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STATE OF MINNESOTA
MINNESOTA DEPARTMENT OF COMMERCE

In the Matter of the Certificate of Need for the 98.9 MW
Ellerth Windpark in Marshall County, Minnesota

MPUC DOCKET NO. IP-6855/CN-11-112

Newfolden Community Center
145 East First Street
Newfolden, Minnesota

November 7, 2011

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1 (Presentation by Mr. Hartman.)

2 MR. HARTMAN: With regard to scoping, are
3 there any questions anyone has or any questions in
4 general?

5 I'm going to have to work the room here,
6 aren't I?

7 MR. GARTH UNKE: I have a question
8 regarding certificate of need. Can I bring that up
9 or are we already past that?

10 MR. HARTMAN: No, that's what we're here
11 for.

12 MR. GARTH UNKE: Okay. What are the
13 things that are considered to determine whether
14 there is a need for the project?

15 MR. HARTMAN: Certificate of need. There
16 are a number of -- well, it's somewhat difficult to
17 explain.

18 The certificate of need process is
19 designed primarily for thermal facilities. By that
20 I mean coal, nuclear, let's even say gas. Wind
21 companies come in and they ask for a lot of
22 exemptions from the certificate of need process
23 because they don't apply to wind. In other words,
24 there's not air pollution, there's not rail
25 transportation issues, there's not water-related

1 issues. So they get a lot of exemptions from what
2 the formal requirements are.

3 Now, which makes you wonder why they
4 still have a certificate of need process and it's
5 something I wonder about also. Having said that,
6 there's also a legislative mandate for utilities to
7 have, I guess, up to 20 percent of their
8 renewable -- or 20 percent of their load be based
9 from renewable energy by 2020 or 2025, depending on
10 what utility you are in the state of Minnesota.

11 Just by way of background information,
12 Minnesota probably has about 2,500 megawatts of wind
13 energy on line right now. If you look at how some
14 utilities approach wind, sometimes municipal
15 utilities have gone together, otherwise it might be
16 independent or investor-owned utilities. And, for
17 example, Xcel might have a scenario whereby they
18 would like to own one-third of future wind energy
19 facilities that they get -- well, facilities they
20 get wind from. One-third might be smaller
21 community-owned projects and one-third just might be
22 from companies like TCI Renewables or others who
23 build and sell renewable energy or build and sell
24 renewable energy to market wholesalers.

25 MR. GARTH UNKE: So a certificate of need

1 really doesn't have anything to do with this
2 particular community having a need for the energy
3 because you may end up contracting with Wisconsin or
4 Indiana?

5 MR. HARTMAN: Could be, yes. Maybe they
6 have a need for it to meet their standards. You
7 know, again, that's one of those issues that I don't
8 know is particularly well defined now. I think some
9 of the questions the Commission has dealt with
10 recently, well, does this project need to be built
11 to meet your renewable energy objectives, maybe not
12 individually, eventually you might need a project.

13 In terms of getting energy, I guess, road
14 to market, would be the grid. And the grid is
15 controlled by what's called the Midwest Independent
16 System Operator. So, in other words, if I'm a
17 generator of electricity, whether it be solar, wind,
18 biomass, chipmunk power, nuclear, coal, whatever, I
19 have to get authorization from MISO. Which means I
20 need a queue position. Which means I need to be
21 able to connect my facility to the grid, which might
22 be you taking grain from your field or coal out
23 there, you know, wherever you take it, so you need
24 access to get that energy on the grid.

25 So I don't know what their MISO queue

1 position is. It's a very complicated process. They
2 do a number of studies, sometimes those studies
3 change. MISO sometimes changes the ground rules
4 also. And if everything goes well, and MISO, if I
5 remember correctly, is about 467 days to get through
6 the queue process.

7 So, in other words, if you look at wind
8 in general in Minnesota, Minnesota is building a
9 number of large high voltage transmission lines now.
10 And I guess the stated purpose is to carry wind
11 energy from the western part of the state or the
12 Dakotas where the markets are, it might be the Twin
13 Cities, Chicago, or other large metropolitan areas.
14 Where the wind resource is they are often
15 transmission constrained. In other words, there is
16 not enough transmission to serve as an outlet for
17 capacity. It's kind of like you drive down Highway
18 59 at 2:00 in the morning, there might not be much
19 traffic, so it's probably easier to get from point A
20 to point B. If it's Sunday morning and everybody is
21 going to church maybe you won't get there as fast.
22 I just say that to illustrate a point.

23 So, again, while they might have a queue
24 position, they are probably still points where they
25 need somebody to be able to say I want to buy that

1 energy you're going to produce for my company and
2 sell it to my customers. Just because the electrons
3 go on the grid, it doesn't mean they're going to be
4 used here, electrons take the path of least
5 resistance.

6 And generally if you look at the -- I
7 guess I haven't done it for awhile -- if you look at
8 the transmission path, it's probably biased to the
9 east, there are always kind of bubbles on the
10 transmission system. For example, Xcel Energy,
11 Northern States Power, buys a fair amount of energy
12 from Manitoba Hydro, we sell them energy in the
13 wintertime because we're a summer peaking utility,
14 they're a winter facility, so we sell them energy in
15 wintertime and we buy it from them in the summer
16 based off hydro. Sometimes there are constraints in
17 an area which might prevent power from, say, flowing
18 on the western side of Minnesota up to Canada, and
19 maybe there's a substation constraint to
20 interconnection or something like that.

21 So, you know, it's hard to give a real
22 specific answer. I think that's probably about as
23 close as I can get.

24 MR. GARTH UNKE: I think you answered it.
25 Thanks.

1 MR. HARTMAN: Any other questions?

2 Yes, sir.

3 MR. BOB DAHL: This is Bob Dahl, D-A-H-L.
4 If I understand, why is our local utility forced to
5 buy from the wind, wind utilities? They got to make
6 contracts with them. Does the government force them
7 to --

8 MR. HARTMAN: Well, the legislature has
9 passed a mandate that utilities now, I don't know if
10 you belong to a municipal utility or a co-op, your
11 co-op might be a member of a different company, for
12 example, there are G and T cooperatives. By that I
13 mean generation and transmission. For example,
14 Great River Energy would be one. Years ago it used
15 to be United Power Association, Cooperative Power
16 Association, so each of them have respectfully
17 between 17 and 19 co-op members. So your co-op
18 might be getting power from them, I guess I can't
19 speak to the particular circumstance.

20 I know that's been fairly controversial.
21 Some people feel that wind energy prices are higher
22 than what they would be normally paying. I think
23 there was a study in the paper, the Minneapolis
24 paper last week, if I remember correctly, and I
25 don't remember who did the study, that indicated

1 that wind energy is probably pretty competitive on
2 price but it hasn't really had a big impact on the
3 electrical grids we all pay as ratepayers.

4 Now, again, I don't know -- and each
5 co-op might have a different rate, but then again if
6 it's a co-op it's nonprofit also.

7 MR. BOB DAHL: Ours went up 30 to 40
8 percent this spring and they said it's because of a
9 forced contract with the wind, the wind people, and
10 they didn't need it.

11 Well, our electricity went up this spring
12 30 to 40 percent because of a wind energy contract
13 they had that they didn't need, they were forced to
14 have, the government says they are forced to have,
15 but they didn't need it, so they were stuck with it,
16 and so we ended up that we got to pay for it. Why
17 is that?

