tinnitus, ringing in the ears, migraines,
 21 dizziness, et cetera. Well, we know that the general
 22 population -- that the percentage of the general
 23 population with dizziness and tinnitus, et cetera is
 24 roughly around 1 out of 10 people, and yet at a mile and
 25 a quarter from the wind turbines in the Health Canada

1 Study they were reporting 20 percent and higher
 2 prevalence rates.
 3 They couldn't explain what caused it. They tended
 4 to ignore it. But I used to say a mile and a quarter was
 5 a safe distance. Safe meaning safe. Now I can't say
 6 that. The Health Canada data calls it into question
 7 because we can't explain why these symptoms of low
 8 frequency noise, tinnitus, migraines, pressure
 9 pulsations, et cetera, nausea are so prevalent at that
 10 distance.
 11 Audible sound would have died off by a mile and a
 12 quarter. It would only be the low frequency and
 13 infrasound that's present in those homes. So the more
 14 with learn about the problem the more we begin to see
 15 that even what would be considered large setbacks may not
 16 prevent some of the complaints.
 17 MS. EDWARDS: Thank you. No further questions.
 18 MR. DE HUECK: Any Commission follow up?
 19 Okay. Commissioner Nelson has a question for
 20 you.
 21 THE WITNESS: Okay.
 22 COMMISSIONER NELSON: Earlier I asked you to try
 23 to explain dissipation to me. And I understood your
 24 answer.
 25 So it would appear that the dissipation of

1 infrasound would occur uniformly over distance since
 2 there appears to be no impediments to it. Is that
 3 accurate?
 4 THE WITNESS: Yes. It -- it -- it propagates
 5 with very decrease in sound level over great distances,
 6 which is an advantage if you're an elephant trying to
 7 communicate to another elephant but it's a disadvantage
 8 if you're looking at a noise source that produces
 9 infrasonic pulses because that problem propagates much
 10 farther than the audible sounds.
 11 COMMISSIONER NELSON: So how many -- since it
 12 dissipates at a uniform rate over distance, how many dB
 13 does it decrease per mile?
 14 THE WITNESS: Well, it -- again, it -- sound
 15 drops off proportional to the distance. If we're talking
 16 about audible sound.
 17 COMMISSIONER NELSON: No we're not talking about
 18 audible sound. We're talking about infrasound.
 19 THE WITNESS: Well audible sound decreases at 6
 20 dB per doubling of distance. Infrasound is more like 1
 21 or 2 dB per doubling of distance.
 22 And in my tests I kind of lean towards the 2
 23 mile, mile and a quarter as the separating difference
 24 between a lot of people, a significant number, let's say
 25 10 percent, having complaints and after that it becomes

1 much more spotty.
 2 COMMISSIONER NELSON: Let me delve into your
 3 answer 1 or 2 dB per doubling of distance.
 4 So between 5 feet and 10 feet it reduces 1 and
 5 2 -- 1 or 2.
 6 THE WITNESS: Yeah.
 7 COMMISSIONER NELSON: That doesn't make sense.
 8 THE WITNESS: Well, let's say it starts out at
 9 100 at 1 meter away. And I'll use meters because it's
 10 smooth. 1 meter away it's 100. So at 2 meters it will
 11 be let's say 98. At 4 meters it becomes 96. At 8 meters
 12 it becomes 94.
 13 And so you can see that as we get to a
 14 significant distance like 500 meters it now in order to
 15 get another decibel of reduction we've got to go 500 more
 16 meters.
 17 COMMISSIONER NELSON: Okay. So I understand
 18 that math. And so then my question is is it 1 or is it 2
 19 decibels? That's a big difference.
 20 THE WITNESS: Yes. It depends upon the
 21 atmospheric conditions, and it depends upon the surface
 22 conditions but -- and that's why I say 1 or 2. Because
 23 it -- depending on where you're measuring, it could be
 24 either.
 25 But for the levels emitted by wind turbines the

1 infrasound is significant enough to trigger the
 2 sensations of the distances of a mile and a quarter to
 3 two miles in those sensitive individuals.
 4 COMMISSIONER NELSON: Have you measured
 5 infrasound -- the level of infrasound at a turbine?
 6 THE WITNESS: Right at a turbine it wouldn't be
 7 very high and that's because the sound's occurring up
 8 above and it's radiating out.
 9 I mean, a wind turbine the sound is radiating
 10 off the blades and, therefore, when you're close to it --
 11 actually one of the quietest places near a wind turbine
 12 is right at the base of the tower.
 13 COMMISSIONER NELSON: And I understand that. So
 14 at what distance would the infrasound be maximized?
 15 THE WITNESS: It becomes more repattable (check)
 16 when we're out at distances let's say a thousand feet.
 17 And for a one hertz infrasonic tone it takes a thousand
 18 feet for the wavelength to form. So within that you can
 19 get numbers -- within that distance the numbers can vary
 20 all over but as you get a little further away the wave
 21 form is fully developed and the propagation becomes
 22 somewhat measurable.
 23 But it depends on how it's reflected off the
 24 ground, how it's reflected off the ionosphere and other
 25 atmospheric conditions. And it's very variable. Low

1 frequency noise problems are hard to trace because of
 2 these issues.
 3 And wind turbine sounds fit into that category.
 4 One day it could be perfectly fine. The next day it
 5 could be much noisier just due to -- I'm assuming they're
 6 operating the same. Just due to how the atmospheric
 7 boundary layers are reflecting the sound.
 8 COMMISSIONER NELSON: So I'm going to ask have
 9 you measured infrasound 1,000 feet away from an operating
 10 turbine?
 11 THE WITNESS: Yes. Multiple times.
 12 COMMISSIONER NELSON: And what level would you
 13 typically find there?
 14 THE WITNESS: Probably in the 60s to 70s average
 15 with peaks up around 85. That was my first paper was at
 16 that distance.
 17 COMMISSIONER NELSON: And what would cause the
 18 distance between it being 60 or it being 85?
 19 THE WITNESS: Well, the 60 is the average, but
 20 remember a pulse and then quiet so what we're doing is
 21 we're averaging a very large short-term sound with a lot
 22 of quiet after it so that average drops down. But it's
 23 the peak of the pulse that's causing the sensations.
 24 COMMISSIONER NELSON: Right. And I know you
 25 explained that already so I assumed that the numbers you

1 were giving me were just the peak numbers. So 85 would
2 be the peak?

3 THE WITNESS: Yeah. 85. Whereas the average
4 would be 50 to 60.

5 COMMISSIONER NELSON: Thank you.

6 MR. DE HUECK: Reiss, any redirect after
7 Commissioner Nelson's question?

8 No.

9 Mr. James, thank you for your testimony --

10 MS. SMITH: Excuse me, Mr. de Hueck, I got
11 skipped, and I didn't want to interrupt.

12 Is it okay? I just have one question.

13 MR. DE HUECK: Yep.

14 RECROSS-EXAMINATION

15 BY MS. SMITH:

16 Q. Mr. James, you had previously talked about the
17 Shirley Wind Farm in response to some of the questions
18 that you were asked; is that correct?

19 A. That's correct.

20 Q. And you mentioned that the board of health declared
21 the wind farm a human hazard. Is that true?

22 A. The exact term is human health hazard.

23 Q. Human health hazard.

24 Are you aware that that designation was rescinded in
25 2015 due to insufficient evidence of a link between wind

1 farms and people's health issues?

2 A. No. I'm not. In fact, 2015 the --

3 Q. I just asked if you were aware of that.

4 A. I'm aware that it was not rescinded at that point.

5 Q. Was it ever rescinded?

6 A. No. The board has maintained that in spite of
7 efforts to have it rescinded.

8 MS. SMITH: I have no further questions.

9 MR. DE HUECK: Thank you for your testimony,
10 Mr. James. That will conclude it.

11 MR. DE HUECK: I'm going to turn to Mr. Almond
12 to call his next witness.

13 (A short recess is taken.)

14 MR. DE HUECK: EL18-026 is back in session. Mr.
15 Almond, you may call your next witness.

16 MR. ALMOND: Intervenors call Jerry Punch.

17 MR. DE HUECK: Good afternoon, Mr. Punch. My
18 name is Adam de Hueck. I am the Hearing Examiner in this
19 matter. I'll be swearing you in today. Are you ready?

20 THE WITNESS: I'm ready. Thank you.

21 (The oath is administered by Mr. de Hueck.)

22 DIRECT EXAMINATION

23 BY MR. ALMOND:

24 Q. Why don't you introduce yourself to the Commission
25 and give a brief recap of your education and experience.

1 A. Well, I'm an audiologist. I have two higher
2 degrees, a master's degree in hearing and speech science
3 from Vanderbilt --

4 MR. DE HUECK: Can you slow down a little bit
5 for the court reporter and identify yourself.

6 A. I'm Jerry Punch. I live in open us, Michigan where
7 I'm seated right now. I appreciate the opportunity to
8 not to have to make the trip to South Dakota by the way.

9 I have been an audiologist since 1967 so I have
10 really about 50 years experience as an audiologist. My
11 educational background is with a master's of science
12 degree in hearing and speech sciences from Vanderbilt
13 university and a Ph.D. in audiology from Northwestern
14 University. I've been a teacher, a clinician, a
15 researcher, an administrator in a number of settings,
16 mostly academic settings.

17 The last 20 years 21 years I've been at Michigan
18 State University. I retired from that position, from the
19 faculty there in 2011.

20 Would you like me to go into the issue of how I got
21 involved with wind turbine noise at this point?

22 Q. Sure. Why don't you explain how you got involved.

23 MR. DE HUECK: Mr. Punch, this is the Hearing
24 Examiner. I'm going to interrupt you for just a second.
25 When you look down we can't really see your lips so if

1 you can either back up while you speak or alternatively
2 if you can adjust your camera down.

3 (Discussion off the record.)

4 Q. First why don't you just -- what is an audiologist?

5 A. Well, audiology is the study of hearing and hearing
6 disorders essentially, hearing loss. Much of my work has
7 been involved, particularly my research has been involved
8 with hearing aid research with diagnostic testing to
9 quantify the amount of hearing loss in people.

10 As I say, I've been certified as an audiologist and
11 still am since the 19 -- late 1960s. I've done a lot of
12 clinical work with patients. As someone already
13 mentioned in the previous testimony, I basically -- I'm
14 losing my train of thought already. It's not that time
15 of day for me.

16 Basically what I was saying is wind turbines is kind
17 of a new area. I got involved in about -- excuse me. In
18 2008 or 2009 when, in fact, Rick James asked me to go to
19 a wind project in lower Michigan. It was in the thumb
20 area of Michigan where a family was abandoning their home
21 or leaving their home at night to be able to sleep
22 because of the turbine noise.

23 By the way, my affiliation with Rick has been over
24 many years. When I was chair of the department for about
25 six years I actually hired Rick as an as an adjunct

1 instructor to teach a couple of not courses but give a
 2 couple of lectures in a hearing conservation course, a
 3 graduate seminar in hearing conservation at Michigan
 4 State University.
 5 And so Rick and I had known each other for sometime
 6 before 2008 or '9. So we basically -- I went there
 7 thinking I'm not sure what my role is here. I'm an
 8 audiologist. I understand sound. They were complaining
 9 of the noise. And I've had a lifelong interest or career
 10 long interest in occupational hearing loss and in
 11 community noise so I thought it would be interesting. I
 12 was thinking about retiring in a few years and I thought,
 13 well, this is something of interest to me. I could
 14 possibly become involved if it seems important to do so
 15 or interesting.
 16 And the family, we just interviewed them, more or
 17 less, informally. Two daughters, two teenage daughters,
 18 again, they were leaving their home at night to sleep in
 19 a hotel or motel. And I came away actually thinking
 20 honestly that what's the problem here? I heard the
 21 turbines. They were moving somewhat during the afternoon
 22 that I was there. I felt a little bit of sensation. It
 23 didn't feel that strange at the time. I was only there,
 24 as I said, a couple hours or so, three maybe. And I came
 25 away thinking, well, I need to understand -- I want to

1 understand what's going on. So I rented -- rented. I
 2 checked out a book from the library, Paul Gipe's book on
 3 wind energy, Wind Energy Comes Of Age. And it was fairly
 4 favorable toward wind energy. It did not -- it barely
 5 mentioned noise, though, as an issue, and the book was
 6 based a lot on the information that was available from
 7 the wind turbines that had been installed in European and
 8 I think Scandinavia countries and so forth and California
 9 at that time by the time had become involved with wind
 10 energy.
 11 So not getting a whole lot from the book in terms of
 12 an explanation of what the family was complaining about,
 13 I began to search the literature, first the internet and
 14 then some other sources of let's say journal articles and
 15 so on, and I ended up writing an article. Rick was a
 16 co-author on the article along with a student we involved
 17 in our measurements and writing the report.
 18 The study was published in Audiology Today, which is
 19 basically a monthly magazine of the American Speech
 20 Language Hearing Association in the summer of 2010, I
 21 believe. And so as a result of that, I was asked to
 22 chair a group in Michigan, which now the Department of
 23 Energy essentially in the state to develop --
 24 My audio died. Are you hearing me?
 25 Q. Yes.

1 MS. SMITH: I'm sorry. I'm kind of wondering
 2 what the question is because I don't think it's quite --
 3 I'm sorry. I don't know where this started.
 4 Q. I think we were just kind of rambling a bit about
 5 your background there, Dr. Punch. So let me try to hone
 6 you in here.
 7 Did you file -- or did you prepare prefiled
 8 testimony in this matter?
 9 A. I did.
 10 Q. And is that what has been marked as Exhibit I-2?
 11 A. I'm looking at my list here I'm sorry I didn't
 12 become acquainted with this earlier. I-2.
 13 A. Yes.
 14 Q. And do you have any changes or corrections you want
 15 to make to that testimony?
 16 A. No, I don't.
 17 Q. And along with that testimony did you include two
 18 exhibits which were your CV and then an article written
 19 by you and Mr. James?
 20 A. I did, yes.
 21 Q. And you also provided some responses to some
 22 questions asked by PUC Staff; is that correct?
 23 A. I did, yes.
 24 Q. And I'll represent to you that that those are on
 25 Exhibit I-34, specifically Intervenors Responses to

1 Staff's Second Set of Data Requests to Intervenors.
 2 If I were to ask you those same questions that are
 3 asked in your prefiled testimony as well as the questions
 4 asked by PUC Staff and Intervenors Responses to Staff's
 5 Second Set of Data Requests to Intervenors, would you
 6 provide the same answers here today?
 7 A. I would, yes.
 8 MR. ALMOND: At this time I would move for the
 9 admission of Exhibit I 2 as well as Exhibits I 2 A and I
 10 2 B.
 11 MR. DE HUECK: Do you have an objection?
 12 MS. SMITH: Can we revisit this after cross?
 13 MR. DE HUECK: Certainly.
 14 MR. ALMOND: I think the process we used
 15 previously was to admit it and have her move to strike
 16 it.
 17 MS. SMITH: If you would like to do it that way,
 18 that's fine by me.
 19 MR. DE HUECK: You're right. Yes. Okay. So,
 20 Staff, do you have anything to add?
 21 MS. EDWARDS: I have no objection.
 22 MR. DE HUECK: So we're going to go ahead and
 23 admit the exhibits and testimony.
 24 (A short recess is taken.)
 25 MR. DE HUECK: Okay. We're back in session.

1 The court reporter is all squared away so we can
 2 continue.
 3 Q. (BY MR. ALMOND) Dr. Punch, did you have the
 4 opportunity to review Dr. Roberts's prefiled testimony in
 5 this matter?
 6 A. Yes, I did.
 7 Q. And do you recall Mr. -- Dr. Roberts's prefiled
 8 testimony **him stating that he's not aware of any reliable**
 9 **evidence providing any link between infrasound and**
 10 **adverse health effects?**
 11 A. I did. Yeah I do.
 12 Q. Do you have any response to that claim?
 13 A. Well, I heard him say I'm not aware at least three
 14 times with respect to that question. Or I read that.
 15 There's I think mountains of evidence as we provided
 16 in our article, the 2016 article, that included as
 17 exhibit -- I've lost the numbers here but my second
 18 exhibit.
 19 You've heard testimony and I would agree with it
 20 that from Rick especially that there's lots of field
 21 evidence. There's lots of anecdotal evidence. There is
 22 some evidence in the literature -- like Dr. Roberts made
 23 the point that only epidemiological evidence is useful in
 24 drawing conclusions about causation between wind turbine
 25 noise and adverse **health** effects.

1 He also said paradoxically that -- when asked how
 2 likely is it that -- and I'm paraphrasing. How likely is
 3 it that such epidemiological studies will be done in the
 4 future. And he said not very likely. And I think I
 5 agree with this in the sense that they're expensive, they
 6 require a lot of preparation, government funding and
 7 Mr. James has already responded to that issue of there's
 8 just not government funding available for that kind of
 9 research.
 10 So my point is we have to take what we have. Just
 11 like the Bradford Hill criteria doctor that is -- Sir
 12 Austin Bradford Hill who addressed the medical society in
 13 Britain in 1965 listing nine criteria which include
 14 experimentation but there are eight other criteria that
 15 he talked about that it becomes sort of the -- if you
 16 will, the Bible of epidemiology, as I understand that.
 17 As I understand it. Indicating that we don't need just
 18 epidemiological research to answer questions about
 19 causations **-- causation of disease processes and/or**
 20 **disorders and external patients.**
 21 He went through those criteria, but he didn't -- he
 22 just named them. He didn't talk about what they are
 23 about. And I think he basically ignored the message that
 24 I would read into -- or read from Bradford -- Bradford
 25 Hill's address, and that is, again, we use what we can to

1 draw inferences. We use what is available.
 2 Not that we shouldn't do more research. Some of it
 3 might be clinical research design. Some of it might be
 4 epidemiological. But these studies that will really
 5 address the question definitely about infrasound or just
 6 even audible sound and things like dose response, how
 7 much sound does it take before people really do come down
 8 with the various complaints and problems that they
 9 complain about.
 10 That was one of my major takeaways from his -- his
 11 comments there. He also did talk about -- he basically
 12 uses government studies to rely on for his inference or
 13 conclusion that there is no causative relationship
 14 between adverse **health** effects and wind turbines. Yet he
 15 uses -- he talked about peer reviewed studies. But these
 16 government studies he relies on don't seem to be peer
 17 reviewed, per se, in the way that he defines per
 18 reviewed. So I found that rather unacceptable.
 19 He holds folks like me and Mr. James and others to a
 20 standard of peer reviewed epidemiological research to
 21 establish those relationships yet he does not really
 22 have -- he can't point to specific studies other than the
 23 Health Canada study perhaps as others have also done to
 24 support his view that there are no relationships, no
 25 causative relationships here.

1 Q. And just I want to jump to kind of your over all
 2 opinions and conclusions in your prefiled testimony. You
 3 recommended two separate alternative noise limitations;
 4 is that correct?
 5 A. I did yes.
 6 Q. One was a 40 dBA Leq night outside, the other 40 dBA
 7 L A max; is that correct?
 8 A. That's correct.
 9 Q. Can you just explain the rationale for those two
 10 recommendations?
 11 A. Well, the 40 dB Leq comes from mostly -- emanates
 12 really with the 2009 World Health Organization document
 13 on night noise guidelines. And that's the point at which
 14 it was said -- it was said -- it was decided and used by
 15 the World Health Organization to be a threshold at which
 16 there are substantial and nontrivial numbers of people
 17 who are affected by low frequency noise.
 18 They did not study in the 2009 document really wind
 19 turbine noise. That needs to be understood. Wind
 20 turbine noise has its own specific characteristics. But
 21 if 40 dB Leq is needed for protection against things like
 22 road traffic noise and airport noise -- or airport noises
 23 and other kinds of noises, then because infrasound is a
 24 component of wind turbine noise, the 40 dB actually seems
 25 to be a conservative threshold to me.

1 45 I know is the design goal for this particular
 2 project, but 40 is really a very conservative goal. It
 3 should be lower. And I know Rick James talks about,
 4 recommends, 35 dB Leq but I realize the stress that puts
 5 on wind companies to build the projects and I'm not
 6 really trying to stop them from building the projects. I
 7 just want to protect people as much as possible.
 8 Let me point out the 40 dB Leq is the level that --
 9 I was about to get into this earlier, that the task force
 10 that I chaired in the state of Michigan some years ago
 11 was about to recommend -- that task force was shut down.
 12 I won't go into that unless you want me to. But there
 13 was some lobbying I think about shutting us down
 14 because --
 15 Q. I don't need you to go into that.
 16 A. Okay.
 17 Q. But --
 18 A. All right. So 40 dB is the level that's certainly
 19 recommended by the World Health Organization. It is very
 20 close to the levels that the -- that Dr. Schomer,
 21 Dr. Paul Schomer, has come up with recently based on four
 22 different sources of information, data. They recommend
 23 36 to 38 dB Leq.
 24 And he recommends it to be measured over a 24-hour
 25 period basically. That is a little different from the

1 World Health Organization 40 dB level because they
 2 recommended that as an annual average, which I think it
 3 impractical -- implying by annual that you actually leave
 4 the sound level meter out for a year. We don't do that,
 5 of course. You take samples over a year.
 6 If I can get down to the 40 dB L E max is an
 7 attempt -- and I made this attempt in another case
 8 earlier in New York to try to look at the WHO documents,
 9 both the 1999 and the 2009 documents.
 10 Q. Can you back up just a little bit from the camera?
 11 A. Sure. I was actually taking a couple notes and
 12 trying to read my notes that I just wrote down just a
 13 minute ago. Anyway --
 14 Q. Let's not take any notes okay?
 15 A. Okay. All right.
 16 A. Okay. Can I go ahead with my --
 17 Q. Yeah. The 40 dB L A max.
 18 A. 40 dB L A max. If you review the -- even the 1999
 19 WHO standards I think they talk about the 45 dB L A max
 20 inside. And again the 40 dB L A max, one, is an attempt
 21 to account for all the peaks and valleys that occur in
 22 wind turbine noise. Much of it is infrasound. Some of
 23 it, of course, is also audible sound.
 24 I think even more conservative number might be in
 25 order because we're talking about -- when we talk about

1 infrasound we're talking about sound that does not
 2 attenuate very well and certainly not very rapidly, and
 3 as you've heard many times already in this hearing, it
 4 dissipates over very long distances.
 5 There's almost no barriers that can stop it. So
 6 even if you have your windows closed, it could be as bad
 7 inside as outside. And because the World Health
 8 Organization dealt with low frequency noises that did not
 9 include infrasound, I think an even lower number like 40
 10 instead of 45 dB L A max would be appropriate to account
 11 for the peaks and valleys that do cause the annoyance in
 12 real time for people.
 13 And my concern -- and particularly in the 2009 WHO
 14 document, the concern there is with sleep. Sleep
 15 disturbance.
 16 Q. In addition to noise limitations, you also
 17 recommended a 1.25 mile setback. Why is it necessary to
 18 have both a noise limitation and a distance setback?
 19 A. Well, a distance setback would be ideal if we could
 20 show a really close correlation with the noise levels
 21 that people are exposed to at those distances. But
 22 because there are differences in terrain even changes in
 23 the weather patterns, differences in noise turbine
 24 arrays, the way they're arrayed with respect to one
 25 another, each other, you can't predict exactly what the

1 noise levels are going to be from knowing the distance.
 2 But I think the 1.25 miles or 2 kilometers that's
 3 been recommended many times in the literature starting
 4 with Pierpont in 2009 would be sort of a minimum
 5 distance. 1.5 probably better, obviously. Again, trying
 6 to give fairness as much as I can be fair to the wind
 7 companies, 1.25 seems a rather respectable conservative
 8 number.
 9 But because the distance does not correlate very
 10 well with the noise levels at those distances, both would
 11 be my recommendation. It's not that hard to set the
 12 distance as a limiting factor or a minimum distance along
 13 with a maximum noise level. But certainly noise level
 14 always has to stay in the equation.
 15 MR. ALMOND: Thank you. I don't have any
 16 further questions for you at this time and I'll tender
 17 you for cross.
 18 MR. DE HUECK: Mr. Punch, we're now going to
 19 subject you to cross-examination starting with the
 20 Applicant, Prevailing Winds.
 21 MS. SMITH: Dr. Punch I'm just waiting so they
 22 can shift the camera over so that you can see me as
 23 opposed to others that are watching.
 24 (Discussion off the record.)
 25 CROSS-EXAMINATION

1 BY MS. SMITH:
 2 Q. Dr. Punch, do you have anyone with you in the room?
 3 A. I don't.
 4 Q. And other than the documents that were filed in this
 5 matter including your testimony do you have any other
 6 documents in front of you?
 7 A. I had taken some handwritten notes. I'm putting
 8 those aside. I'm not using them. I don't have any other
 9 notes. I have a laptop to my right with some files I
 10 thought I might need, but I think everything is on the
 11 exhibit list that we might need.
 12 Q. Okay. Thank you. You mentioned -- you indicated
 13 you're an audiologist; correct?
 14 A. Correct.
 15 Q. And you're not an engineer, not a professional
 16 engineer. Is that also true?
 17 A. True. True.
 18 Q. And you're not an acoustician as Mr. James is;
 19 correct?
 20 A. Not as he is, no.
 21 Q. You don't perform modeling analyses for wind
 22 projects, for instance, to determine sound levels?
 23 A. I've never done that.
 24 Q. And you're not qualified to do that; is that
 25 correct?

1 A. I don't really know, to be honest, in terms of
 2 acoustical standards. Probably not. I have certainly
 3 done measurements in communities about community noise,
 4 race tracks, for example, and public events like concert
 5 hauls and so forth. I have made noise measurements part
 6 of my training as an audiologist was how to make noise
 7 measurements.
 8 Q. Okay. Are you a licensed audiologist?
 9 A. I am not because I am a retired audiologist I didn't
 10 want to pay the \$350 a year when I knew I wouldn't be
 11 practicing clinical work. Licensing only applies to
 12 clinical work, working with patients who have hearing
 13 problems.
 14 Q. Certainly. And so have you ever been licensed?
 15 A. I have been licensed the whole time with my career
 16 that I was involved in clinical work, yes.
 17 Q. Okay.
 18 A. In a couple states.
 19 Q. Are you licensed to practice medicine?
 20 A. Of course not.
 21 Q. Based on your testimony earlier I understand that an
 22 audiologist deals with hearing related diagnoses or
 23 treatment. So, for instance, hearing loss treatment. Is
 24 that true?
 25 A. That's true.

1 Q. And so an audiologist can determine if somebody has
 2 hearing loss but they cannot necessarily determine or
 3 diagnose diseases, for instance, from the ear. Is that
 4 true?
 5 A. Well, I think a medical doctor would say we can't
 6 diagnose in the sense that we can tell where the
 7 lesion -- the site of the lesion is by audiometric
 8 testing battery that we can perform, some of which is
 9 electrophysiologic, some of which is audiological through
 10 earphones and so forth but we can't determine what the
 11 actual cause of, say, sensory neuro hearing loss really
 12 is.
 13 Many times in reports we put in audiometric results
 14 are highly consistent with presbyacoustic hearing loss or
 15 noise-induced hearing loss, for example, and that is
 16 helpful to physicians in making their diagnosis. But
 17 they have additional tests they can perform, including
 18 their own physical exam.
 19 Q. So if you -- as I understand your testimony, if you
 20 identified an issue, that may be referred to a physician
 21 in order to make a further testing diagnosis to determine
 22 the actual cause?
 23 A. Yes. We work closely with otolaryngologists, ENT
 24 specialists, in that we get referrals from them, and we
 25 refer to them with respect to diagnostic and sometimes

1 treatment issues. If medical or surgical treatments seem
 2 applicable, then certainly we refer to a medical
 3 specialist.
 4 Q. And as an audiologist you don't have any expertise
 5 to diagnose nonhearing related maladies like heart
 6 disease or diabetes; is that true?
 7 A. That's true. True.
 8 Q. In your testimony you state that you're testifying
 9 as an expert witness regarding the potential health
 10 effects posed by noise from the project; is that correct?
 11 A. True.
 12 Q. I believe if you want to turn to pages 3 and 4 of
 13 your testimony, do you have that in front of you?
 14 A. What exhibit is that? I do not have it -- I have it
 15 on the computer.
 16 Q. Certainly. I believe it is Exhibit 2. I 2. Sorry.
 17 A. I 2?
 18 Q. I 2.
 19 A. I 2 A? I'm sorry. Prefiled testimony?
 20 Q. Yes.
 21 A. Okay. Okay. I have it.
 22 Q. And if you look at page 3. 3 and 4.
 23 A. Okay.
 24 Q. I'm looking at lines 58 and 59. Do you see those?
 25 A. 59 ends the question and 60 starts an answer.

1 Q. Yes.

2 A. On my -- okay.

3 Q. That's correct. And, as I understand that portion

4 of your testimony starting at line 60 through 81 you're

5 identifying your qualifications to testify as a health

6 expert regarding wind turbine noise. Is that true?

7 A. Well, the question was what experiences do I have to

8 qualify me as a health expert, yes. In that sense it's

9 true.

10 Q. And as I'm looking at your testimony, you indicate

11 that you coauthored an article on wind turbine noise in

12 Audiology Today.

13 Is that the article you were referencing with

14 Mr. James that you --

15 A. That was the first article. That's not the same

16 article as I included as my Exhibit 2.

17 Q. Certainly. You talk about chairing a technical work

18 group. Is that true?

19 A. Yes.

20 Q. Testifying before zoning boards and commissions. Is

21 that also correct?

22 A. I have, yes.

23 Q. Coauthoring a blog on a website. Is that also true?

24 A. The article, wind turbine -- well, Exhibit 2 is an

25 article that is published on a website. I called it a

1 blog. I'm not sure it's really a blog. It's really a --

2 it's like a journal of the hearing health -- technology

3 and health matters. Okay.

4 Q. Okay. And then testifying in other matters; is that

5 true?

6 A. Yes.

7 Q. And interviewing individuals?

8 A. I have interviewed individuals, yes.

9 Q. And then the article that you've coauthored with

10 Mr. James that you do have is Exhibit 2-2; is that

11 correct?

12 A. Sure. Yes.

13 Q. So other than your interviews with people where you

14 were interviewing them and asking them about their

15 complaints as you described earlier in your testimony,

16 you're relying primarily on other people's information to

17 have your opinions; is that true?

18 A. Well, to a large extent I have my own experiences

19 visiting and talking with people and doing some more

20 formal interviewing than I had mentioned earlier.