18 MR. HARTMAN: That's a good question. I
19 don't have a particularly good answer for you. I
20 know it's been a point of contention for a number of
21 the cooperatives in Minnesota, but it's something
22 I'm not well informed of to be able to give you the
23 answer.

24 MR. BOB DAHL: Sure.

25 MR. HARTMAN: Again, the study that I

1 mentioned I think referenced the fact that some
2 co-op members have been kind of upset about the
3 increases they faced, you know. And, again, the
4 study indicated that overall it hasn't had that much
5 effect on the rates in general. Now, maybe on
6 individual co-ops it might affect more than others
7 and that might be if it's a fairly small co-op,
8 depending on load, depending what you're taking
9 might be disproportionate to load. Again, that's
10 hard to say without more information.

11 Could I ask what co-op you belong to?

12 MR. BOB DAHL: REA, whatever. It's out
13 of North Dakota, or whatever.

14 MR. HARTMAN: So it's not a Minnesota
15 co-op?

16 MR. BOB DAHL: No.

17 MR. HARTMAN: And co-ops aren't regulated
18 by the state, in terms of the Commission doesn't set
19 tariffs or rates for co-ops. Again, if it's a North
20 Dakota co-op, I know they've added wind in North
21 Dakota, I don't know what the regulatory
22 requirements are there in offloading to other
23 entities, though. Sorry I can't give you more
24 information. If you want to contact me later on and
25 give me a little bit more information I'll try to

1 check on it for you.

2 Any other questions regarding scoping?

3 No other questions?

4 Again, there's kind of a draft scoping
5 thing here indicating what would generally be looked
6 at. You know, many comments you have that would
7 fall into this generic outline would more than
8 likely be addressed to something more specific or
9 something that you see that you think should be here
10 that isn't here. I would ask that you, you know,
11 please send us comments if you have any concerns
12 about that.

13 Any other questions or comments about
14 scoping?

15 And I know this is probably somewhat
16 difficult to understand if this is the first time
17 you've gone through something like this. Again, it
18 might sound complicated, I don't believe that it is,
19 and it's pretty straightforward. So if you do have
20 comments, again, tonight, after the meeting, if you
21 want to fill out the sheet or e-mail me, fax, or
22 whatever else, we'll consider those comments.

23 What will happen, I will take those
24 comments and just kind of summarize them and we
25 would probably bundle them and make them available

1 on our website as well as eDockets also.

2 And speaking of eDockets, I have another
3 question. How many people here have e-mail? How
4 many people don't have e-mail? Okay. It's, you
5 know, I think as we try to go electronic in
6 everything, and having done enough work in rural
7 Minnesota, I'm cognizant of the fact that not all
8 people have e-mail and I wish I could avoid it some
9 days. But, you know, it's probably one of those
10 things we're forced to live with. If you do sign up
11 for electronic notification, any time something is
12 posted to our website or eDockets regarding the
13 project you get e-mail notification of that so you
14 don't have to go looking for information to come to
15 you. If that's of any help or use to you or it
16 gives you a sense of comfort, or perhaps concern, I
17 don't know.

18 Any other questions about the
19 environmental report? Yes, sir.

20 MR. MARK KNUTSON: Mark Knutson, M-A-R-K,
21 K-N-U-T-S-O-N.

22 And I guess I thought of this because on
23 your list here, effects on wireless broadband, I
24 have read where wind farms can affect GPS. Is there
25 anything to that or not? Have you run into

1 anything, as far as have you --

2 MR. HARTMAN: I've been involved with --
3 well, actually, in terms of wind farms having
4 interference. When they look at the contract, with
5 a company like Comsearch, and those companies always
6 do an FCC database search as well of all the radio
7 stations and TV stations and landlines, mobile
8 radios and GPS.

9 In fact, we just had a meeting down in
10 Faribault County a couple weeks ago and GPS has been
11 around for quite awhile, we've had wind farms in
12 Minnesota since 1995 and we have had no reported
13 impacts in terms of affecting GPS. I know that
14 there are several wind farms in Mower County that --
15 they have GPS, I guess, transmitters on for drain
16 tiles and things like that and there have been no
17 reports of interference. And over the years I've
18 worked with several with drain tiles down there and
19 it hasn't proved to be an issue yet.

20 Typically, what will happen on wind
21 farms, and maybe we can just kind of segue here and
22 I'll maybe cover a number of issues here related to
23 wind and we might deal with more of the siting
24 issue. So let's start up in the air.

25 So, first of all, you basically have a

1 windmill on a 262-foot tall tower. Now, in this
2 case they're looking at three different turbines
3 ranging in size from 1.6 megawatts to 2.3 megawatts.
4 A standard 80 meter tower, they all look pretty much
5 the same. The difference in the turbines might be
6 the rotor diameter. If I remember correctly, of the
7 three that are being looked at, the GE might have
8 the smallest rotor diameter. And was it the Siemens
9 was the --

10 MR. CANTWELL: Yeah, the Siemens would be
11 the largest. Yeah, 101 meters.

12 MR. HARTMAN: So about 343 feet then?

13 MR. CANTWELL: Yeah.

14 MR. HARTMAN: So basically what happens,
15 when you have something up in the air like that, it
16 can cause interference. So that's why you look at
17 FCC databases for radio signals, TV stations,
18 microwave. There is a lot of microwave out there,
19 whether we realize it or not.

20 For example, Burlington Northern has the
21 largest microwave system in the world, it's
22 basically how the trains run. Banks have
23 microwaves, pipeline companies have microwaves. So
24 you try not to have any of the rotating blade in the
25 microwave beam path.

1 Your microwaves typically work point to
2 point or site to site, it might be 20 to 30 miles
3 apart depending on elevation. Some counties have
4 microwave beam path setback ordinances for future
5 microwaves, so they'll find out what's out there for
6 microwaves to site the turbines so it does not
7 interfere with those microwave beam paths. And
8 typically the beam paths will have a fresnel zone,
9 and now that we're in a digital world it might be a
10 little bit tighter, and there might be a comparable
11 setback area from that. If it's a digital system,
12 you can get some chopping in that. So typically
13 that has not been an issue.

14 The companies will typically coordinate
15 with MnDOT also, our Minnesota Department of
16 Transportation. The state has been, I guess,
17 installing a number of new microwave towers for the
18 armor 800 megahertz public safety system, so there's
19 several towers up here and so they might coordinate
20 with MnDOT to find out where their future towers
21 might be so they can avoid that beam path or so they
22 can avoid that conflict also.

23 Same thing, you know, with Comsearch or
24 whoever does that. I remember companies who do that
25 list all the radio stations, all the TV stations

1 maybe within a 100- or 200-mile area. You know,
2 mobile landlines, some companies I know maintain
3 about a quarter of a mile setback from those just to
4 avoid interference. Those would typically be around
5 farms, though, so it depends on your transmitter.
6 There's a lot of unregistered communications out
7 there in terms of police bands and things like that
8 also. So a lot of those factors are considered from
9 the electronic component side of things.

10 On the way up here I did notice one
11 shortwave radio, I've seen a couple of wind farms
12 around shortwave radios so it hasn't presented a
13 problem either. It doesn't mean that there can't
14 be, it just means that I'm not aware of any to date.