21 Q. Okay. As far as -- as far as the people that you

22 interviewed, did you perform medical examinations of

23 those people?

24 A. No.

25 Q. And you have identified a number of maladies that

1 you think can occur due to wind turbines; is that true?

2 A. Yes. Most of which are documented all of which are

3 documented in the literature.

4 Q. And that's your -- you reference those on page 5 of

5 your testimony; correct?

6 A. Are you talking about the symptoms or the complaints

7 or the health problems?

8 Q. Yes.

9 A. Okay.

10 Q. So, for instance, you note sleep disturbance,

11 annoyance, headaches, dizziness, vertigo, nausea, those

12 types of symptoms?

13 A. Absolutely, yes.

14 Q. People that don't live near wind turbines also can

15 experience those same health effects. Is that true?

16 A. Admittedly, yes of course.

17 Q. And there's multiple reasons why someone might

18 suffer a headache, for instance. Is that also true?

19 A. Many reasons I understand, yes.

20 Q. So if someone is seeking treatment for certain

21 symptoms part of the process as we discussed earlier

22 would be to diagnose potential causes of that

23 particularly symptom. Is that true?

24 A. True.

25 Q. And you would also rule out other potential causes

1 so that you can identify hopefully the true cause; is

2 that correct?

3 A. Yes. And you're talking about individuals. I don't

4 diagnose individuals. I talk -- my work is involved with

5 what I call causation assessment or risk assessment, not

6 individual diagnosis.

7 Q. No. That would be what a physician would do; is

8 that correct?

9 A. Individual diagnosis, yes.

10 Q. And an audiologist does not have the training to

11 rule out nonhearing related symptoms as you've stated

12 earlier; correct?

13 A. Nonhearing related symptoms? Rule out?

14 We can take the patient's -- or client's or

15 patient's word for it, like the physicians have to do,

16 that they have a headache, for example, but we can't

17 officially diagnose it.

18 Q. On page 5 of your testimony you indicate that

19 landowners who participate in a wind project or sign

20 waiver agreements with a wind company are less likely to

21 experience or report negative effects from turbines; is

22 that correct?

23 A. I believe it is.

24 Q. So a person's perception of a wind project can

25 influence their reaction to the wind project. Is that

1 true?
 2 A. Of course.
 3 Q. On page 6 of your testimony you state that you
 4 estimate around 15 to 20 percent of exposed residents
 5 will experience extreme annoyance and sleep disturbance.
 6 Is that true?
 7 A. Right.
 8 Q. You don't site a source for that statement in your
 9 testimony, do you?
 10 A. There is no source that says the range is 15 to 25
 11 percent. I was offering an opinion and also an estimate,
 12 and that is my estimate.
 13 Q. In your testimony you indicate that you have been
 14 retained as an expert witness in the past. Is that true?
 15 A. Yes.
 16 Q. Are you familiar with the case of Williams versus
 17 Invenergy, LLC?
 18 A. Yes.
 19 Q. And do you have in front of you what's been marked
 20 as I -- oh, A 36?
 21 A. I have it on the list I'll have to find it. I'm
 22 sorry. I --
 23 Q. I apologize. It's A 36. It would have been sent to
 24 you by e-mail.
 25 A. Oh, I think that was sent to Mr. James's e-mail

1 address because I'm in his study in his home. I don't
 2 know --
 3 Q. I apologize. So do we need to send it to your
 4 e-mail now?
 5 A. I have my computer available to do that, if you
 6 will.
 7 Q. Okay. We will send it to you.
 8 A. I need to log in.
 9 Q. Okay.
 10 A. Again.
 11 A. I think I have it now.
 12 Q. Okay. If you have it up just let us know when
 13 you're ready.
 14 A. It's open. I'll need to be leaning to the right to
 15 access it. Okay.
 16 Q. Okay.
 17 A. Okay.
 18 Q. Were you retained by the plaintiff in this action to
 19 provide expert testimony on health effects of wind
 20 turbines?
 21 A. Yes, I was.
 22 Q. And was your testimony excluded by the court?
 23 A. As I recall, it was. I heard -- I should say I was
 24 present to hear Mr. James's testimony, and I think we
 25 were -- I know we were involved in the same case, and for

1 the same reasons my testimony was excluded because of the
 2 Daubert hearing issue that we discussed.
 3 Q. Okay. So if you'll look on page 14 of the -- and so
 4 the -- as I understand it, the page numbers are on the
 5 lower right-hand side.
 6 A. Yeah. I'm almost there.
 7 Q. Okay.
 8 A. Okay. I have page 14.
 9 Q. So if we look under A, Qualifications, do you see
 10 that subsection?
 11 A. I do. Yes, I do.
 12 Q. And I'll just warn you Cheri's looking at me so we
 13 have to be careful not to talk over each other. Cheri is
 14 our court reporter.
 15 I see a line that says, "Punch's qualifications are
 16 impressive to be sure." Is Punch you, Dr. Punch?
 17 A. I would assume.
 18 Q. And if you look down at the bottom of the page it
 19 says, "However," and then up at the top of 14, "Punch is
 20 neither a medical doctor nor an epidemiologist who could
 21 opine on the cause of Williams' symptoms solely on the
 22 basis of these qualifications. Therefore, for Punch's
 23 causation testimony to be admissible he must support his
 24 causation opinion with reference to foundational
 25 literature which establishes the causal relationship

1 through the Application of scientific knowledge."
 2 Have I read that accurately?
 3 A. You have.
 4 Q. So if we turn then to page 15?
 5 A. Okay.
 6 Q. And were you -- before I get there were you present
 7 for the discussion of the reason -- I believe you said
 8 you heard Mr. James's testimony?
 9 A. From another room I was listening on another
 10 computer, yes, on the website.
 11 Q. Did you hear the discussion and us read through the
 12 reasons why the Cape Bridgewater study was found by the
 13 Court to not support an opinion of causation?
 14 A. I have to say I only caught part of that. I'm not
 15 fully aware of what was said in total.
 16 Q. If I indicate that Mr. James agreed that I read the
 17 portions that were referencing the Cape Bridgewater study
 18 and the Dr. Kelly article and Paul Schomer's articles as
 19 not being sufficient to form a basis for causation, would
 20 you accept that based on what's in the document?
 21 A. I would accept that you --
 22 Q. Read it correctly.
 23 A. I'm accepting that you read it correctly, yes.
 24 Q. I won't repeat those then.
 25 A. Okay.

1 Q. If we look at then on page 15 at the bottom on the
2 left-hand column it says -- and are you there? I should
3 ask before I start.

4 A. Am I here? Yes.

5 Q. It says here, "Neither the Pierpont nor Schomer
6 information constitutes an epidemiological study or shows
7 a significant statistical relationship between turbine
8 generated infrasound and adverse health effects. The
9 third article by Sult and Huller (check) supports its
10 theory of causation by demonstrating some low frequency
11 sounds stimulate hair cells in the cochleas of guinea
12 pigs. However, the Salt and Huller article, like Punch's
13 other exhibits, fail to demonstrate the statistical
14 relationship between low frequency wind turbine
15 infrasound and human health effects."

16 Did I read that accurately?

17 A. I wasn't actually reading with you. I have no
18 reason to doubt that you read it accurately. Is that
19 acceptable?

20 Q. That's acceptable.

21 And the Pierpont study is the book by Neenah
22 Pierpont called Wind Turbine Syndrome? Is that true that
23 they're referencing?

24 A. True.

25 Q. And there's testimony in your -- in your Direct

1 Testimony you have certain references to Mr. Howell's
2 study on -- the acoustical study that was performed by
3 Mr. Howell. Is that accurate?

4 A. I did make some comments on that, yes.

5 Q. Okay. And you made recommendations of certain
6 distances and certain sound levels that you believe are
7 appropriate; is that true?

8 A. I don't recall whether that was in -- with respect
9 to Mr. Howell's testimony or someone else's, but I think
10 that's -- that makes sense, yes.

11 Q. And I should --

12 A. I'll take it as true.

13 Q. I should restate that you did make those opinions
14 not necessarily in response always to Mr. Howell but of
15 your own determination?

16 A. That's right.

17 Q. And as I understood your testimony earlier, you
18 indicated that you had offered a distance of -- a mile
19 distance in addition to a dBA level because you didn't
20 know how you would determine sound at a specific level.

21 Is that true -- or a specific distance. Is that
22 accurate?

23 A. Yes. I said basically that the two don't correlate
24 always because of differences like terrain and weather
25 conditions and times of year. All kinds of things,

1 variations, factors, can influence the noise levels that
2 are picked up or expose people to certain noise levels at
3 that particular distance.

4 In other words, different people at 1.25 may not
5 experience the same noise levels. I didn't quite make
6 that clear earlier, I think.

7 Q. Are you aware that -- as Mr. Howell did in this
8 case, that it's possible to model in advance the
9 estimated sound levels at specific distances from wind
10 turbines?

11 A. As I said earlier, I don't do the model but I
12 understand what modeling is about and I understand from
13 other acousticians in addition to Mr. James that modeling
14 is not always accurate.

15 MS. SMITH: I have no further questions at this
16 time. I would move to strike all of Dr. Punch's
17 testimony. He does not have the qualifications to opine
18 regarding health effects, nor does he have the
19 qualifications to opine regarding acoustical analyses of
20 wind project and appropriate wind turbine levels.

21 MR. DE HUECK: So from my perspective I'm going
22 to stand by my prior ruling and apply it to Mr. Punch in
23 that he may not testify as to health related effects.
24 However, I think he is allowed to testify as an expert to
25 infrasonic sounds and inaudible noises from his

1 experience and his training and research.

2 MR. ALMOND: May I have the opportunity to voir
3 dire the witness specifically related to this court case
4 that she was just referring to, as there's a pretty
5 significant paragraph in there where the Court says --
6 "Dr. Punch is provided to give an opinion on causation
7 that wind turbines produce audible noise which may
8 disturb individuals and interfere with sleep," which is
9 on page 16 of this court case we're going over that has
10 not been discussed yet.

11 MR. DE HUECK: Can you point me to where
12 you're --

13 MR. ALMOND: Page 16 of of the Williams versus
14 Invenergy.

15 MR. DE HUECK: Where is it?

16 MR. ALMOND: C, Admissible Subjects of
17 Testimony. Just read that section.

18 MR. DE HUECK: Yeah. The first sentence, that's
19 what I was trying to say. We're not going to talk about
20 adverse health effects.

21 MR. ALMOND: Of infrasound and not audible -- or
22 low frequency sound pulses.

23 That paragraph goes on to say that "Given his
24 expertise as an audiologist, he is qualified to give
25 opinions that wind turbines produce audible noise which

1 may disturb individuals and interfere with sleep."
 2 MS. SMITH: May I respond? Because nothing that
 3 we've discussed here so far indicates that an audiologist
 4 tests for infrasound. They test for hearing loss.
 5 Hearing has to be audible. Therefore, I do not believe
 6 that he is qualified to speak regarding infrasound.
 7 MS. EDWARDS: I'd just like to weigh in that, if
 8 permissible, I would like to further voir dire the
 9 witness on the same issue.
 10 MR. DE HUECK: Go ahead.
 11 MS. EDWARDS: Thank you. Mr. -- rather,
 12 Dr. Punch, are you familiar with the case out of -- or,
 13 rather, docket out of New York involving the Cassadaga
 14 Wind Farm permit.
 15 THE WITNESS: I am.
 16 MS. EDWARDS: Did you offer testimony in that
 17 case?
 18 THE WITNESS: I did, yes.
 19 MS. EDWARDS: Was your status as an expert
 20 challenged?
 21 THE WITNESS: I don't think my credentials per
 22 se were challenged. I don't recall that they were.
 23 MS. EDWARDS: Was there a Motion to have your
 24 testimony excluded?
 25 THE WITNESS: Well, if you have evidence that's

1 true, your documentation would be better than my
 2 recollection. I don't recall it. No. I don't recall
 3 it.
 4 MS. EDWARDS: Would it be accurate to state that
 5 the Public Service Commission found that it went to
 6 weight and persuasiveness rather than admissibility and
 7 allowed your testimony in?
 8 THE WITNESS: That sounds consistent with what I
 9 recall. But I'm not -- I'm not a lawyer either, and I
 10 don't really fully understand the weight of those -- you
 11 know, the substance of those labels.
 12 MS. SMITH: I would say that this -- we're
 13 really just doing legal argument through the witness
 14 because that particular case had a standard where they
 15 allowed -- they decided they didn't -- were not going to
 16 apply the traditional standards of admissibility and they
 17 allowed the witness in and it went to weight.
 18 Here we have been applying the rules of
 19 admissibility. They need to be an expert witness in
 20 order to testify. Otherwise, anyone could come up and
 21 give their opinions regarding articles on the internet,
 22 and we've been attempting to differentiate between the
 23 two.
 24 MR. DE HUECK: Okay. So still applying a legal
 25 standard here is my ruling, and it's similar to what we

1 did earlier.
 2 He may not talk about adverse health effects as,
 3 say, a doctor or another medical professional because
 4 clearly he is not. But he has clearly stated that he has
 5 been studying audiology for a long long time, and he's
 6 got a background and a resume to support that.
 7 On that note I believe infrasound and other
 8 inaudible noises go hand in hand with his study, and he's
 9 clearly very fluent in that matter, which is beyond
 10 someone just someone talking about what they've read on
 11 the internet. So I believe his background will allow him
 12 to testify in terms of infrasound.
 13 Additionally, I see what Reece has pointed out,
 14 and if you read the whole paragraph it makes sense to me.
 15 They're not saying that he can medically go on to expound
 16 about sleep related health effects but that if he has,
 17 such as the WHO, literature that talks about health
 18 effects, he's qualified to tell us about those reports
 19 and what they said.
 20 MS. SMITH: And just to be clear, as I
 21 understand -- I understand with the reading here that
 22 noise can cause sleep disturbance -- the relationship
 23 between noise and sleep disturbance was allowed by the
 24 court in this particular case.
 25 So is your ruling that that's allowable? That's

1 the extent of what's allowable?
 2 MR. DE HUECK: That would be the extent.
 3 MS. SMITH: Okay. Just wanted a clarification.
 4 Thank you.
 5 MR. DE HUECK: So I'm considering it pretty
 6 limited testimony, avoiding anything that is assessing
 7 the risk of health problems.
 8 MS. SMITH: All right. As long as we're
 9 stopped, I will offer that we'll do the same approach
 10 that we did before. We will provide our proposed
 11 striking redaction of the testimony that's been
 12 submitted, and we'll look at the transcript as well.
 13 MR. DE HUECK: Yes.
 14 MS. SMITH: Thank you. I have no further
 15 questions then.
 16 MR. DE HUECK: Okay.
 17 Moving on for cross-examination to Mr. Fuerniss.
 18
 19 CROSS-EXAMINATION
 20 BY MR. FUERNISS:
 21 Q. Hello, Dr. Punch. You have referenced the World
 22 Health Organization. Is it true that they're currently
 23 reviewing their noise standards and looking in particular
 24 at noises from wind turbines?
 25 A. That's true. I learned that yesterday.

1 MR. FUERNISS: Thank you. I have no further
 2 questions.
 3 MR. DE HUECK: Ms. Jenkins.
 4 MS. JENKINS: No questions.
 5 MR. DE HUECK: Ms. Pazour.
 6 MS. PAZOUR: No questions.
 7 MR. DE HUECK: Staff.
 8 MS. EDWARDS: No questions.
 9 MR. DE HUECK: Okay. Dr. Punch -- or,
 10 Mr. Punch, now we're going to subject you to Commissioner
 11 cross-examination. We're going to get you over to
 12 Kristie Fiegen.
 13 Before she begins I just have one question.
 14 That Pierpont lady, she came up with infrasound
 15 and studied it and published some things. Would it
 16 surprise you to know that she had changed her position
 17 and determined that wind turbines do not carry
 18 infrasound? In other words, she backed off of her former
 19 position that you would have relied on in that court
 20 case?
 21 THE WITNESS: Well, I relied on a number of
 22 things. But it would surprise me, yes. It would
 23 surprise me.
 24 MR. DE HUECK: So you have not heard that?
 25 THE WITNESS: I have not.

1 MR. DE HUECK: Okay.
 2 CHAIRWOMAN FIEGEN: I have none.
 3 MR. DE HUECK: Vice Chairman Hanson.
 4 No questions.
 5 Commissioner Nelson.
 6 COMMISSIONER NELSON: Dr. Punch, your Exhibit 2,
 7 which I think has been labeled as Intervenor 2 B, the
 8 wind turbine noise and human health paper, on the bottom
 9 of page 2 --
 10 THE WITNESS: I'm sorry. Is that Exhibit 2?
 11 COMMISSIONER NELSON: It was Exhibit 2 on your
 12 testimony.
 13 THE WITNESS: Right.
 14 COMMISSIONER NELSON: It's been labeled as 2 B.
 15 THE WITNESS: Well, they're numbered by letters
 16 and then a number.
 17 COMMISSIONER NELSON: Yep. I-2 B. And if you
 18 go to the second page.
 19 THE WITNESS: Okay.
 20 COMMISSIONER NELSON: Bottom of the second page,
 21 probably second to the last sentence that starts, "In
 22 fact."
 23 THE WITNESS: Just getting to the second page.
 24 Okay. Yes. Okay.
 25 COMMISSIONER NELSON: "In fact much research and

1 some already rendered legal decision so convincingly that
 2 some segments of the population suffer damaging effects
 3 from exposure to wind turbine noise."
 4 Can you cite for me the legal decisions that
 5 you're referring to there?
 6 THE WITNESS: I don't think they're necessarily
 7 the legal decisions that were made in cases I've been
 8 involved with. They're cases that I've discussed with
 9 Rick James, and he's discussed some cases of others who
 10 he knows -- other acousticians who have been involved in
 11 these cases.
 12 I cannot cite at this point -- I was basing that
 13 on information I had then, but I don't recall what I was
 14 basing it on at this point.
 15 I think probably I was thinking for sure about
 16 the Wisconsin case. We mentioned the Shirley Wind case
 17 in this article, in fact. This was written in 2015 or
 18 '16. And that case was on going since, I don't know,
 19 2012 at least, if not earlier. So the fact that it had
 20 been ruled a human health hazard was a legal decision in
 21 a court case essentially, in a hearing at least.
 22 There are other cases in Europe. There are
 23 cases now that anyone about then in Canada, particularly
 24 Ontario, Australia, I think, Ireland where there are real
 25 community pushback -- there's real community pushback to

1 install turbine operations.
 2 And even in Canada I think -- my understanding
 3 is that in the province of Ontario the new premier, Doug
 4 Jones -- excuse me. Doug Ford was elected in large part
 5 because of the community's complaints and upset with
 6 respect to all the turbines that are going up in that
 7 area of the country.
 8 COMMISSIONER NELSON: Yeah. But that has
 9 nothing to do with a convincing legal decision.
 10 So I want to go back to your reference to the
 11 Shirley Wind Farm issue where that area was declared to
 12 be a public health area.
 13 THE WITNESS: Human health hazard, yes.
 14 COMMISSIONER NELSON: Okay. And that decision
 15 was made by a court of law; is that correct?
 16 THE WITNESS: Well, it was made by the Public
 17 Service Commission, I think, based on evidence from the
 18 Department of Health. I was not involved in that case.
 19 Let me make that clear.
 20 COMMISSIONER NELSON: But that's the one that
 21 you're referring to in this paper; correct?
 22 THE WITNESS: Okay. Correct. I believe so. I
 23 believe so.
 24 COMMISSIONER NELSON: No further questions.
 25 THE WITNESS: Again -- okay.

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1 MR. DE HUECK: With that, Mr. Almond, do you
 2 have any redirect?
 3 MR. ALMOND: No.
 4 MR. DE HUECK: Prevailing Winds, do you have any
 5 recross based solely on Commissioner Nelson's question?
 6 MS. SMITH: No.
 7 MR. DE HUECK: Staff.
 8 MS. EDWARDS: No.
 9 MR. DE HUECK: Okay. Mr. Punch, thank you for
 10 your testimony today. You may be dismissed.
 11 (The witness is excused.)
 12 MR. DE HUECK: And moving on, Mr. Almond, you
 13 may call your next witness.
 14 MS. AGRIMONTI: Mr. de Hueck, I'm sorry. I just
 15 realized the time. We're hitting 5:30, and I know we'll
 16 go until 7:00. I didn't know if this was the right time
 17 to break, or if you had a different time in mind.
 18 (Discussion off the record.)
 19 MR. DE HUECK: Reece, why don't you go ahead.
 20 Call your next witness we'll at least get your portion
 21 done and then think about a break before
 22 cross-examination.
 23 MR. ALMOND: Intervenors call Paul Schoenfelder.
 24
 25

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1 Paul Schoenfelder,
 2 called as a witness, being first duly sworn in the above
 3 cause, testified under oath as follows:
 4 DIRECT EXAMINATION
 5 BY MR. ALMOND:
 6 Q. Why don't you introduce yourself to the Commission?
 7 A. My name is Paul Schoenfelder. I live at 40228 296th
 8 Street, Wagner, South Dakota.
 9 Q. And do you own land in or around the project
 10 footprint?
 11 A. I do.
 12 Q. How long -- sorry.
 13 A. Sorry. Own a farm together with my wife. I in 2000
 14 received a deed to a portion of what's my wife's family
 15 farm.
 16 Q. How many acres do you own?
 17 A. 160.
 18 Q. And how long did you say you've lived there?
 19 A. My wife grew up on the family farm. We moved to
 20 Boise, Idaho and then in -- let's see 2017 my wife
 21 returned to the area, to the farm, and then I moved to
 22 the area in January of 2018.
 23 Q. And what do you do for a living?
 24 A. Right now I'm working on building two businesses in
 25 the area. We -- I lived out in Idaho for 24 years. I

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1 worked as a recreation manager for the city of boys I
 2 parks and recreation department. Wife and I worked on a
 3 business model, plan tried to figure out a way to
 4 basically get back to South Dakota get back to the farm.
 5 So right now since January I moved back. I'm in the
 6 process of building a business on the farm site.
 7 Q. And what about your wife? What does she do?
 8 A. She's a training manager for a company called D T S.
 9 She works remotely the company she works for is based out
 10 of Orlando Florida she works out of our home remotely.
 11 Q. Do you have any children?
 12 A. We do. We have four adult children. Our adult
 13 child, Zachary, our third child, moved back to
 14 South Dakota in June.
 15 Q. Where does he live?
 16 A. He lives on the farm with us. He purchased a camper
 17 and moved on to the farm site. We're in the process of
 18 renovating the farmhouse, and so for the last few months
 19 we've been living in the camper since we don't have a
 20 flush toilet. So until I get my rough-in permit, my
 21 rough-in inspection and get my shower back in place,
 22 we're living in the camper on the farmsite.
 23 Q. The other three children live outside of
 24 South Dakota?
 25 A. Yes. All three live in Idaho.

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1 Q. And do you have any concerns with this project?
 2 A. I have numerous concerns with the project.
 3 Q. I should first clarify are you an Intervener in this
 4 proceeding?
 5 A. Yes. I am an Intervenor in this case. Several
 6 concerns. My primary concern is my health, the health of
 7 my family.
 8 We have several wind turbines proposed within a mile
 9 of our home. I know several people that live near the
 10 Beethoven wind project have had very credible health
 11 concerns associated with that. I've visited the
 12 Beethoven area. Again it's only a few miles from my
 13 home. Sound, shadow flicker, vibration. Those are
 14 things that are definitely concern for me. Long-term
 15 we're planning to live in this house I have to assume for
 16 the rest of our lives. It faces towards the east. To
 17 the southeast we've got multiple wind turbines. So
 18 health issues are huge.
 19 You know, from an aesthetics standpoint, this is
 20 where where he want to live. This is where we've spent
 21 the last 10 years trying to figure out how to get back
 22 to.
 23 I wake up every morning and look to the east and
 24 based on the maps vision where the wind turbines are
 25 proposed, I know that physically it would be a different

1 environment. So along with my own health concerns, I
 2 guess I'm afraid for the health of my neighbors. I fear
 3 for their physical and psychological well-being, having
 4 multiple large wind turbines in the neighborhood.
 5 Q. And what county do you live in?
 6 A. Charles Mix County.
 7 Q. And did you participate in the I guess attempted
 8 zoning process and all the County Commission meetings
 9 that we talked about with Mr. Mushitz?
 10 A. Yes. Pretty much throughout the process. I started
 11 attending some meetings in April. Shortly thereafter the
 12 idea of zoning was brought up and again attended multiple
 13 meetings in which zoning was discussed by the county.
 14 Q. And from start to finish just give the Commission
 15 kind of your impression of the process that took place.
 16 A. Well, the first meeting I attended was in April. I
 17 believe it was April 19. It was a County Commission
 18 meeting attended by Mr. Powers who discussed his health
 19 concerns.
 20 MS. AGRIMONTI: Objection. I'm going to ask
 21 that the witness please not recite what others may have
 22 said at a meeting. He was asked about his impression,
 23 not what people said.
 24 THE WITNESS: I apologize.
 25 MS. AGRIMONTI: That's okay. I'm sorry for

1 interrupting. I want to make sure I have an opportunity
 2 to interject an objection during a narration.
 3 A. I attended meetings in April. My primary take away
 4 from that meeting was that the County Commissioners did
 5 not have a great deal of information about the proposed
 6 project. My impression was that they were surprised at
 7 what the setbacks potentially were in neighboring Bon
 8 Homme County. It was expressed by County Commissioners
 9 that they -- they were surprised that setbacks would be
 10 that close to occupied residences.
 11 I expressed my concerns that there was a lack of
 12 information about the project available. There was a lot
 13 of unknowns. I didn't know exactly what the plans were.
 14 I've been trying to follow the project earlier, you know,
 15 through 2016, through 2017, but still didn't have a great
 16 deal of information. I attended several meetings, at
 17 least two or three meetings during the month of May in
 18 which the topic was brought up to the County
 19 Commissioners. Several members of the community attended
 20 those meetings. Again, I was struck by the general lack
 21 of knowledge of wind, large wind facility regulations,
 22 practices. We discussed setbacks with the County
 23 Commission. It was expressed several times that two mile
 24 setbacks may be appropriate. County Commissioners
 25 expressed that --

1 Q. And let's not talk about what any County
 2 Commissioners said.
 3 MS. AGRIMONTI: Yeah. I'm going to move to
 4 strike the testimony of the witness. He has provided, I
 5 believe, speculation about what the County Commissioners
 6 knew or did not know in his recounting of what was said
 7 or not said at a variety of meetings.
 8 MR. DE HUECK: So it's pretty blended in there
 9 with what he took away from the meetings. I'm going to
 10 allow him to continue I'm not going to strike any
 11 testimony up to this point but we need to just focus on
 12 what you observed, how you felt, and not speculate as to
 13 what they said or how they felt or --
 14 THE WITNESS: Yes.
 15 Q. So summarizing you said you attended meetings in the
 16 months of April and May. Did you get a sense or a
 17 feeling of whether or not the County Commissioners were
 18 attentive to the concerns of the residents?
 19 A. I got the impression they were very very attentive
 20 to the input that they were sleeving from the public.
 21 Q. Okay. So then after May did you continue to attend
 22 meetings?
 23 A. I did. I attended.
 24 Q. Tell us about those.
 25 A. I attended the meeting in June. That was the

1 meeting that was attended by a representative from
 2 District III economic development, Mr. McGinnis. He
 3 talked about -- I got to be careful. I honestly want to
 4 be very careful.
 5 MR. DE HUECK: Well, here's the easy way to do
 6 it. You're doing a lot of what's called narrative, and
 7 you just start -- which is great and appreciate it, but
 8 your attorney can ask a lot more questions and kind of
 9 help guide what comes out of your mouth.
 10 So I'm going to allow Reece to ask more
 11 questions and for you to give shorter answers. You can
 12 talk just as much. It's just he's going to be there to
 13 help you guide it along so we're going to break up your
 14 long narratives into smaller sections through your
 15 attorney.
 16 THE WITNESS: Thank you.
 17 Q. So this June meeting in which a District III
 18 representative was there, at that meeting did you have a
 19 sensor an impression of how the Commissioners were
 20 responding to the concerns of the citizens?
 21 A. I believe they put a lot of weight on what
 22 Mr. McGinnis brought forward. My take away was that if
 23 the county was going to set about regulations greater
 24 than those that existed in Bon Homme County, that they
 25 would subject the county to litigation, that there was a

1 rationale that was used to develop the Bon Homme County
 2 regulations regarding large wind turbines and that if the
 3 county were going to do anything more restrictive than
 4 that they would have to provide peer reviewed research or
 5 they would subject the county to litigation.
 6 Q. And did you continue to attend county meetings as
 7 the process continued on?
 8 A. I did. I attended another meeting later in June.
 9 Q. And what was the purpose of that meeting about?
 10 A. That meeting was to take more public input. There
 11 were several members of the community that came in and
 12 expressed larger setbacks, one mile setbacks and two mile
 13 setbacks were what they would like to see, what they
 14 would expect, that they felt would be necessary to
 15 protect them.
 16 Q. And did you have a sensor impression of how that
 17 information was -- or how the Commissioners responded to
 18 those requests?
 19 A. Continued to be very well received. Expresses
 20 that -- at the public -- we felt as members of the public
 21 other public people that I heard there that those things
 22 were being heard and that the idea of larger setbacks,
 23 one mile setbacks for residences was certainly --
 24 certainly under consideration.
 25 Q. And did there come a point in time where you felt

1 that the County Commissioners were no longer as receptive
 2 to the requests of their citizens?
 3 A. I attended a meeting in July which was also attended
 4 by Mr. McGinnis, members of -- I guess I refer to them as
 5 Prevailing Winds project, Thorstad, their legal counsel,
 6 also several people who were investors and/or had
 7 easements for the project.
 8 At that time the tenor of the Commission seemed to
 9 change.
 10 Q. How so?
 11 A. When the topic of one mile setbacks was brought up
 12 the Commission seemed to be stepping away from that.
 13 Mr. McGinnis brought a map that he had put together. I
 14 assumed it was Mr. McGinnis put together that showed the
 15 southern part of Charles Mix County overlaid with
 16 residences with multiple rings representing setbacks.
 17 Overlaid with that were proposed turbine locations and
 18 that was reviewed.
 19 Several times -- you know, it was -- it was -- it
 20 felt difficult to express something, you know, other than
 21 what would now have been significantly reduced setbacks.
 22 I requested at that meeting that a map show -- a map
 23 of nonparticipating residents. Because as it was looked
 24 at, people observed that most of the county if you
 25 overlaid one mile or two mile setbacks that occupied most

1 of that southern part of the county. I requested a map
 2 that would also represent nonparticipating or withdraw
 3 nonparticipating households. Mr. McGinnis, I believe --
 4 Q. Did you receive a copy of the map that you
 5 requested?
 6 A. I did not receive a copy of that map. I also did
 7 not see a copy of the map that included nonparticipating
 8 residences.
 9 Q. Okay. After that meeting, did you attend any
 10 additional meeting?
 11 A. I did. At that meeting in July it was suggested
 12 that -- it was suggested that an agreement --
 13 Q. You said the July meeting this is the one you were
 14 just talking about?
 15 A. Just talking about, the July meeting. It was
 16 suggested that Prevailing Winds Staff visit with --
 17 Q. Let's hold on -- off on that testimony, okay?
 18 A. Sure.
 19 Q. So when you left this meeting in July what was your
 20 kind of take away from it?
 21 A. My take away was that -- my take away was that the
 22 Prevailing Winds Staff was having more influence on the
 23 County Commission than the residents of the county.
 24 Q. Okay. And then did you continue to attend County
 25 Commission meetings there after?