15 Now, as I say that, there are a number of
16 defined -- an awful lot of information about wind
17 energy in general on the web. Some of it's good,
18 some of it's bad, and some of it is just downright
19 misleading. Again, I'm not going to tell you what's
20 right or what's wrong, just look at it and judge for
21 yourself. And I think reasonable people can come to
22 similar conclusions. There is always going to be
23 some people who take the other side of the argument,
24 you know. But the fact is, if you have questions,
25 there's a lot of information out there.

1 If you'd like sources -- well,
2 actually -- well, a Canadian firm, there's an AWEA
3 site, American Wind Energy Association, it's
4 basically an industry used as a clearinghouse for
5 information. There's a Canadian, CWEA, which is
6 Canadian Wind Energy Association that has a very
7 good site. There's Wind Watch based out of
8 Wisconsin, I check it frequently, they have a lot of
9 good information on there also. They also have what
10 some people perceive to be problems also. So,
11 again, check that.

12 So from the electronic side of things, we
13 have had a couple wind farms in Minnesota recently
14 where the conversion to digital TVs resulted in some
15 problems and I'm not exactly sure what the
16 underlying causes of that are. I guess I've heard a
17 couple of things, I don't know, I think it's been
18 resolved, it might have been some equipment issues.
19 But sometimes when you do have or have had
20 television interference issues, and generally in an
21 area like this, I'm assuming you either have, you
22 know, off the air, which means just kind of
23 broadcast signal or else satellite, I don't imagine
24 you have a lot of cable out here in this part of the
25 world. There's typically no effect on cable.

1 A lot of times companies, before they
2 build a project, there are different ways of --
3 well, they know what the TV signal strengths are.
4 You know, sometimes I've seen companies put a meter
5 to each landowner's home from the band, they don't
6 have to go in the house, to measure what your TV
7 signal strength is. If there's any degradation in
8 signal strength the company would be obligated to
9 correct that. You know, it's typically done, if
10 it's off air, it's typically done by replacing it
11 with a satellite system, which the company is
12 typically responsible for paying for then as long as
13 there's a problem. So that's one of the things in
14 the air.

15 One of the other things, I guess, if
16 we're talking towers that tall, they do produce a
17 level of noise in the gear box and the mechanical
18 housing up there where a lot of the noise is
19 generated. If you look at the various
20 specifications, the noise level up there might be
21 104 to 109 decibels, which is fairly loud. Now, as
22 you get further and further away, the noise will
23 decrease.

24 The State of Minnesota does have noise
25 requirements. Those rules are come under the

1 Minnesota Pollution Control Agency. And it's an L50
2 standard, which means the noise level should not
3 exceed 50 decibels. 50 decibels might be kind of
4 like the noise or the humming you hear here.
5 Turbines also generate different types of noise,
6 there's a mechanical noise, which might be from the
7 moving parts on the top. You also get some kind of
8 noise from the turbine blades as they pass in front
9 of the tower. Most turbines spin right to left like
10 a clock, so you might get most of your noise from
11 the 2:00, 7:00 position, on the downward sweep of
12 the rotor. Now, again, you only get that if the
13 turbine is operating. If there's no wind, it
14 doesn't make any noise.

15 And, again, as the wind speed rises, it
16 tends to mask the background level. And I guess
17 most of you probably have lived up here for awhile
18 and you know when it's windy out the wind itself
19 does create noise. Also, depending on time of the
20 year, season, where the crops are, even the height
21 of the corn will vary over the years, say with
22 sunflowers, beans, or anything else. And, again, so
23 the noise will probably be more pronounced downwind
24 from the turbine.

25 All the turbines used pretty much in this

1 day and age are what's called up-speed variable
2 pitched turbines, which means when the anemometer on
3 the back of the turbine senses wind the turbine will
4 rotate into the wind and when the wind speed picks
5 up the blades will start spinning. And, you know,
6 maybe in the lower speeds they'll turn much more
7 slowly. Your turbine, your revolutions per minute
8 on the turbine, depending on the turbine, might be
9 anyplace from 14 to 19 revolutions per minute and
10 that's a function of the rotor diameter too. So
11 your tip speed can probably vary anyplace from 130
12 to 170 miles an hour. I believe, if I remember
13 correctly, noise is less pronounced when the light
14 speed is less than 148 or 147 miles per hour.

15 So anyhow, when they design a project, in
16 the site permit application they've done noise
17 profiles. So they've calculated the noise, it's a
18 computer program, I don't remember which one they
19 use. So depending on turbine location, they'll
20 calculate the noise profile for each turbine. So
21 they've got three layouts in there and you might see
22 a different type of footprint regarding noise for
23 that particular turbine depending on the turbine.
24 Actually, there's been some improvements in that.

25 Some turbines right now, I believe when

1 noise gets to a certain level they might feather the
2 blades a little bit or dial down a little bit if
3 it's a problem. So the turbine layout, and they'll
4 take the worst-case scenario, when the turbines are
5 operating at maximum speed or probably somewhat
6 below that worst case, in terms of noise modeling
7 they might build in a -- I guess a little zone of
8 protection on that, and then the setback would be
9 based on that.

10 Now, I believe in the application they've
11 indicated that and that will be cumulative setbacks.
12 So if you have turbines in a row, let's say three,
13 four in a row, probably if you're behind the fourth
14 one it is going to be a little bit noisier than what
15 it is behind the first one because noise tends to
16 propagate downwind also.

17 So I guess coming down, I guess one of
18 the other things we deal with in permitting would be
19 avian issues, which means birds, bats, migratory
20 birds, et cetera. Our Minnesota Department of
21 Natural Resources and the U.S. Fish and Wildlife
22 have been taking a more active role in that and
23 that's addressed on some of the boards that they
24 have back there. The permit requires all developers
25 to have an avian bird and bat protection plan right

1 now also. So they expect that they'll be filing one
2 also before a draft permit is issued on this
3 project.

4 And, again, I don't know what those
5 agencies would have to say, it depends on, I guess,
6 features in the area, whether it's a migratory
7 corridor. There's a number of things that those
8 agencies look at. So that's one of the other things
9 we look at when it gets in the air.

10 So we've covered, I guess, a little bit
11 on birds and bats, sound, radar. I guess radar is
12 another one, I don't know if that's an issue up
13 here. That's an issue that kind of comes and goes
14 on a periodic basis. You know, again, it turns out
15 a lot of our radar is just kind of outdated and I
16 think the newer radar systems tend to eliminate some
17 of the radar interference problems. So I guess
18 coming down we've covered noise.

19 I guess shadow flicker would be another
20 element. There aren't any standards on shadow
21 flicker. I guess it's perhaps somewhat of a cryptic
22 reference, but I think we've seen some indications
23 that Germany tries to limit shadow flicker from
24 turbines to less than 30 hours per year.

25 Now, shadow flicker is going to be worse

1 maybe during kind of the winter months, the sun is
2 lowest on the horizon, it would be worse in the
3 early morning, late in the day. The site permit
4 application I believe has calculated shadow flicker.
5 The worst-case scenario for all the turbines under
6 consideration also. I don't remember what the
7 numbers are. Some homes may not experience any,
8 other homes, maybe it's 30, 40 hours per year, I
9 don't know if there are any higher than that.