1 A. I did.
 2 Q. And did your impression or your sense change at any
 3 point as you attended those additional meetings that the
 4 County Commission was providing -- was receiving the
 5 Prevailing Winds' input more favorably than that of its
 6 residents?
 7 A. Yes. That was my impression. It built from that
 8 July meeting and continued in future meetings that I had
 9 attended.
 10 Q. When was the last Commission meeting that you
 11 attended with respect to this project?
 12 A. I attended an August meeting of the Commission,
 13 which zoning was discussed. And then I also attended a
 14 September -- early September meeting that was actually
 15 with township representatives and the County Commission
 16 to discuss zoning.
 17 Q. What was that September meeting about?
 18 A. That was about zoning in general. There was a draft
 19 zoning ordinance being brought forward and there were --
 20 there were, I don't know, approximately -- there were
 21 several people -- 40 people from the community, several
 22 of them representing the townships discussing all aspects
 23 of zoning.
 24 Q. And was the discussion of wind energy zoning -- or
 25 was wind energy zoning considered during that meeting?

1 A. In that September meeting wind energy zoning was by
 2 and large dismissed because at that point what was
 3 referred to as an agreement had been signed and the
 4 county would not entertain any zoning changes or
 5 emergency zoning with regards to large wind facilities.
 6 Q. And you referenced the agreement. Have you come to
 7 learn that was the Peter Pawlowski Affidavit that we've
 8 been discussing in this hearing?
 9 A. Yes.
 10 Q. Okay. You've attended this entire hearing process;
 11 is that right?
 12 A. Yes.
 13 Q. Earlier a question was asked about the level of
 14 social disruption that has occurred in the area. What is
 15 your sense on the social disruption that has occurred and
 16 that will -- whether you think it will likely continue
 17 on?
 18 MS. AGRIMONTI: Objection. Vague.
 19 MR. DE HUECK: You may go ahead and answer that.
 20 A. I've been -- I've been aware of this project since
 21 2016, and I've seen that it's generated quite a bit of
 22 anxiety. I attended the public meeting in Avon in July
 23 of 2018, and I think if you attended that meeting what
 24 you saw at that meeting is really indicative of what I've
 25 seen in the community, if not even more so. I've seen a

1 great deal of anxiety.
 2 My -- my sister-in-law owns property adjacent to
 3 ours. Her intention -- she's developing that property
 4 with the intention to move to that property. When she
 5 learned that there may be turbines --
 6 MS. AGRIMONTI: Objection. He's testifying to
 7 what other people think or believe.
 8 MR. DE HUECK: Yes. So don't continue down the
 9 road of that. Just your own personal.
 10 A. I've seen people who I fear would -- who have been
 11 so emotionally bothered that I fear for their health.
 12 The idea that wind turbines are going to be placed in the
 13 area. I've seen high levels of anxiety. I've felt
 14 personally a lack of information, a lack of accurate
 15 information. I can't -- I guess I could speak for others
 16 because I've talked to quite a few people, but my
 17 feelings have been echoed by others. They feel that it's
 18 esthetically disturbing.
 19 Q. Have you observed any strains on friendships or
 20 relationships in the community?
 21 A. Absolutely. I've seen neighbors who don't look each
 22 other in the eye. I see conflicts. I see people brought
 23 to tiers. I see people who feel ashamed because they --
 24 because of the position they've taken for or against it.
 25 MS. AGRIMONTI: I'm going to object to that

1 testimony as well. He's speculating as to how people
 2 feel.
 3 MR. DE HUECK: I agree. However, I'm not going
 4 to strike that testimony. I don't think it's
 5 incredibly -- just, Reiss, continue to ask some
 6 questions.
 7 MR. ALMOND: I don't have any other questions
 8 for Mr. Schoenfelder thank you for testifying.
 9 THE WITNESS: Thank you.
 10 MR. DE HUECK: As you've seen we're now going to
 11 turn you over for cross-examination. We'll start over
 12 here with the Applicant.
 13 MS. AGRIMONTI: Thank you.
 14 CROSS-EXAMINATION
 15 BY MS. AGRIMONTI:
 16 Q. Mr. Schoenfelder, just a couple of questions.
 17 You've reviewed the proposed layout for the project in
 18 this proceeding; is that right?
 19 A. I have. I've seen the map change a couple times,
 20 but I'm pretty familiar with it.
 21 Q. And do you know how close the nearest turbine is to
 22 your home?
 23 A. I would say approximately three-quarters of a mile.
 24 Q. And you stated that you were actively involved in
 25 Charles Mix County with respect to whether a zoning

1 ordinance ought to be put in place; is that right?
 2 A. Yes.
 3 Q. And you would agree that all interested persons who
 4 have a stake in whether zoning would be appropriate or
 5 not have a right to speak and influence the political
 6 process?
 7 A. Yes.
 8 Q. And in fact that's what happened in Charles Mix
 9 County?
 10 A. Could you restate that question?
 11 Q. Yeah. You would agree that both -- or all sides,
 12 there were townships that weighed in on whether zoning
 13 was appropriate. There were people like yourself who had
 14 opinions about setbacks. There were participants who
 15 believed there should be certain rules in place for their
 16 development of their property and there was Prevailing
 17 Wind Park and all of those entities weighed in to this
 18 Charles Mix process. Would you agree?
 19 A. Yes.
 20 MS. AGRIMONTI: I have no further questions.
 21 MR. DE HUECK: Mr. Fuerniss, do you have any
 22 questions for Mr. Schoenfelder?
 23 CROSS-EXAMINATION
 24 BY MR. FUERNISS:
 25 Q. Mr. Schoenfelder, you mentioned the potential impact

1 of a wind farm on your home, your homestead and your
2 business do you feel it would also potentially impact --
3 you said that your -- that was your wife's home she grew
4 up there. Would there possibly be an impact on the
5 cemetery that her family's buried in?

6 A. I believe so. Absolutely.

7 MR. FUERNISS: Thank you.

8 MR. DE HUECK: Ms. Jenkins, do you have any
9 questions.

10 MS. JENKINS: I have one.

11 CROSS-EXAMINATION

12 BY MS. JENKINS:

13 Q. Do you think that we -- that the process to get this
14 Application approved or denied, has it gone according to
15 how you would expect for people like us Intervenors?

16 MS. AGRIMONTI: I'm going to object. I don't
17 believe that the witness would have any expectation or
18 basis on which to make a prediction about how this
19 process ought to go.

20 MS. JENKINS: Maybe I have to restate that.

21 MR. DE HUECK: You do. I think you're trying to
22 ask him his level of satisfaction with the process that
23 he's gone through? Or something along those lines?

24 Q. Do you understand?

25 A. I believe I understand the question.

1 Q. Okay.

2 A. I have been disappointed in the amount of -- or the
3 lack of information available about the project. I have
4 been dissatisfied with the -- with the type of
5 information that I've been able to access. I've never
6 been contacted by Prevailing Winds even though I live in
7 the impacted area. My wife's never been, you know,
8 contacted.

9 I've attempted to contact Prevailing Winds. See
10 very little response. I hear -- I am surprised and
11 disappointed at the length of time between when the
12 Application is submitted through this process and when it
13 will be approved.

14 My personal opinion is that the County Commission
15 doesn't have the -- didn't have the time, didn't have the
16 tools in order to adequately and in depth look at this
17 project.

18 I fear that it moved very quickly for the people in
19 the area and it moved very quickly for our county
20 officials.

21 Q. Thank you. And can you describe how you feel about
22 it since the Application came in and the process for the
23 Intervenors to prepare for the case and the burden? Do
24 you feel like there's a burden?

25 A. Well, if you look at the mounds of paper, there's a

1 lot of information. And it's a very complicated process.

2 I think for individuals to try and navigate that process,
3 it's very difficult and I think there's a lot of people
4 that would be shut out of the process simply due to the
5 lack of understanding of how the process works.

6 Q. And do you feel that the necessary permits from the
7 different entities that are required --

8 A. Again, having a lack of understanding of how the
9 process works, I was somewhat surprised that certain
10 things -- the WAPA study being primary among them. I
11 submitted a letter to WAPA in 2016. It was by
12 happenstance I saw the announcement in the Wagner post
13 that that deadline for information to be submitted to
14 WAPA was drawn to a close.

15 It seems like it's very important, impactful
16 project, and a lot of people, myself included, my family,
17 not aware of what the process was and still look at it to
18 a certain extent shaking our head wondering how is this
19 happening so quickly.

20 Q. Okay. And then one final question, I think.

21 Do you feel like the resources that we as
22 Intervenors have are comparable to the resources that --
23 of the Applicant's?

24 A. Absolutely not.

25 Q. Okay. And the question B to that is do you feel

1 that if the necessary permits that they needed to
2 finalize this project -- do you feel like they probably
3 should have been obtained before they filed an
4 Application with the PUC and caused us to have to spend
5 money to protect our interests?

6 MS. AGRIMONTI: Objection. Relevancy.

7 MR. DE HUECK: You can go ahead and answer that.
8 If you understood the question.

9 A. I think that there are still unknown factors in the
10 Application that there's still holes in the Application.
11 And I don't know how -- how those could be addressed. I
12 still don't understand how they could be addressed or
13 redressed through the process leading up to either
14 approval or denial of the Application.

15 Q. Okay. And do you have any other concerns?

16 A. Well, again, I have personal concerns. I'm trying
17 to start a business in the area. And a business is based
18 on -- on sort of the uniqueness of the area. I'm trying
19 to -- I'm working on opening a brewery. We'd love people
20 to come out and enjoy the area and understand that you
21 have products that are -- that are produced in this area,
22 that this is where it comes from. And when I -- I'm kind
23 of -- I'm a history buff so whenever I go up to the hill
24 I go up to Fort Randall anybody who's in the car gets to
25 hear me point out Lake Andes. Lake Andes from the hill.

1 Lewis & Clark documented Lake Andes because it's a
 2 natural lake.
 3 Well, then you turn and look farther to the east.
 4 What you don't see is the rolling plains that was there
 5 250 years ago. What's become the dominant feature is a
 6 band of large wind turbines. And then you envision that
 7 large band of wind turbines stretching for miles farther
 8 to the south across Highway 46.
 9 And then you look off towards Nebraska. I drive
 10 down to Elgin, Nebraska, and I'm -- I'm not stricken by
 11 the rolling hills. I'm struck by the large wind
 12 turbines, and that's not -- that's not where I grew up.
 13 I grew up in Mitchell. I didn't grow up in an industrial
 14 wind farm so that's some concern.
 15 MS. JENKINS: Thank you.
 16 MR. DE HUECK: Ms. Pazour.
 17 MS. PAZOUR: No comment.
 18 MR. DE HUECK: Staff.
 19 MS. REISS: No thank you.
 20 MR. DE HUECK: And that brings us to Commission
 21 questions starting with Commissioner Hanson.
 22 COMMISSIONER HANSON: Good evening,
 23 Mr. Schoenfelder. It's understandable that there will be
 24 mixed feelings about a large industrial project of this
 25 nature within an area for a number of different reasons.

1 And that there will be some significant feelings
 2 expressed by the inhabitants that are affected by it.
 3 We've read a number of things and certainly
 4 we've witnessed some emotional presentations to us when
 5 we were there for the public meeting.
 6 Can you tell us just I'm curious -- and it's not
 7 necessarily going to weigh a tremendous amount on the
 8 decision but I'd like to know, have you witnessed --
 9 let's look at degrees, for instance. Have you personally
 10 witnessed altercations from the standpoint of shouting
 11 matches between people?
 12 THE WITNESS: I've witnessed I would say strong
 13 words. I don't know if I would describe them as shouting
 14 matches.
 15 COMMISSIONER HANSON: Have you witnessed any
 16 physical altercations?
 17 THE WITNESS: I have not.
 18 COMMISSIONER HANSON: Okay. I'm just curious to
 19 the fabric of the town and relationships. Have you seen
 20 people that are no longer willing to do business at
 21 particular areas or people who have estranged
 22 relationships of that nature?
 23 THE WITNESS: Yes. Yes, I have.
 24 COMMISSIONER HANSON: Okay. Thank you.
 25 Well, to what degree have you seen that? Is it

1 just one or two or --
 2 THE WITNESS: Again I guess trying to avoid
 3 hearsay.
 4 COMMISSIONER HANSON: Sure. That's a little
 5 difficult. I understand.
 6 THE WITNESS: People say I -- I don't want to --
 7 I don't want to do business with that person. I don't
 8 want to tell them how I feel because I fear that I'll
 9 estrange them and they won't do business with me.
 10 COMMISSIONER HANSON: Is this, I'm assuming --
 11 when you socialize and to whatever extent, church and
 12 sports events in the high school, things of that nature,
 13 is this a number one topic of discussion or is Trump's
 14 latest tweet the --
 15 THE WITNESS: What to me is almost more
 16 disturbing is that there is a lack of information that
 17 people don't know that more than anything else I hear is
 18 that still happening? Or I don't want to talk about it
 19 because it's already done. It's already -- a done deal
 20 is the word you hear so often. It's a done deal. As if
 21 this -- all these proceedings are completely irrelevant.
 22 That people when asked if they would attend that meeting
 23 in Avon in July said there's no point it's already
 24 approved and I don't want to rock the boat. That's --
 25 that's been repeated several times.

1 COMMISSIONER HANSON: All right. Thank you.
 2 COMMISSIONER NELSON: Thank you for being here.
 3 Just to make sure I've got you placed properly
 4 on the map, I'm seeing a parcel owned by the Vernon sip
 5 life estate. Is that where you're at.
 6 THE WITNESS: That is correct.
 7 COMMISSIONER NELSON: Perfect. You referred in
 8 your testimony to the mountains of paper that were
 9 involved in this process.
 10 THE WITNESS: Uh-huh.
 11 COMMISSIONER NELSON: But you ended by saying
 12 that there are holes in the Application.
 13 THE WITNESS: Uh-huh.
 14 COMMISSIONER NELSON: And do you believe that
 15 those holes have not been filled by the mountains of
 16 paper that have been involved here?
 17 THE WITNESS: A couple things I guess that come
 18 to my mind immediately. The one is WAPA environmental
 19 study. It was my understanding that that was a precursor
 20 for approval for this project. Again, submitted letters
 21 to that process. Still waiting to hear what that says.
 22 Environmental cultural asset survey. Even in
 23 the Application I read that that's being worked on. Then
 24 again then the accelerated process of the zoning in my
 25 own county led to believe that zoning would move forward,

1 that there would be opportunities for public input when
 2 there is to the best of my knowledge that agreement and
 3 Affidavit that was produced between Prevailing Winds and
 4 the county didn't receive public input. So again still
 5 feeling like there's a lack of information out there and
 6 misinformation but definitely still things lacking and
 7 not understanding how the process works.
 8 COMMISSIONER NELSON: Do you understand that
 9 those first two items that you mentioned will in fact
 10 need to be completed before any permit would ever be
 11 valid from this Commission.
 12 THE WITNESS: I do absolutely.
 13 COMMISSIONER NELSON: And that that information
 14 at least that which is not confidential information will
 15 ultimately be public.
 16 THE WITNESS: Yes.
 17 COMMISSIONER NELSON: The last question, I want
 18 to follow up on Commissioner Hanson's question about
 19 relationships.
 20 Have any of your relationships been damaged
 21 through this process?
 22 THE WITNESS: Yes.
 23 COMMISSIONER NELSON: Are there people that you
 24 don't talk to because of this?
 25 THE WITNESS: There are people I feel less

1 comfortable talking to. There are relationships that
 2 have been strained personally for me. Neighbors. Yes.
 3 COMMISSIONER NELSON: And do you feel ill will
 4 towards those who support the project?
 5 THE WITNESS: I am -- I made a commitment early
 6 in this process that I would want to be treated the way
 7 other people want to be treated. I hope that other
 8 people feel the same way. These are my neighbors. A lot
 9 of those neighbors are taking the stands for a lot of
 10 different reasons. They're not evil people. I just --
 11 I -- I refuse to -- I refuse to hate anyone through this
 12 process.
 13 COMMISSIONER NELSON: Thank you. And I
 14 appreciate your sharing that. And that was a tough
 15 question for me to ask, and I appreciate your answer.
 16 Thank you.
 17 THE WITNESS: Thank you.
 18 MR. DE HUECK: Chair Fiegen.
 19 CHAIRWOMAN FIEGEN: Thank you for being here.
 20 Thank you for being part of the process. When I was a
 21 legislator and then I came to the PUC the process here is
 22 completely different than the legislative process, and it
 23 is difficult to maneuver but we're quasi-judicial and
 24 yeah. So it's completely different. And so thank you.
 25 THE WITNESS: No problem. It's my pleasure.

1 CHAIRWOMAN FIEGEN: Two quick questions. The
 2 closest wind tower number to your property is -- do you
 3 know what number it is or could Reece --
 4 THE WITNESS: I could look at the map in a
 5 heartbeat.
 6 Between 23 and 58. I couldn't tell you exactly
 7 which one's closer. They're both approximately
 8 three-quarters of a mile from my home.
 9 CHAIRWOMAN FIEGEN: Okay. How many acres there
 10 does your family own?
 11 THE WITNESS: In total 320.
 12 CHAIRWOMAN FIEGEN: 320. And then you talked
 13 about looking at building a business and --
 14 THE WITNESS: Uh-huh.
 15 CHAIRWOMAN FIEGEN: It's always neat when people
 16 come back -- come back to South Dakota and raise their
 17 families and retire here, whatever. We love that.
 18 THE WITNESS: Uh-huh.
 19 CHAIRWOMAN FIEGEN: Tell me a little bit about
 20 the business that you're looking at developing and will
 21 people come to your facility? Will they be outside?
 22 Will they be in your home? Are you building a shed?
 23 Help me understand the dynamics of that business and like
 24 how many acres. Where will it be? Right next to your
 25 home?

1 THE WITNESS: And I apologize. You're going to
 2 get me started.
 3 The first thing is the family farm. So we're
 4 working on the family farmhouse. We sharecrop that land.
 5 So we're involved in the process. We received revenue
 6 from that farm. We would never want to do anything that
 7 would significantly diminish that. Farms are important
 8 both economically and culturally. So we want to make
 9 sure that that family farm can continue working with a
 10 couple of families who do the real work and they've done
 11 it for 10, 15, 20 years plus and we want to maintain that
 12 relationship.
 13 We also want to build a farm based business.
 14 Basically producing products on the farm, woodworking
 15 products, hand crafted products, and then distribute it
 16 from the farm.
 17 And then the primary business that we're working
 18 on is a brewery. From the legislative side I would say
 19 the legislature did a good job this spring because they
 20 changed some of the brewery laws so now we're able to do
 21 what's called self distribution. In the past you -- if
 22 you didn't sell beer on the sight you had to work through
 23 a distributor, approximately 35 percent of what you --
 24 the cost of production goes to that distributor. So
 25 being able to self distribute is huge up to 1,500

1 barrels. So we started the process we have a building
 2 permit we're clearing the ground for a brewery building.
 3 It will be a pole barn.
 4 We know that the margins -- you make a lot more
 5 money if you can sell it on site so we are hoping to get
 6 people on site to come out and buy our beer.
 7 We also know that brand loyalty is huge in the
 8 small brewery market so we want to create an environment
 9 where people can come out, sit on the porch patio that
 10 would be incorporated into this building. We are trying
 11 to situate the patio of that building so it's got a
 12 prairie view, emphasizing the farmhouse origin and nature
 13 of our products is a big part of that marketing strategy.
 14 And knowing that also then we can self distribute that
 15 and push that out of the area, that we can push the
 16 lion's share of our products out. But if we get people
 17 to identify with us, they'll become loyal to our brand.
 18 CHAIRWOMAN FIEGEN: Thank you. I certainly
 19 appreciate understanding how you're using the land that
 20 you came back to. Thank you.
 21 MR. DE HUECK: Mr. Schoenfelder, in following up
 22 with both Commissioner Hanson and Commissioner Nelson
 23 regarding the social climate of your community, you
 24 talked a lot about strained relationships, high anxiety
 25 among community members, annoyance between the two sides.

1 Have you ever felt a threat to your personal
 2 safety?
 3 THE WITNESS: Up to this point -- concerns but
 4 not a threat. I mean, that's kind of a subtlety but it's
 5 something I've thought about but it's not --
 6 MR. DE HUECK: It's not there on the streets.
 7 THE WITNESS: Personally threatened.
 8 MR. DE HUECK: Like a riot isn't looming.
 9 THE WITNESS: Yeah.
 10 MR. DE HUECK: You can still gather under one
 11 roof, yes. Feel that hostility and whatnot.
 12 THE WITNESS: Yeah. There's a high level of
 13 sensitivity, anxiety.
 14 MR. DE HUECK: The community's been able to keep
 15 civility amongst each other because you're good people.
 16 THE WITNESS: Yes. For the most part -- I mean,
 17 I've been to these County Commission meetings where, I
 18 mean, some of the Intervenors are personally attacked and
 19 insulted. Not physically attacked.
 20 MR. DE HUECK: Yeah.
 21 THE WITNESS: But demeaned. That's -- yeah.
 22 That's disturbing.
 23 MR. DE HUECK: Yep. Thank you.
 24 With that, we'll go back to your attorney for
 25 redirect.

1 MR. ALMOND: None.
 2 MR. DE HUECK: And we had Commissioner questions
 3 so Prevailing Winds, do you have any cross based on those
 4 questions?
 5 MS. AGRIMONTI: No. Thank you,
 6 Mr. Schoenfelder.
 7 MR. DE HUECK: Mr. Fuerniss, no. Ms. Jenkins.
 8 MS. JENKINS: Of course I have one.
 9 CROSS-EXAMINATION
 10 BY MS. JENKINS:
 11 Q. Did you give the business plan to the county or have
 12 you presented that to them?
 13 A. We went to the County Commission I want to say in
 14 2014, presented a model of what we had in mind and they
 15 said that from their perspective -- my understanding
 16 their perspective was that we would be able to move
 17 forward with our plan.
 18 MS. JENKINS: Okay. Thank you, Paul.
 19 THE WITNESS: Thank you.
 20 MR. DE HUECK: Ms. Pazour.
 21 MS. PAZOUR: None.
 22 MR. DE HUECK: Staff.
 23 MS. EDWARDS: No.
 24 MR. DE HUECK: Go ahead.
 25 MR. ALMOND: Do you intend to brew brown ale?

1 A. I will say my wife's family's Belgian. We'll brew a
 2 lot of Belgian styles.
 3 MR. DE HUECK: We'll take a short break, come
 4 back at 6:25. That's about a 10-minute break.
 5 (The witness is excused.)
 6 (A short recess is taken.)
 7 MR. DE HUECK: The hearing has resumed.
 8 Mr. Almond, you may call your next witness.
 9 MR. ALMOND: Call Gregg Hubner.
 10 Gregg Hubner,
 11 called as a witness, being first duly sworn in the above
 12 cause, testified under oath as follows:
 13 DIRECT EXAMINATION
 14 BY MR. ALMOND:
 15 Q. Gregg, why don't you introduce yourself for the
 16 Commissioners.
 17 A. Gregg Hubner, spelled H-U-B-N-E-R. My address is
 18 29976 406th Avenue, Avon, South Dakota.
 19 Q. How long have you lived at that address?
 20 A. Since 2012.
 21 Q. And what do you do for a living?
 22 A. I'm a licensed real estate broker and a certified
 23 general appraiser and I farmed up until last year. I
 24 have rented my land out now.
 25 Q. Do you own any land in or around the footprint of

1 the project?
 2 A. Yes.
 3 Q. Using the map behind you over your shoulder can you
 4 point out to the Commissioners where your residence is?
 5 A. Right here this long yellow line it's right at the
 6 bottom (indicating). I see it's under my wife's name,
 7 Marsha.
 8 Q. And in addition to your residence, do you own other
 9 land in the project footprint area?
 10 A. Yes.
 11 Q. And using Exhibit I 29 back there, can you see the
 12 Hubner name on various parcels of land?
 13 A. Yes. From the house I own 240 acres where the house
 14 are -- is, excuse me, and my brother owns the next four
 15 quarters north and then I own some land to the west of it
 16 and then some more to the east of it. And then my
 17 brother and I own a couple quarters up north but I think
 18 it's just out of the project. Because it's right near
 19 Beethoven so I think it's right up in that white there.
 20 Q. And how many total acres do you own -- do you and
 21 your brother own and if you can split up who owns what
 22 approximately?
 23 A. Well, I have -- yeah. I think I have about 1120
 24 acres and my brother has about 840 acres, I think.
 25 There's about 1,900. And we own that one piece together.

1 So roughly the two of us -- but we each own our own land
 2 but together we own about 1,985 acres.
 3 Q. Okay. And at some point were you asked to sign up
 4 to participate in the project?
 5 A. Yes. I was asked to sign up for the Prevailing
 6 Winds project in the spring of 2015.
 7 Q. And how were you asked to sign up?
 8 A. Well, I was called by Ron Hornstra and he wanted to
 9 make an appointment, which they did. And so him and
 10 Roland Jurgens came to our house. I think it was in -- I
 11 think it was in March of '15.
 12 Q. And if you'd take a look at Exhibit I-16 for me.
 13 A. Okay. Yes. I've got that.
 14 Q. And tell me what Exhibit I-16 is.
 15 A. Well, they brought this document with them the day
 16 they were at my house, and this was their shall you call
 17 it addendum or estimator projection of what my payment
 18 would be and how it would work out. And for some reason
 19 they put my brother's land and my land together because I
 20 think someplace on here it says 1,985 acres.
 21 But anyway -- yeah right here on the bottom, long
 22 table on top. It says 1,985 acres. And they did all the
 23 calculations over their 25 year projected time and they
 24 projected us to get 12 turbines. This was all based on
 25 12 turbines. And that's up in the top table. Yeah. So

1 12 times whatever they were going to pay per turbine for
 2 \$25 years would total about 2.886 million dollars and
 3 that was their projection or estimate.
 4 Q. So did you take it to mean that if you signed up,
 5 there was a possibility you were going to get 2.896
 6 million dollars?
 7 A. Well, there might have been a possibility but I
 8 thought it was a pretty slim possibility. Since my
 9 brother and I were actually small farmers. We're small
 10 landowners compared to nowadays. And 12 percent at that
 11 time when they were projecting 100 turbines was 12
 12 percent of the project. So that wasn't the reason I
 13 didn't sign but I mean it was pretty unlikely to me that
 14 we were going to get 12 turbines on this small piece of
 15 land.
 16 Q. Was it ever expressed to you why 12 was used?
 17 A. No.
 18 Q. Okay. I'm going to do some quick math but 1,985
 19 acres divided by 12 does that come out to about 165 acres
 20 per turbine?
 21 A. I think that's the math, yes.
 22 Q. Was this -- did you have any other interactions with
 23 Mr. Jurgens or Hornstra regarding this exhibit?
 24 A. No.
 25 Q. And this meeting took place at your house?

1 A. Yes.
 2 Q. In March of 2015?
 3 A. It was either February or March but it was in the
 4 early spring of '15.
 5 Q. And during that meeting did you sign up for the
 6 project?
 7 A. No.
 8 Q. So after that meeting did you then become engaged
 9 with the county process and follow this project, how it
 10 went through the county process?
 11 A. Yes.
 12 Q. And can you give a brief broad brush strokes summary
 13 of your involvement in the county process from the spring
 14 of 2015 to I guess today?
 15 A. Well, we got pretty involved in the county process
 16 after they came to our place. To be honest I had never
 17 been to a County Commissioners meeting in my life before
 18 this started. Probably a zoning meeting either so shame
 19 on me, we'll say.
 20 But give you just a little bit of history it won't
 21 take over 30, 40 seconds. When they built the Beethoven
 22 project we were also approached to sign up for that. And
 23 320 acres my brother and I own upright next to it was
 24 right next to it. So they wanted that and we decided not
 25 to do that.

1 But we had built this house in 2012, and before we
2 built the house we knew the Beethoven -- you know, they
3 had been around since 2009 actually. In 2010 I was first
4 approached by my name, not by Roland or Ronnie but by my
5 neighbor in 2010. And I said no, I'm not interested and
6 so before we built our house then in the fall of 2011 I
7 called the same neighbor and I said we're going to build
8 my house we're going to move from town we're going to
9 build this home where I want to retire just a mile grew
10 up. --

11 MS. AGRIMONTI: I'm going to object to the
12 extent the witness is stating what other people said.

13 MR. ALMOND: He hasn't done it yet but I think
14 he's about to get there so if you can avoid that, Gregg.

15 THE WITNESS: I was trying not to.

16 MR. DE HUECK: You were saying that your
17 neighbor said there was nothing going on so that's --

18 A. Okay. I got information to find out from a B&H
19 representative -- that won't work either.

20 Q. Did you have an understanding of whether or not
21 there was going to be --

22 A. I was assured, don't worry about wind turbines.
23 There's nothing happening.

24 MS. AGRIMONTI: Same objection.

25 MR. DE HUECK: Okay. We won't strike it. Let's

1 just move on.

2 Q. Let's go back to the original question. Walk us
3 through the county process and your involvement in the
4 process after that spring of 2015.