10 There's mitigation you can do for shadow
11 flicker. Some companies, I guess, there's some
12 software that they have now that manufacturers use
13 that might stop the turbine on the worst-case
14 scenario. And shadow flicker might be 30 hours per
15 year, that's just for reference purposes only, it
16 might be eight minutes a day, six minutes a day,
17 that's a total cumulative. And that's generally
18 done on several scenarios that would be daylight all
19 the time, if you live in a clear glass house, the
20 sun is always shining, no nighttime, no clouds, no
21 nothing, so it's kind of a worst-case scenario which
22 is not the world we live in. But, again, that's
23 kind of a worst-case scenario so that is generally a
24 factor looked at also. There aren't any standards
25 on shadow flicker per se. That doesn't affect

1 persons who might be epileptic or anything like
2 that. The turbine I think is too slow to affect
3 that.

4 So that kind of gets us down to maybe the
5 ground level. And I guess at the ground level it's
6 a question of what the setback from homes is. If
7 you're a nonparticipating -- I might mention,
8 Minnesota has a statute whereby as a landowner you
9 also -- we also have a statute that provides -- is
10 it your boyfriend calling.

11 UNIDENTIFIED: Yes.

12 MR. HARTMAN: Are you jealous, sir?

13 As a landowner, you also -- we have laws
14 in Minnesota that provide wind rights. So the wind
15 that blows over your property is yours. And, of
16 course, up here the land and the farm size is
17 probably quite a bit larger than where it is in
18 southern Minnesota.

19 So, for example, if I have 160 acres,
20 that may not be enough to have a wind turbine on the
21 land. That leads to another analogy here. If I
22 live next to you and let's say I've got 40 acres of
23 beans and you've got 40 acres of sunflowers, and you
24 go to town someday and I figure, huh, he's gone,
25 I'll go take his soybeans. Well, you probably

1 wouldn't favor that kindly and I have no right to go
2 and take your soybeans. So basically wind rights
3 are the same way.

4 However, in order to build a wind turbine
5 you might need more wind rights than what you have
6 land for. In other words, the need for the free
7 flow of wind might go beyond your property line.
8 So, for example, if you look at the map back there,
9 not every landowner will have a turbine on their
10 property, a wind easement or a wind bucket, which
11 means that the company needs to, I guess, obtain
12 permission to use the wind that blows over your
13 neighbor's land or vice versa, maybe the turbine is
14 on his land that needs free flow of that wind over
15 your land to service that.

16 So if you're not the participating
17 landowner, which means you aren't participating in
18 this project, and we've had other areas where we've
19 had projects and we call them kind of donut holes,
20 where people say I want to do my own project. Okay,
21 fine, that means you have to have a setback far
22 enough from you so you don't interfere with them and
23 vice versa.

24 So, in other words, if they only have 40
25 acres, one, they probably wouldn't have enough land

1 to put up the wind turbine unless it's just kind of
2 a household model, a large commercial turbine you
3 probably need, oh, probably 80 to 140 acres for free
4 flow of wind. So if you're not a participating
5 landowner the nearest turbine to your property is
6 five rotor diameters so let's say that would be up
7 to 1,500 feet, which means that they would have to
8 be set back 10 rotor diameters -- excuse me, five,
9 so between the two of you there's 10 rotor diameters
10 of separation. So that's one project or one turbine
11 that can affect the wind from another turbine or
12 affect the ability to produce energy.

13 And I say five, that's five rotor
14 diameters on prevailing wind access, which up here
15 would be typically northwest to southerly,
16 southeasterly, southwesterly, depending. On the
17 other access we have a three rotor diameter so it
18 would be between two competing projects in ten by
19 six spacing. Is that clear to everybody or have
20 I -- anybody not understand that?

21 Okay. So, in other words, if you go back
22 there and you're a nonparticipant, the nearest
23 turbine to your land should be three rotor
24 diameters. If it's your house and you're a
25 nonparticipant it's 1,000 feet so it would be

1 whatever is the greater of the two is. So we have a
2 number of setbacks.

3 So the larger the setback, whether it's
4 for noise, participating landowner versus
5 nonparticipating landowner, sound, or something
6 else, it would be governed by the largest setback on
7 whatever category it falls. Now, sometimes the
8 larger one might be more than sufficient to
9 accommodate for the noise setback or anything else.
10 So we do try to distinguish between participants and
11 nonparticipants with respect to wind rights also.

12 Typically, a wind farm will -- or a
13 turbine will have an access road. So depending on
14 where the turbine is located at, a low profile
15 access road would be installed, which allows
16 vehicles to get back there and service it. It's
17 also for construction purposes also.

18 It turns out over the years, and I guess
19 I've been working on wind farms for about 15 years
20 now. And, you know, I had a fair amount of concern
21 about that and it turns out farmers like the wind
22 access for two reasons. One, it allows them to get
23 their wagons back there so it helps them get the
24 crops out rather than going through the fields
25 because they're typically built to class C

1 standards, township roads standards, classified
2 standards, anyhow. And for those who have their
3 land available for hunting, it makes it a little bit
4 easier if you have a deer to get your deer out or
5 whatever else.

6 How many people went deer hunting this
7 weekend? And how many got a deer? Good luck. So,
8 you know, that's a couple of advantages there for
9 those who might have those on their property also.

10 And sometimes at the county level,
11 counties might restrict the number of driveway cuts
12 on a per mile basis. All farms are to participate
13 in the 911 system, all become members of Gopher
14 State One Call system, that's the underground
15 distribution system.

16 Again, I think I've covered the number of
17 setbacks from homes and property lines. Not
18 property lines, but participants and
19 nonparticipants, so I think that gets us to the
20 underground side of things.

21 I know drainage is an issue up here
22 because it's so flat and there's not a lot of places
23 for water to go. I'm assuming there's not too much
24 drain tile up here, am I wrong on that? A lot of
25 times your turbines will have foundations in them

1 and typically it might be a spread tier foundation
2 or an inverted T. So it's kind of like an upside
3 down T, where the base that holds the foundation,
4 which could be anyplace from -- the tower base
5 anyplace from 14 to 17 feet wide, perhaps, would be
6 sitting on that. And below that pier will be kind
7 of the spread foundation, which is probably 50 feet
8 across, it could be a tag-along shape, round.
9 Generally it will have a base coat and it will have
10 a wire down there for lightening protection.

11 And then they'll build what's called a T,
12 which would be all the rebar that goes into the
13 tower foundation, which could weigh anywhere from 30
14 to 40 tons perhaps, they could be manufactured on
15 the site or manufactured off the site and hauled to
16 the site. Then each foundation, depending on soil
17 conditions, would have anyplace, depending on
18 turbine soil conditions, anyplace from 350 to 450
19 cubic yards of concrete.

20 So assuming your concrete trucks are
21 eight to 12 cube yards, you're looking 50 to 60
22 trucks of concrete to get that foundation in the
23 ground. So you're looking at about a million pounds
24 of cement in the ground, plus your steel, and then
25 you're going to have your underground cables, which

1 will go from transformer box to the turbine.

2 And then you're going to have a series of
3 underground cables depending on where you might be
4 in relation to the substation. You'll have a series
5 of cables, three cables. You will also have
6 fiber-optic line, called the status system for
7 supervisory control, and data acquisition, which is
8 what they use to monitor the wind farm. So if I had
9 a computer and I was in South Africa, if I wanted to
10 turn it on or turn it off I could do that from
11 there. Because basically we're talking about
12 400-foot tall computers on a stick, so you can
13 basically run them from a computer. So they use
14 that for troubleshooting, for sending out or
15 dispatching crews for repair or any number of
16 things. Again, there's a lot of science and
17 technology involved.