5 A. Okay. Okay. So we built the house. We moved into
6 the house. And Beethoven came along and we can see it
7 from our house it's about 9 miles away. And we thought
8 well that's okay. Well then in 2015 when they came
9 around with the second project the house was already
10 built. So we thought, well, you know, these things come
11 and they're, you know, very seldom don't they build them
12 so we thought the only thing we can do to protect
13 ourselves -- the second best thing we can do is get safe
14 long setbacks so that we can stay in our house.

15 And so we started attending zoning and Commissioners
16 meetings in the spring summer of 2015. I looked up in my
17 records. We attended -- my wife and I and several
18 neighbors and people that were interested -- eight
19 meetings in 2015 and at the fall of 2015 is when they did
20 the draft -- or excuse me. The Article 17. And so this
21 was kind of leading up to that and advocating for
22 setbacks through that Article 17 process. That's what
23 happened in 2015.

24 Q. And during the Article 17 process was a state
25 standard utilized during these meetings?

1 A. Yeah. It was -- at all of our meetings we were
2 talking a two mile setback. And I've, you know, written
3 some stuff in my prefiled stuff that would explain why we
4 thought we wanted two miles. And, you know, it's very
5 similar to what Paul testified to just a little while
6 ago. You know, the first meeting it sounded like they
7 were listening. But the second meeting not so much. And
8 by the third meeting it's like they didn't even hear what
9 we said. I mean we took them volumes and volumes of
10 stuff to read and I mean it just -- they were being
11 highly persuaded, highly influenced by in my opinion
12 Prevailing Winds, District III, and they had their mind
13 set up on this state standard, 1.1 times, 1,000 feet from
14 the house, and there was nothing you could say, nothing
15 you could do, nothing you could show them to make any
16 difference.

17 And going through the process, the hearing process
18 at the zoning and also the public hearing meeting for the
19 County Commissioners, the vast majority of people that
20 spoke against the Article 17 were people that were living
21 in the project, and the vast majority of people that
22 spoke for Article 17 were people that were adjacent -- or
23 not adjacent what's the word I'm looking for.
24 Landowners.

25 Q. Absentee?

1 A. Absentee. It's later today I would have been better
2 this morning. But anyway absentee landowners or people
3 that live in Sioux Falls, investors these type of people
4 were for it.

5 So in my opinion we never had much of a chance
6 because they always got what they wanted and there was
7 never talk of compromise. As a matter of fact they
8 painted it like -- at the public hearing at the
9 Commissioners they painted it. If you go through some of
10 the recorded stuff that I have sent in, two miles is way
11 too long we're against the two mile setback. Two miles
12 doesn't work anywhere and they never talked about a mile
13 or half-mile or anything but 1,000 feet or two miles.
14 And so we just got totally wiped out by the people that
15 persuaded them more than we did.

16 Q. And how many County Commissioners are there in
17 Bon Homme County? First I should say you live in
18 Bon Homme County; right?

19 A. Yeah. Bon Homme County. Western edge.

20 Q. How many County Commissioners are there?

21 A. We have five one -- one for every town.

22 Q. What town?

23 A. Avon, Springfield, Tabor, Tyndall, and Scotland
24 districts. We're in the Avon District, and that is the
25 only district that has any Beethoven towers and it's also

1 the only district that is going to have any Prevailing
 2 Winds towers is the Avon district.
 3 Q. Who's the Commissioner for the Avon district?
 4 A. Our Commissioner is Bruce Voigt.
 5 Q. And was Bruce Voigt participating in any of the
 6 processes?
 7 A. Well, Bruce Voigt is on the managers board of
 8 Prevailing Winds. And it's only been that way since the
 9 last election so I assume he took auction January 1 of
 10 '17.
 11 MS. AGRIMONTI: Objection. The witness is
 12 assuming.
 13 THE WITNESS: Okay.
 14 A. He got elected in the last general election.
 15 Q. Okay.
 16 A. Whenever he would have taken office that's how long
 17 he's been there.
 18 Q. And has he voted on any matters that related to this
 19 project?
 20 A. No. He -- he can't vote. And that's another
 21 problem I have with this process is that if you're for
 22 this project or against this project it doesn't make any
 23 difference. If you're in the Avon district where all the
 24 turbines are you have no representation.
 25 Q. We talked a little bit about the state standard.

1 Was your understanding of the use of the state
 2 standard -- or was it your understanding the state
 3 standard came from the PUC draft model ordinance?
 4 A. Yes. I've done extensive research on all of those
 5 things, and the draft model ordinances ordinance which
 6 was made in 2008 and implemented in 2009, and it was
 7 never law or -- you know, it was just more of a
 8 suggestion. And I think counties used that back when
 9 wind came in to our state back in 2008, 2009.
 10 Q. Did you observe the Bon Homme County Commission
 11 utilize those state standards?
 12 A. Yes.
 13 Q. I'll call them?
 14 A. Because as they were doing the process I would look
 15 through and read and compare and, yes, it was based on
 16 that ordinance.
 17 Q. Changing topics here, can you flip to Exhibit I 18
 18 for me, please.
 19 A. Okay. I have it.
 20 Q. And what is Exhibit I 18?
 21 A. This is a -- an sPower production front and back. I
 22 think it's actually two pages but it's an sPower
 23 production with a map on it where the blue lines
 24 represent the footprint of this new prevail winds park.
 25 Q. And the land that is colored orange or red, can you

1 tell me who owns that land?
 2 A. Well, I had a neighbor, went to one of the meetings
 3 in trip and brought this map back home and showed it to
 4 me. And I looked at it and it hit me, struck me kind of
 5 funny because it doesn't take me very long to figure out
 6 that all of this land at the bottom belongs to my
 7 brother, myself, and one piece to my neighbor Greg Wyly.
 8 And then all the land, the next little piece up to the
 9 left, is Indian land. And then we go up to Sherman
 10 Fuerniss's land on the very north part. And there was I
 11 think another piece of Indian land and there was maybe
 12 one we didn't identify.
 13 Basically this map was showing about three or four
 14 people I contend that it was to make it look like we're
 15 the only ones who didn't sign up. I don't know what else
 16 it would have meant.
 17 MS. AGRIMONTI: Objection. Speculation.
 18 MR. DE HUECK: I agree.
 19 MS. AGRIMONTI: So I'd move to strike.
 20 MR. DE HUECK: We can strike that very last
 21 part. But you can continue to take him down that line of
 22 questioning.
 23 A. I guess before the hearing's up I would like to see
 24 sPower tell me what this map is since my land is front
 25 and center.

1 Q. We might get a chance to do that?
 2 A. Okay.
 3 Q. But let's continue with your examination.
 4 Can you flip to Exhibit I 29 for me, please.
 5 A. Okay.
 6 Q. Do you see a data response 4-2?
 7 A. Yes.
 8 Q. The data request asks the Applicant to provide the
 9 names of the 35 landowners who will have a turbine on
 10 their property and in doing so identify the county in
 11 which the landowner owns the land in which the turbine
 12 will be placed and you see the answer is see Attachment
 13 4-2?
 14 A. Yes.
 15 Q. Turn over your right shoulder. What does it say on
 16 the top right corner?
 17 A. Of this?
 18 Q. Of that board.
 19 A. 4-2. Attachment 4-2.
 20 Q. And since receiving that have you had the
 21 opportunity to go through and count all the landowners
 22 that have turbines placed on their land?
 23 A. Yes. I did.
 24 Q. And have you created a table showing the different
 25 turbines and the landowners associated with each turbine?

1 A. Yes. As best I could. Yep.
 2 (Exhibit 38 is marked for identification.)
 3 Q. I'm handing you what's been marked as Exhibit I 38.
 4 Is this the table that you've prepared after reviewing
 5 Attachment 4-2?
 6 A. Yes.
 7 Q. And is this table showing the different turbine
 8 numbers and the landowners associated with each turbine
 9 number?
 10 A. Yes. There's a couple turbines that were like right
 11 on the border. Could possibly be mistaken here but it's
 12 as best I could do.
 13 Q. And if you flip to the second page, did you then add
 14 up the different number of turbines that each particular
 15 landowner would get?
 16 A. Yes.
 17 MR. ALMOND: At this time I'd like to move for
 18 the admission of Exhibit I 38.
 19 MS. AGRIMONTI: I will not object to the extent
 20 it is the witness's interpretation of what he believes is
 21 shown on the map.
 22 MS. REISS: No objection.
 23 MR. DE HUECK: So admitted for as Ms. Agrimonti
 24 stated.
 25 Q. And what was the purpose of performing this

1 analysis?
 2 A. Well, what's come up in our rural community in the
 3 last, say, month was the talk about all of the people
 4 that aren't getting turbines that thought they were. So
 5 that's why I wanted to know who was actually getting the
 6 turbines. And I think, according to what I heard from --
 7 MS. AGRIMONTI: Objection.
 8 MR. ALMOND: You can't talk about what you
 9 heard.
 10 THE WITNESS: At this hearing?
 11 MR. ALMOND: Oh, you want to talk about what
 12 someone said at this hearing?
 13 MS. AGRIMONTI: Let me just interpose an
 14 objection. To the extend he wants to use this exhibit to
 15 talk about people who thought they were going to get
 16 turbines but who aren't, hearsay, speculation. So if
 17 that's where he goes, that's my objection.
 18 Q. Go ahead.
 19 MR. DE HUECK: Try to help him down a road he
 20 can go.
 21 Q. What have you heard during this hearing?
 22 MS. AGRIMONTI: Objection.
 23 MR. DE HUECK: Yeah. We're going to be in the
 24 same boat. That would be hearsay.
 25 MR. ALMOND: It's not out of court.

1 No. We'll go elsewhere.
 2 Q. So I'll ask again what were you trying to illustrate
 3 with this analysis?
 4 A. I heard somewhere --
 5 Q. Well, hold on, Gregg.
 6 A. I'm sorry. I heard this week it's in the Docket
 7 it's somewhere.
 8 Q. Hold on, Gregg. No. No.
 9 A. Can I assume anything?
 10 Q. No.
 11 MR. DE HUECK: Reiss, you can pry a little bit
 12 on what he's heard while we've been in trial, if that's
 13 helpful.
 14 Q. While you've been attending this trial what have you
 15 heard?
 16 A. The number of turbines -- the number of leases that
 17 sPower Prevailing Winds has. I heard the number this
 18 week. Or it's probably on the Docket.
 19 Q. Well, you can actually refer to Exhibit I 29. You
 20 should be open to it. No. 4-3 gives you that
 21 information.
 22 A. I-29? 4-3?
 23 Yeah. That's what I'm trying to say if I just turn
 24 the page over. There's 136 full rights agreements.
 25 Those would be agreements where they could put turbines

1 on. And so in relationship to the 136 that coughed
 2 turbines, I was interested in how many actually got
 3 turbines and that's why I made this paper.
 4 So 136. And I think it was 29.
 5 MS. AGRIMONTI: I object to this line of
 6 questioning. I don't understand the relevance to the
 7 factors that are before the Commission in terms of who
 8 got turbines and who didn't.
 9 MR. ALMOND: We were done with the line of
 10 questioning so I'll end there.
 11 MR. DE HUECK: Okay.
 12 MR. ALMOND: I don't have any other questions
 13 for you, Gregg. You are an Intervenor so I don't want to
 14 not allow you to say anything that you want to.
 15 Is there anything you want to tell the
 16 Commission at this point, given this opportunity.
 17 A. Well, basically I wrapped in this because all the
 18 work that we did in the county we were there eight times
 19 in 2015, six times in 2017. In 2016 we didn't go at all
 20 because we felt after they did the Article 17 and did it
 21 with basically no consideration for the residents at all,
 22 we basically gave up. We did nothing in 2016. Never
 23 went to one meeting.
 24 And then they came along in August of 2016, had the
 25 PUC meeting, and then a week or 10 days later pulled

1 their permit, and it's also in the exhibits here where
 2 Mr. Pawlowski testifies that the reason they pulled it
 3 they didn't have their land signed up. And it's always
 4 bothered me that they would bring the PUC clear to Avon
 5 and put on this big show as if this was going to happen
 6 and they never had the land signed up. And I knew that
 7 was the fact but they never -- it took them two years to
 8 actually admit that.
 9 And so it's always been about second best which is
 10 protection of our home our neighbor's home, creation,
 11 safety, shadow flicker, red lights. It's always been
 12 we're trying to get some protection. We got no
 13 protection from the county.
 14 The county is not capable -- the county doesn't do
 15 enough work -- the county doesn't have enough time -- and
 16 this was probably evidenced here this morning -- to do
 17 the due diligence that they need, you know, to do
 18 setbacks and do shadow flicker and study sound and all
 19 this stuff we've been going through for, you know, three
 20 days already. They don't have -- I don't mean to be
 21 disparaging but they don't have a clue as to what all
 22 this is.
 23 And we would take them information after information
 24 after information, and we'd talk to them and we'd give
 25 them stuff and it made absolutely no difference. And

1 then not having a County Commissioner to represent us.
 2 We have just totally given up on our county because they
 3 have done everything that the wind energy system has
 4 wanted them to do.
 5 Every time we went to a meeting if we would get --
 6 if we would just show up and they wouldn't know it the
 7 next time you'd show up at a meeting they'd have a wall
 8 stacked with investors, attorneys, and Prevailing Winds
 9 people. And it was totally intimidating, totally. I
 10 could go on and on about each individual meeting. I
 11 won't have to. But that's the way it's always been.
 12 As soon as you opposed or brought in a witness -- we
 13 brought in Geronimo ohm powers one day we brought in
 14 Vickie may one day and at the very next meeting they
 15 showed up and basically refuted and tried to dismiss the
 16 whole thing. So we got no protection from our county.
 17 They're not capable and they've been highly influenced by
 18 the wind industry. And you can go to any county in the
 19 state and they're going to tell you the exact same thing.
 20 So that's why we're here, and we're trying to -- you
 21 know, everybody wants to paint us as aunt I wind aunt I
 22 wind aunt I wind that's not it. We're for safe and
 23 responsible wind energy if they want it. I mean I'd
 24 never put it on my land but my neighbor has the right to
 25 do with his land what he wants to a point. To a point.

1 Until he starts putting flicker on my land or into
 2 my bedroom window or making noise where I can't sleep.
 3 That point has been crossed.
 4 And I used the analogy -- I thought of this a few
 5 weeks ago. The to be owe industry it took 40 years of
 6 people dying from lung cancer before they finally did
 7 something. Now I can't legally light up a cigarette and
 8 start puffing smoke in this room. Why is that?
 9 If I lit a cigarette and then burned another one and
 10 another one, I'd have smoke in this room and it's illegal
 11 and everybody's going to go home and probably nobody's
 12 going to get lung cancer. Probably not. But why is that
 13 law in existence? Because we protect people. We protect
 14 them.
 15 And so when you talk about protecting people you
 16 need to protect all the people. Not the big corporations
 17 or the big money but the people. Because that's what
 18 we're supposed to do, and that's the way a lot of our
 19 laws are written.
 20 That's why I can't smoke a cigarette. I don't
 21 smoke, but that's why I can't light up a cigarette in
 22 here because we're to protect. And that's why we're at
 23 the PUC because we don't get protection, and we will
 24 never get protection at our county level.
 25 I don't think I have anything else to say.