18 And I guess just putting a wind farm
19 together, one, MISO, find somebody to buy the power,
20 and I guess another analogy might be that it's kind
21 of like a 440 meter hurdle race where you've got
22 maybe eight different lanes, one might be
23 permitting, one might be financing, one might be
24 turbine layout. You don't really have the project
25 of the last guy crosses the last hurdle. It's not a

1 question of getting there first, you don't have to
2 be the last guy who crosses.

3 One other thing I wanted to mention.
4 When we started permitting wind energy facilities in
5 Minnesota we did not have a permitting process so we
6 kind of created this one. And we did it
7 concurrently.

8 One of the other issues that we addressed
9 was taxes. And originally a lot of turbines were
10 taxed as commercial property, so because of the
11 accelerated depreciation, a lot of entities have
12 gotten a lot of money, they weren't getting much
13 money years five, six, et cetera, et cetera. So
14 wind turbines are on a production tax and this works
15 several ways.

16 We have three different rates in
17 Minnesota. One grade is a project between zero and
18 two megawatts, between two and 12 megawatts and over
19 12 megawatts. This one is over 12 so it would be
20 taxed at a mill rate of, I think, .015 cents per
21 kilowatt-hour, if I remember correctly.

22 So what happens is the company, every
23 year in February, have to file an M-25 or M-28 form
24 with the Department of Revenue, which would indicate
25 what they owe in taxes. And then I believe they

1 send that to the county, then the company sends the
2 county a check. And so the county would get 80
3 percent of that tax bill and the township,
4 supposedly, would get the other 20 percent. School
5 districts used to get some of that and the
6 legislature modified that a few years ago.

7 What this does is it provides more
8 benefit for the community over the long haul. So,
9 for example, some people may not be participants and
10 say how am I really benefiting. Well, a project
11 this size might pay, depending on capacity factor,
12 might pay anyplace, let's say, \$300,000 to \$400,000
13 per year is probably a workable good number. If
14 that were done as a property tax that would
15 appreciate fairly quickly and the community doesn't
16 wind up with as much money. Now here the community
17 might get less money upfront than they would on
18 conventional property tax, but they get more money
19 for over the long haul of the project or for the
20 life of the project.

21 So let's say if you're a landowner out
22 here and you don't have the turbine on your
23 property, let's assume that your local unit of
24 government doesn't raise taxes, in essence, lowers
25 your mill rate. So in one sense the community might

1 benefit. I believe last year wind developers in
2 Minnesota paid four or five million dollars in
3 taxes, and some of the counties' wind energy budget
4 is 15 percent of the county budget in some of the
5 counties we have in Minnesota.

6 So that was done as a way to promote, I
7 guess, community acceptance a little better and be
8 equitable of how that gets divided up on the
9 financial side of things. And I know some townships
10 have forced wind facilities to give more money than
11 what their annual budget is. So there's a community
12 benefit side to it.

13 Also, in terms of jobs, on that project I
14 would guess there would be probably six to eight
15 people on staff?

16 MR. CANTWELL: During operation?

17 MR. HARTMAN: Yeah, during operation,
18 probably a site manager, clerical support, and five
19 or six wind technicians?

20 MR. CANTWELL: Yep.

21 MR. HARTMAN: And there are a couple
22 schools in Minnesota that have programs for that
23 now, Iowa has some also. I believe the gentleman
24 over here works on the Rugby Wind Farm in North
25 Dakota?

1 MR. PAUL JOHNSON: Yep.

2 MR. HARTMAN: So I guess if you have any
3 questions of wind, he lives up the road here, you
4 can perhaps talk to him also. Your name was Paul,
5 wasn't it?

6 MR. PAUL JOHNSON: Yep, Paul Johnson.

7 MR. HARTMAN: So he has hands-on
8 experience. So that's something else you can do.

9 Again, I guess I'd like to perhaps spend
10 a few minutes on the site permit process. And that
11 was kind of the other side of the schematic back
12 here.

13 Now, again, as I mentioned, they refiled
14 their application on Friday, as planned. I guess
15 we'll present it as a condition for acceptance on
16 November 22nd of this year. Once an accepted order
17 would come out we would then do another notice. We
18 would then send the application out for public
19 review and comment for probably 30 days.

20 So, again, the application -- site permit
21 application will be distributed to the local units
22 of government. As a landowner you might get a CD
23 copy, it's available electronically. It will also
24 be provided to the county, I guess the county board.
25 It will be sent to all of the presidents of each

1 township, as well as the clerk of each township, as
2 well as some of the local libraries. So I think the
3 notice indicates where the applications would be
4 available also. The site permit application will
5 also be available on eDockets as well as our project
6 website. And, again, that could be a site permit
7 application.

8 So the application will be sent out for,
9 I guess, review to the state agencies that we work
10 with as well as federal agencies. That's basically
11 to determine is there anything that they missed.
12 They have done a lot of work putting together the
13 application, this is just kind of focusing in a
14 little bit more on that.

15 So depending on the comments we get back
16 from individuals, comments they might have on the
17 site permit application, and/or state and federal or
18 local agencies, we would then go to the PUC, I
19 guess, the Energy Facility Permitting staff, and
20 request that the -- I guess if it passes muster then
21 we would request the Commission issue a draft
22 permit. Once a draft permit is available, and this
23 is where we'd probably try to link up again with the
24 certificate of need process.

25 Once the environmental report is

1 available, as well as the draft permit, we'd
2 probably try to set up a public hearing and be back
3 here in March of next year. So at that public
4 meeting we'd have the draft permit available, it
5 would be available before that to review and comment
6 to see if those conditions, I guess, are adequate to
7 protect the public's interest as well as I guess a
8 number of other things the state is interested in in
9 ensuring what wind developers do or defining things
10 they shouldn't do.

11 And, again, I guess, trying to kind of
12 wrap everything up. The public hearing, we'd
13 probably hold it back here or in a similar facility.
14 It would be an opportunity for the public, again, to
15 offer comments on the certificate of need, as well
16 as the draft site permit or anything else that they
17 have.

18 At that point in time the administrative
19 law judge who would preside over the hearing would
20 establish a close of public comments on that. If
21 people choose they can request a contested case
22 hearing, and that would have to be addressed by the
23 Commission as to whether to hold it or not. If
24 there's no request, and we would know that before
25 the hearing is held, but anyhow, then the ALJ would,

1 I guess, submit his, I guess, through the informal
2 process, I guess a summary of the public meeting.

3 And I guess we at the staff level, then,
4 regarding the site permit, would compile the record,
5 present it to the Commission with a proposal for a
6 draft site permit then. Assuming a permit is issued
7 by the Commission, there's an opportunity for
8 judicial review by aggrieved parties. And I guess
9 there's also a reconsideration aspect by the
10 Commission, if requested, then judicial review, and
11 if that's done then they can build the project,
12 assuming they have a PPA.

13 Any questions about what I've covered?
14 And I know I've covered a lot here and probably
15 glossed over some of the stuff, but not by intent,
16 but just because there's a lot of ground to cover.

17 Yes, sir.

18 MR. MIKE OLSON: I'm Mike Olson,
19 O-L-S-O-N. I had a question concerning the -- it
20 says the life-span of the wind park is about 20, 25
21 years. So is the certificate of need open-ended as
22 far as time or, like, you know, if it's constructed
23 and 20 years later is it abandoned at that point or
24 do they replace them or what?

25 MR. HARTMAN: It's two different things.

1 The certificate of need authorizes them to build it,
2 but if they don't proceed as scheduled they have to
3 notify the Commission. The site permit we issue has
4 a life period of 30 years. So we would expect from
5 the day we issue the permit that they have 30 years
6 to operate that facility.

7 Now, again, if turbines, I guess, give it
8 up before that, our permit also addresses and covers
9 decommissioning. In other words, if the thing
10 doesn't work anymore, who is responsible for tearing
11 it down and getting rid of everything and restoring
12 the land. Decommissioning is addressed in the site
13 permit application.

14 As one of the permit conditions we also
15 ask them that they file with us a decommissioning
16 plan, kind of outlining that. Generally they're
17 funded in different ways. Some of them actually
18 have decommissioning funds where maybe year seven,
19 ten, 12, they might put in so much money to cover
20 decommissioning costs.

21 Now, if you look at the cost of copper,
22 steel, you could probably say, well, maybe there's
23 enough scrap value there that covers the cost of
24 that, and I've seen decommissioning numbers kind of
25 run the gamut. We have not yet had any -- also, as

1 part of that, should any turbine go out of service
2 for a year or more, they have to notify us of that,
3 and if it's not operational we can ask that that
4 turbine be decommissioned also.

5 MR. MIKE OLSON: It wouldn't just be
6 abandoned or left there?

7 MR. HARTMAN: No, it would be torn down
8 and they will -- they won't dig out the whole
9 foundation, but probably down to a depth of four
10 feet.

11 MR. MIKE OLSON: Okay. Thanks.

12 MR. HARTMAN: Any other questions?

13 Yes, sir.

14 MR. JERRY KRUGER: Jerry Kruger,
15 J-E-R-R-Y, K-R-U-G-E-R. My question is about the
16 access roads. Who maintains them and who owns them?
17 Are they public, private, the township's.

18 MR. HARTMAN: They are private property,
19 they are on your land.

20 Let me address this in two ways. You
21 have to give them permission to build the access
22 road on your property. If it's going to be -- now,
23 access roads, let me go back and cover that a little
24 bit more.

25 Permit access roads are probably 16 to 18

1 feet in width. So it would be a low profile road,
2 about the same as the ones to get your cultivation
3 equipment over that. Now, when they build the wind
4 farm, what they'll do is it will probably be much
5 wider then, let's say 35 to 40 feet wide, assuming
6 they're moving the crane in along that road. So
7 they'll come in and scrape off all the topsoil --
8 well, I shouldn't say all the topsoil, down to a
9 depth -- I know topsoil gets to be fairly deep up
10 here. In some cases they will excavate the topsoil.
11 They might bring in, you know, larger rock and build
12 it up. They might put in a fiber mesh or something
13 also like that or a membrane of some sort just to
14 get all the equipment in there that they need to.

15 And then as they restore the area, once
16 they move back all the construction equipment,
17 they'll haul the topsoil back in there, spread it
18 out, and restore it. And Jamie and I have been at
19 several wind farms in the last few weeks in southern
20 Minnesota and farmers farm right up to or in parts
21 of the access roads as there hasn't been any
22 prohibition on that.

23 Now, two other things regarding access
24 roads. If you have cattle, I don't know how many
25 people have cattle up here, for grazing, if your

1 area is fenced we require that they put a gate in.
2 If you have electric fence, we require that for
3 continuity they do an electric fence, which might
4 mean running PVC pipe underneath the road and
5 running circuits through for the fence. Anyhow, if
6 the gate is a privacy -- well, I guess that's
7 private land, you don't want people in there, they
8 put a gate on it so you'd have a padlock and they'd
9 have a padlock to the gate and if you have cattle
10 they would lock the gate when they leave so your
11 neighbor doesn't call you and say come over and get
12 your cows, please.

13 MR. JERRY KRUGER: In essence, they're
14 private roads then?

15 MR. HARTMAN: Yes. Now, again, the first
16 couple projects we had in Minnesota, the company put
17 gates in and they weren't very clever about it for
18 the simple fact that they were from California and
19 they never thought about snow. Now, I tried to tell
20 them, they didn't listen. And so they put the gates
21 in and, of course, people are curious to see what a
22 wind farm looks like so they drove around the gates,
23 which people do, to go back and look. So the
24 company put in concrete pilings. Well, people just
25 drove further out so the company still wasn't very

1 smart. So then came wintertimes, a bad winter, lots
2 of snow that year, and they forgot that you had to
3 clear snow to clear the gates to get the damn thing
4 open. Again, not very smart. So they were kind of
5 slow learners there.

6 So the next company came along and said,
7 well, we're going to put gates up. And I said why?
8 Well, to keep people out. I said, well, all the
9 citizens down there, just let everybody go back
10 there for three or four weeks, they'll just quit
11 going back because they will have seen everything
12 that they want to see. Of course, the company
13 didn't understand that because they're from
14 California, I guess.

15 So the next company said, well, we'll put
16 in gates. And I said, why would you do that? And
17 they said, well, you know, insurance. Well,
18 insurance doesn't really require it. And I said,
19 well, whatever gate you put in, it can be a chain to
20 drop and drive over, and they said, oh, really, that
21 simple.

22 So I've seen some very sophisticated
23 gates and I've seen some very plain gates. It's a
24 question of whether you want a gate on your property
25 or not, if you feel that you need a gate I'm sure

1 the company will work with you assuming you have
2 turbines on your land. If there are gates, we do
3 require, I guess, more continuity of an electrical
4 circuit, if you do have electric for cattle.
5 Otherwise, it's something you can work out with the
6 company. Now, again, depending on how flat the land
7 is, considering how flat the land is, I don't know
8 how much of a challenge it would be to drive around
9 a gate anyhow.

10 Any other questions?

11 Yes, sir.

12 MR. GARTH UNKE: Garth Unke, U-N-K-E. As
13 a practical matter, are you having complaints about
14 the noise at other farms?

15 MR. HARTMAN: Noise has been a very
16 sensitive issue lately. I'll try to answer this
17 about three different ways.

18 Based on the compliance maps we've seen,
19 noise has not been an issue for most of the wind
20 farms in Minnesota. We do have one where one
21 individual has made several complaints regarding
22 noise, we're investigating that and that's ongoing
23 at this point in time. We have required post
24 monitoring noise studies. We have received one so
25 far, we have another one that's due, and we have a

1 few others we have proposals for.

2 And, you know, again, if you and I or
3 everybody here were to, let's say, go to a movie or
4 a concert or whatever else, we all perceive noise a
5 little bit differently. You know, what may sound
6 great to me you might find noisy. You know, again,
7 I think it depends on your sensitivity level, you
8 know.

9 With the right conditions noise can be a
10 problem, however, that's why we try to have
11 limitations on where turbines are so that noise
12 levels are not exceeded. You know, again, if you
13 look at the issues associated with noise, and I
14 think what's happened, technology may have got in
15 front of us a little bit.