1 MR. ALMOND: Thank you, Gregg.
 2 THE WITNESS: Yep.
 3 MR. DE HUECK: So it's 7 o'clock so what I'd
 4 like to do is break for the evening, come back refreshed,
 5 and be at our best tomorrow morning. If that works for
 6 my three Commissioners.
 7 CHAIRWOMAN FIEGEN: So can we start earlier
 8 tomorrow?
 9 MR. DE HUECK: 8:15.
 10 (Discussion off the record.)
 11 MR. DE HUECK: I guess we'll move into
 12 cross-examination. So if we were recessed we're back in
 13 session now.
 14 Go ahead, Prevailing Winds.
 15 MS. AGRIMONTI: Thank you, Mr. de Hueck.
 16 CROSS-EXAMINATION
 17 BY MS. AGRIMONTI:
 18 Q. Mr. Hubner, are you aware of the predicted shadow
 19 flicker and sound level predictions for your residence?
 20 A. I've read them, but I can't tell you right now what
 21 they are.
 22 Q. All right. Please turn to Exhibit A22-1. Page 2.
 23 A. I've got the wrong book here.
 24 Q. I'd like you to go to the response to 1-2 A. It's
 25 the paragraph that begins "another concern." It's about

1 the fourth paragraph down. Do you see that?

2 A. Where it says identify.

3 Q. Where it starts, "Another concern relates to

4 compliance with setbacks."

5 Do you see that?

6 A. I'm on page 1.

7 Q. I'd like you to be on page 2, please.

8 A. Oh, okay. Another concern.

9 Q. Yeah. And in that paragraph you talk about a

10 belief --

11 And let me ask you first, did you participate in

12 drafting these responses, Mr. Hubner?

13 A. I did.

14 Q. All right. And it states that there is another

15 concern relating to the Campbell County wind farm and

16 that it relates to seven instances where the turbines

17 were built in violation of setbacks; is that right?

18 A. Yes.

19 Q. So that's the concern for the Campbell County wind

20 farm is they were not built in conformance with required

21 setbacks?

22 A. Well, that's a concern I would have too is if they

23 don't follow the law here, you know, how do I know

24 they're going to follow the law here.

25 Q. I'm trying to understand a couple of other lay

1 witnesses who are identified as potential witnesses for

2 the Intervenor including yourself and they're going to

3 talk about the Campbell County wind farm and I want to

4 make sure I understand what the concern is. And I read

5 this response to say it's about violation of setbacks.

6 Is that an accurate summary?

7 A. Yes.

8 Q. Thank you.

9 All right. Please go to page 13 of the exhibit.

10 You're actually ahead of me. Give me just a second.

11 Can you please tell me what this document is? The

12 top of it says timetable?

13 A. These are the meetings that we attended at our

14 county level.

15 Q. For what purpose was this table put together?

16 A. I just do a lot of -- I just do a lot of

17 documentation of all this stuff.

18 Q. All right. Did you create it for the purposes of

19 responding to this discovery request or was it already

20 something in your files?

21 A. No. I had done this about maybe a year ago or less

22 than a year ago.

23 Q. All right.

24 A. Would have been after February. So it would have

25 been sometime this spring probably.

1 Q. I note in there a variety of meetings both with

2 Commission and zoning do these all relate to Bon Homme

3 County?

4 A. Yes. These are all Bon Homme County.

5 Q. And I note that in 2017 there are two meetings

6 listed, one for zoning and one Commission where it says,

7 "Gregg proposes one mile with waivers."

8 Can you please explain what that is.

9 A. Yes. I would like to. What happened there was the

10 draft model ordinance that, you know, Article 17 was

11 based on was taken down by the PUC.

12 Q. Mr. Hubner I'm just asking -- maybe I've asked a

13 poor question. What was your proposal with respect to

14 one mile with waivers? What kind of setback was it?

15 A. Okay. It was a mile from a residence with waivers

16 and we know what they are; right?

17 Q. Yeah. Thank you.

18 A. All right.

19 Q. Okay. Please turn to page 28.

20 A. Okay.

21 Q. What is this letter?

22 A. It looks like a -- oh, that's a letter I sent to the

23 Real Estate Commission and without reading the whole

24 letter because it was September '15, I was -- I had been

25 trying for years to get the South Dakota Real Estate

1 Commission to add in their property disclosures statement

2 on the house just a little paragraph that says does the

3 seller of the property -- is there a wind farm in the

4 area or a proposed wind farm or do you know of a wind

5 farm in the area so that if somebody bought your house

6 they would know even if it wasn't built yet they would

7 know if a turbine was -- turbines were coming in.

8 Q. All right. And that effort hasn't been successful,

9 has it?

10 A. No. Not at all.

11 Q. Please turn to page 15 of the exhibit. I'm going to

12 back up a little bit.

13 A. Okay.

14 Q. One second. All right. On the paragraph that

15 begins "today"?

16 A. Yep. Right in the middle?

17 Q. Yeah.

18 A. Yep.

19 Q. I'm going to read a portion of the last paragraph.

20 It says and you're responding to your concerns about the

21 Bon Homme zoning ordinance is that right Article 17 in

22 this letter?

23 A. There's no date on this letter, is there?

24 Q. I didn't see one.

25 A. Well, this would have been -- if it starts out -- it

1 starts out talking about in the spring of '15 so I'm
 2 assuming this is a spring or summer 2015 letter.
 3 Q. Okay.
 4 A. Okay.
 5 Q. All right. At the end of that paragraph you state
 6 that, "there should be concerns about reduced property
 7 values and then "not only would I want my property taxes
 8 and valuation reduced I plan to sue B.H. Wind or Ronnie
 9 Hornstra personally for the loss I'll have to take on my
 10 property."
 11 Did I read that right?
 12 A. Yes.
 13 Q. And have you otherwise made threats to commence
 14 legal action against any of the wind developers in the
 15 area?
 16 A. Not that I know of. I'm not sure B&H wind is in
 17 existence anymore.
 18 Q. I'm sorry what did you say sir?
 19 A. I'm not sure B&H wind is even in existence anymore.
 20 Q. And do you know what the closest turbine is to your
 21 residence?
 22 A. Yeah. According to a map that was provided to me
 23 during this hearing, it was in the 4,500 foot range, I
 24 think.
 25 MS. AGRIMONTI: Thank you. I have no other

1 questions.
 2 MR. DE HUECK: Mr. Fuerniss.
 3 MR. FUERNISS: I don't have any questions.
 4 MR. DE HUECK: Ms. Jenkins.
 5 CROSS-EXAMINATION
 6 BY MS. JENKINS:
 7 Q. Gregg, you heard my testimony yesterday?
 8 A. Yep.
 9 Q. And did you also have the concerns of the -- the
 10 county not following proper procedure, Bon Homme County?
 11 A. Well, I never contended their procedure. I mean,
 12 I -- whether they made a mistake or didn't make a mistake
 13 as they were doing this. How they did it was really not
 14 an issue for me. It's what they did and who they
 15 listened to.
 16 Q. Okay. And do you have anything else that you want
 17 to talk about?
 18 A. Oh, not really.
 19 MR. ALMOND: I don't think we've got time.
 20 MS. JENKINS: Thank you.
 21 MR. DE HUECK: Ms. Pazour.
 22 MS. PAZOUR: Not at this time.
 23 MR. DE HUECK: Staff, do you have
 24 cross-examination?
 25 MS. REISS: Yes. Thank you.

CROSS-EXAMINATION

1 CROSS-EXAMINATION
 2 BY MS. REISS:
 3 Q. Mr. Hubner, you mentioned that one of your concerns
 4 was the setback distance; correct?
 5 A. Correct.
 6 Q. And did you have concerns about sound or shadow
 7 flicker at all?
 8 A. Yeah. Shadow flicker definitely. Sound definitely,
 9 yes. All three.
 10 Q. Okay. You mentioned the one mile setback as your --
 11 or as a recommendation. Would you have any
 12 recommendation for sound or shadow flicker?
 13 MR. ALMOND: I'm going to object. Misstates his
 14 testimony.
 15 MS. REISS: Can I rephrase.
 16 MR. DE HUECK: Yeah.
 17 Q. What was the setback you requested in your
 18 testimony?
 19 A. The setback I requested in my testimony?
 20 Today? Here? Now?
 21 Q. In response to a question Ms. Ago -- or Ms. Ago had
 22 pointed you to a document. Let me pull it up.
 23 A. You're referring to the one mile with waivers or --
 24 Q. Yes.
 25 A. -- or you talking about? Okay. So that's one mile

1 with waivers from a residence.
 2 Q. Yes.
 3 A. Yes.
 4 Q. Would you have any recommendations to alleviate your
 5 concerns with sound?
 6 A. Well, from what I've heard today, 35 decibel top
 7 limit would be -- would be very good. I've been duck
 8 hunting already and I've heard turbines for 3 miles. And
 9 I'm assuming at one mile I'm going to hear turbines. So
 10 35 decibel one mile from a residence 1,500 feet from a
 11 property line would be a minimum for me.
 12 Q. Okay. Would you have any recommendation in regard
 13 to shadow flicker?
 14 A. Zero. On the property or on the house.
 15 Q. Okay. And if the Applicant could commit to those
 16 sound and shadow flicker levels related to your property
 17 would it alleviate some of your concerns?
 18 A. Some of them.
 19 MS. REISS: No further questions.
 20 MR. DE HUECK: That brings us over here to
 21 Commission questions. And I'll call -- I'm starting with
 22 Commissioner Nelson.
 23 COMMISSIONER NELSON: Gregg, just a couple of
 24 questions. I've asked a lot of questions about
 25 infrasound in the proceeding. Do you have any evidence

1 that you or your wife have a sensitivity to infrasound?
 2 THE WITNESS: I have no evidence, but if I could
 3 just say another sentence, from reading a lot of this, we
 4 do have a health condition in the family that could be
 5 sensitive to infrasound.
 6 COMMISSIONER NELSON: I promised myself I wasn't
 7 going to ask any questions about the zoning process
 8 because I don't believe that's properly before us, but
 9 I'm going to ask one.
 10 Was there ever an attempt to refer the 2015 Bon
 11 Homme zoning changes to a vote of the people?
 12 THE WITNESS: No.
 13 COMMISSIONER NELSON: No other questions. Thank
 14 you.
 15 MR. DE HUECK: Chairman Fiegen.
 16 CHAIRWOMAN FIEGEN: Thank you. I did not know
 17 your background. And so were you here -- you were here
 18 yesterday when I -- or maybe two days ago. I can't
 19 remember now. When I asked about housing eligibilities?
 20 THE WITNESS: Yeah.
 21 CHAIRWOMAN FIEGEN: So I couldn't remember how
 22 much land do you own all by yourself with Marsha, your
 23 wife?
 24 THE WITNESS: The 1,120 acres or whatever.
 25 CHAIRWOMAN FIEGEN: Okay. And then do you have

1 another 1,900.
 2 THE WITNESS: No.
 3 CHAIRWOMAN FIEGEN: It's all -- okay. So out of
 4 that 1,100 how many housing eligibilities would there
 5 possibly be? And because of your background -- yeah.
 6 That's my question.
 7 THE WITNESS: Well, I think the word housing --
 8 the term housing eligibility is more for the more
 9 metropolitan if you want to use that term, Sioux Falls,
 10 Brookings, Watertown. They go in their counties and they
 11 establish housing eligibilities so that you can put so
 12 many houses on a quarter of land. And each county's got
 13 a different set.
 14 Okay. In Bon Homme County we don't call them
 15 housing eligibilities but there are zoning laws that you
 16 have to have so many minimum acres to build a house. And
 17 I think that it's five acres if I'm not mistaken.
 18 So you can't plat off anything less than 5 acres
 19 and build a house unless of course you can get a waiver.
 20 CHAIRWOMAN FIEGEN: I'm going to go back to the
 21 Staff's questions. When they asked you questions about
 22 what you would be comfortable with on a -- when you
 23 proposed that one mile setback, I guess, and then the
 24 Staff kind of asked you a little bit of questions you did
 25 talk about your goal was to negotiate at the County

1 Commission meeting, I believe, and what you said it was
 2 two miles or 1,000 feet and you wish they would have
 3 negotiated.
 4 THE WITNESS: I wish they would have tried to
 5 compromise in some way.
 6 CHAIRWOMAN FIEGEN: Compromise. Okay.
 7 THE WITNESS: Yeah.
 8 CHAIRWOMAN FIEGEN: So when you answered the
 9 Staff questions was that property lines or was that your
 10 resident that you built?
 11 THE WITNESS: What I have -- I started out for
 12 two miles. And after we fought that for two years and
 13 got nowhere, and it looked like this next project was
 14 going to come in, that's when I made an effort to go back
 15 one more time and say here I'd like you to do a mile from
 16 a residence. And I don't think at the county at that
 17 time I mentioned 1,500 feet from the property line. But
 18 since being involved in a couple PUC hearings and
 19 learning about, you know, ice throw and owners manuals of
 20 turbines and all of that stuff it occurred to me that the
 21 property line and the right of way line to a highway
 22 would be a minimum of 1,500 feet.
 23 If you have a bunch of bear land, you know, a
 24 1,500 foot property is going to allow some of your
 25 neighbors to put turbines on their land. If your bear

1 land is next to they're bare land, you know, 1,500 foot
 2 would work. It's a minimum but it -- to summarize, a
 3 mile from a residence, 1,500 feet from a property line,
 4 35 decibels.
 5 CHAIRWOMAN FIEGEN: From a residence? 35?
 6 THE WITNESS: Yeah.
 7 CHAIRWOMAN FIEGEN: Thank you.
 8 MR. DE HUECK: Commissioner Hanson.
 9 COMMISSIONER HANSON: Good evening.
 10 THE WITNESS: Hi.
 11 COMMISSIONER HANSON: Over the years I have read
 12 a lot of literature.
 13 THE WITNESS: So have I.
 14 COMMISSIONER HANSON: From a gentleman by the
 15 same name as you who lives in your vicinity. Would that
 16 be you?
 17 THE WITNESS: It's possible.
 18 COMMISSIONER HANSON: I'm surprised when you
 19 gave your resume you didn't say author on it as well.
 20 I don't have any questions for you. You've been
 21 very patient sitting there going through the process.
 22 Appreciate it.
 23 THE WITNESS: Thank you.
 24 COMMISSIONER HANSON: And that's all I have to
 25 say other than good evening.

1 MR. DE HUECK: Mr. Almond, do you have any
2 redirect? No.

3 Mr. Hubner, thank you for your testimony.

4 THE WITNESS: Thank you.

5 (The witness is excused.)

6 MR. DE HUECK: That's concludes our hearing
7 today. We will reconvene --

8 MS. AGRIMONTI: Just one housekeeping matter,
9 Mr. de Hueck.

10 Ms. Smith cross-examined two witnesses with an
11 Exhibit No. 36. It's a court case. We would move
12 admission.

13 MR. DE HUECK: Oh. We had this discussion
14 earlier, and I could have swore you guys already got it
15 in.

16 Yes. The court case will be admitted. Thank
17 you for catching that.

18 MS. AGRIMONTI: Thank you.

19 MR. ALMOND: Can I say no objection.

20 MR. DE HUECK: Yeah.

21 So reconvene at the same time? Is that okay?

22 CHAIRWOMAN FIEGEN: Well, I'd love to start at
23 8:00 but --

24 MR. DE HUECK: 8:30. We'll show up at 8:30 and
25 be ready to go.

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