16 The rotor area becomes so large on these
17 things, if you look at the Siemens turbine, the
18 rotor is probably 7,200 square feet, so we're
19 talking an acre and three-quarters almost so that's
20 a fair amount of area. Well, given the gradient in
21 wind, that means a difference in wind speed at the
22 top of the turbine versus the bottom of the turbine,
23 there can be a big difference. So even the growth
24 of crops will affect the wind shear. So if you look
25 at that, I sometimes think noise has been an issue

1 that a turbine -- I don't know that shear was
2 actually accounted for to maybe do the adjustment
3 you need to control that issue. And, again, it's a
4 very, very complicated issue.

5 I can't tell you how many noise studies
6 I've read in the past two and three, four years,
7 I've monitored, I guess, noise conferences, they had
8 one in Italy this year. They have issues on low
9 frequency noise. Low frequency noise I guess is a
10 concern for some people. However, it's very, very
11 hard to document. If you go out and you try to
12 measure wind turbine noise, the wind itself creates
13 problems in using microphones so it's a question of
14 how you do everything. We had a noise study done
15 recently in southeastern Minnesota that they did
16 monitoring before the project was built, they went
17 back and did post monitoring construction at the
18 same sites and they had several control sites off
19 site. And then, you know, it's kind of perceived to
20 be state of the art technology, they did find a few
21 noise issues, but for the most part they were in
22 compliance. I guess we're still trying to sort
23 through some of those issues.

24 Probably the biggest area we've had on
25 noise is a project that hasn't been built yet, it's

1 people's perception of noise. And, again, I'd
2 encourage you, I don't know if any of you have ever
3 been to a real wind farm to listen to what they
4 sound like, and if you have the opportunity to do
5 that I'd encourage you to do so. If you're ever
6 down in southwestern Minnesota and, you know, I
7 think some of the cities up here have turbines and
8 you can listen on a windy day and come to your own
9 conclusion.

10 Now, the wind speed in Minnesota tends to
11 be diurnal so it's strongest early afternoon and
12 kind of maybe from 11:00 p.m. at night to maybe
13 three, four in the morning. So for some people it
14 might be more of an issue when you're trying to
15 sleep at night rather than daytime noise just
16 because there's so many activities going on in terms
17 of truck traffic, farm machinery. So that's why
18 it's more of a nighttime issue. And I think
19 worldwide there are probably over four to five
20 hundred large commercial wind farms and to my
21 knowledge there are only about five documented cases
22 or five projects where noise has been an ongoing
23 issue.

24 And, again, Minnesota does have noise
25 regulations, we try to factor that into our siting

1 considerations here. It's also addressed in our
2 site permit. It doesn't mean that it's not an
3 issue, in reality it hasn't been an issue. I've
4 talked to a number of farmers in previous projects
5 and I asked them about noise and they said no, it
6 hasn't been a problem. But then, again, maybe it's
7 not a problem for them and it might be a problem for
8 their neighbor, they just haven't come forward and
9 said anything.

10 Now, again, you can find a lot of
11 information on noise, I encourage you check both the
12 pros and cons and come to your own conclusions.

13 Now, again, it's the type of thing that
14 we address in our permit, but sometimes machines do
15 different things when you get out there in the real
16 world. If there's a reported issue we more than
17 likely ask the company to investigate and report
18 back on it also. And sometimes, let's say, wind
19 farms, and they're fairly new, there's kind of a
20 shakedown period in turbines, it might take four or
21 five or six months to sort through some of the
22 issues once the wind farm is initially built and you
23 go back maybe after five, six months and you torque
24 everything down, check your oil pressure, maybe your
25 blades, you know, sometimes you get things on

1 blades, you know, soil and other things like that
2 that cause that. And most of your noise on a
3 turbine blade comes around the tip area. If you
4 look at some of these computation of fluid dynamic
5 models there is about 17 colors, you see noise in
6 color on some of the blades, so the worse part of
7 the noise tends to be on the edge of the blade.

8 I don't know, is that your experience in
9 Rugby?

10 MR. PAUL JOHNSON: Yes. The tip is
11 traveling the fastest.

12 MR. HARTMAN: And, again, that's also the
13 thinnest part. And also part of the difference in
14 the air pressure in the front of the blade versus
15 the trailing edge. And it's one of the issues that,
16 you know, I think designers of turbine blades look
17 into.

18 They look for, one, increased efficiency,
19 the better the blade design there is probably less
20 noise, and noise is wasted energy so you want to
21 capture that, kinetic energy to mechanical energy,
22 and you'll be able sell it on the market rather than
23 creating noise.

24 So, again, design, it's kind of one of
25 those trade-offs between energy and noise and it's a

1 question of where you find that sweet spot. And
2 it's probably a little bit different, you do all the
3 modeling, but it might depend on the parameters in
4 the field also, whether you're close to a wood lot,
5 you know, whether you're on a downslide of a hill
6 and it could be any number of factors.

7 So a lot of your noise calculations might
8 be done on computer models, some of that might
9 account for terrain or vegetation. But, again, you
10 can do all the modeling in the world but it's not
11 until you actually get out there and find out that
12 you have a problem that you need to fix. I guess we
13 try to avoid the problems upfront if we can.

14 Any other questions? Any other questions
15 at all?

16 Yes, sir.

17 MR. SCOTT PETERS: Scott Peters,
18 S-C-O-T-T, P-E-T-E-R-S, with Marshall County. I
19 guess just a comment more than a question.

20 TCI has met with our county board for a
21 few visits. What we've seen and experienced, we
22 enjoyed the professionalism and they seemed to be
23 caring about what they're doing and we hope that
24 they continue to make progress with what they're
25 doing because the economics seem to be very

1 favorable for Marshall County. Certainly, the
2 county commissioners, they've seen good things from
3 them thus far and hope that they'll continue.

4 The commissioners, I know, want to make
5 sure that the people's needs and concerns are met
6 and addressed, we appreciate the things you do to
7 make sure it is done right. Some of these economic
8 incentives here in Marshall County, from the tax
9 side and from a building side, you know, we
10 encourage you to do this at this point.

11 MR. HARTMAN: That reminds me of a point
12 I wanted to make so thank you for indicating you're
13 from Marshall County. What we've done, our permit
14 doesn't talk about it, but a lot of the counties
15 have road development agreements with developers,
16 and I would encourage you, if you are on the county
17 board, to maybe get ahold of your county highway
18 engineer. And I'd suggest that you talk to some
19 county highway engineers either in Faribault County,
20 Martin County, Jackson County, and Nobles County
21 about road development agreements.

22 And this is typically an agreement
23 entered into between the developer and the county.
24 I don't know here if the county represents the
25 townships or not. A lot of times the county highway

1 engineer might be delegated authority from the
2 townships that there's a road developing agreement
3 in place between the two parties and/or the
4 townships that covers road damages, everything like
5 that. And the engineers have kind of a working
6 group on that. I think they've done a very good job
7 in a fairly short period of time and I can assure
8 you that if you don't have it, you'll wish you did
9 when you're done. And I think it would be in the
10 interest of both the developer as well as the county
11 to have such a document in place.

12 I guess, rather than us being another
13 layer of bread in the sandwich of bureaucracy, I
14 would encourage your engineer to contact the company
15 and some sample road agreements also and see what
16 other counties have done. Again, the needs of each
17 county might be a little bit different, the concerns
18 might be a little bit different also, but I think
19 the engineers will say they've been very helpful to
20 have that, it's a pretty steep learning curve.

21 MR. SCOTT PETERS: Okay.

22 MR. HARTMAN: If you want to give me your
23 name and address, I might have some agreements I
24 could send you copies of electronically also.

25 Are there any other questions?

1 Yes, ma'am.

2 MS. SYLVIA SCOTT: Two questions. The
3 first one, where are these made? Are they made in
4 the United States, these wind turbines? And the
5 second question, are the transmission lines from the
6 individual wind turbine, are they underground or are
7 they going to be above ground?

8 MR. HARTMAN: Okay. Good questions.
9 Three turbines, GE, GE's are typically manufactured
10 in the U.S. Turbines can be the source of many
11 number of places. We've had towers from DMI
12 Industries over in the Dakotas, we've had towers
13 here from Montreal, Malaysia, Vietnam, Texas,
14 Louisiana, Pennsylvania. They'll put out a bid
15 probably as to what the specifications are. Siemens
16 turbines are made in Germany or Denmark.

17 MR. CANTWELL: Germany, I think.

18 MR. HARTMAN: Germany. Siemens does have
19 a manufacturing facility in the United States that
20 recently opened up. The other turbine was Augustus?

21 MR. CANTWELL: Yeah, Danish. They have a
22 manufacturing plant in Colorado.

23 MR. HARTMAN: Yeah, and they have one in
24 Colorado also. And towers can be sourced from many
25 places.

1 Concrete would typically be local, they
2 might have a batch plant on site, otherwise they'll
3 contract with a developer for that. The cables from
4 the turbines that will go from turbine to turbine
5 and then they might go to what's called a junction
6 box which takes all the power from, let's say, 10
7 turbines and maybe aggregate it up from the junction
8 box to run underground lines from there to either an
9 overhead collector, an overhead collector line or it
10 can be underground also, but typically the cables
11 from turbine to turbine are underground.

12 And, again, in terms of the areas
13 impacted by construction. For example, where the
14 turbine is actually located in the field, where the
15 foundation is, that area will be, I guess, marked,
16 flagged. If you look at some of the diagrams over
17 there, they've got kind of like where the crane pad
18 is, it might take four or five acres of the area to
19 assemble the turbine. For example, they would bring
20 the tower in and lay it down in sections, three or
21 four sections, then they bring in the generator and
22 the cell and the three blades and so those are all
23 laid down.

24 Now, the blades can be assembled two
25 different ways depending on the turbine. The GE

1 turbine, what they might do is assemble each blade
2 into the cell on the ground and then they'll have a
3 smaller crane lift it up -- well, a bigger crane,
4 and a smaller crane to kind of come underneath
5 typically in a vertical position and you do one lift
6 on it and hoist it in place to the generator as one
7 assembly. If you have a 1.8, for that they hook up
8 each blade individually. It's one of their newer
9 turbines. So there are different ways, it depends
10 on who the contractor is, what sort of crane you
11 have, any number of things.

12 And even the underground cable is going
13 to vary in size or diameter depending on where it's
14 at. It'll probably be a little bit thicker further
15 out and, again, they're all designed for a certain
16 size so you might have seven or eight different
17 cable sizes that are underground. The overhead
18 lines is typically 34.5 kV lines that will be
19 located in either private land immediately adjacent
20 to public road rights-of-way or in public road
21 rights-of-way depending.

22 MS. SYLVIA SCOTT: And how deep are they?

23 MR. HARTMAN: How deep are the cables?

24 It depends on whether there's drain tile or not.

25 Assuming there's no drain tile, probably a minimum

1 of three feet or more. If it's under tile, you
2 probably want to put a separation in by tile. I
3 mean individual farm tile. If you have county drain
4 tile, maybe it's a ditch or something, it might be
5 under a ditch or whatever, the county might require,
6 for clearance, in case they're going to go back to
7 make the ditch deeper, for example, in the future.

8 MS. SYLVIA SCOTT: Okay.

9 MR. HARTMAN: Does that answer your
10 question, ma'am?

11 Okay. Any other questions? No other
12 questions?

13 Again, if there aren't any other
14 questions, if you go to our website, and it's -- if
15 you go to puc.state.mn.us, you can go to Energy
16 Facilities Permitting Unit wind category, and we've
17 probably permitted 40 to 50 wind farms over the
18 years and we have our site permits in there for each
19 project. We have an open project file and then if
20 you go to the database and pull up each individual
21 permit we've issued, assuming it's new enough to be
22 on the database so you can see what the permit
23 conditions are like.

24 If you like I can send you a sample
25 permit. Permits are about 25 pages long with a lot

1 of requirements that the company is obligated to
2 comply with. If the project is permitted several
3 things would happen afterwards also. There would be
4 a number of documents that would be required to
5 submit to us prior to the start of construction. We
6 also hold a preconstruction meeting. We try to do
7 that near where the project is located, we invite
8 representatives from the county there, which might
9 be the county engineers, county commissioners from
10 the area, emergency responders, 911 so they have an
11 understanding of what's going on, what the rules of
12 the road are.

13 Once construction is complete they also
14 have additional reporting requirements and we have a
15 pre-operation meeting to specify what the ongoing
16 responsibilities are to us in terms of complaints,
17 energy production reports, a number of other things
18 like that.

19 And the reason we do that, a lot of the
20 wind farms in Minnesota now have been, I guess, sold
21 a couple times, so a lot of times when a project
22 gets sold the next developer may not know I was
23 supposed to do that. So we try to lay everything
24 out for a developer so they know what they need to
25 do in the permitting phase through our guidance,

1 documents, through our preconstruction requirements
2 as well as post operation requirements.

3 And, again, if you go to our website, if
4 you want to follow a project, see how they
5 progressed, you can certainly do that. If you have
6 any questions certainly feel free to contact me at
7 your convenience either by e-mail or by telephone.
8 Again, I do have an 800 number, it's on the card
9 back there, I don't know what it is right offhand.

10 Any other questions at all? Otherwise
11 we'll probably wrap things up here in a couple
12 minutes.

13 Yes, sir.

14 MR. RORY HARGES: Transmission lines, do
15 you have enough transmission lines to receive all
16 this power or do they have to be put in? Do you
17 have to put a whole new grid of wires in?

18 MR. HARTMAN: I think they'll be tying
19 into the existing 115 kV line out here, at what,
20 330th and 160th or 170th.

21 MR. CANTWELL: Yeah.

22 MR. HARTMAN: Which means they'll
23 probably build a project substation there, so I'm
24 assuming, if they have MISO authorization, which
25 means they would be authorized to put the energy on

1 the grid at that point.

2 MR. CANTWELL: Just to add to that. We
3 have a generator interconnection agreement signed
4 with Otter Tail Power and MISO, the organization
5 that regulates the energy flow in the Midwest. So
6 that's been signed and that indicates what sort of
7 interconnection facilities are required to bring the
8 project on line. But to answer your question, there
9 is sufficient capacity on those lines to export the
10 power without a need for additional lines.

11 MR. HARTMAN: Thank you, sir. Any other
12 questions? No other questions? I guess we'll wrap
13 it up then.

14 I'd like to thank you for attending
15 tonight. Again, I'll be here for awhile afterwards,
16 if you have questions, please come up to me,
17 certainly feel free to do so. Jamie back there is
18 also available for questions and staff from TCI is
19 here also, so please feel free to contact any of us.
20 If you have questions after tonight, please feel
21 free to call or e-mail and we'll try to do what we
22 can to answer your questions.

23 Thank you.

24 (Matter concluded.)

25