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**STATE OF MINNESOTA
OFFICE OF ADMINISTRATIVE HEARINGS
FOR THE MINNESOTA PUBLIC UTILITIES COMMISSION**

**IN THE MATTER OF THE APPLICATION BY AWA GOODHUE WIND, LLC
FOR A SITE PERMIT FOR A LARGE WIND ENERGY CONVERSIONS SYSTEM FOR A 78 MW
WIND PROJECT IN GOODHUE COUNTY**

DIRECT TESTIMONY

OF

CHARLES BURDICK

SENIOR WIND ENERGY DEVELOPER

NATIONAL WIND, LLC

ON BEHALF OF

AWA GOODHUE, LLC

JANUARY 28, 2011

DIRECT TESTIMONY OF CHUCK BURDICK

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1 **BEFORE THE MINNESOTA PUBLIC UTILITIES COMMISSION**

2 **DIRECT TESTIMONY OF CHARLES BURDICK**

3 **I. INTRODUCTION AND QUALIFICATIONS**

4 **Q: Please state your name and business address.**

5 A: My name is Charles (Chuck) Burdick and my business address is 706 2nd Avenue South,
6 Suite 1200, Minneapolis, MN 55402.

7 **Q: By whom are you employed and what is your position?**

8 A: I am employed as a Senior Wind Energy Developer at National Wind, LLC. As part of
9 my responsibilities, I am the project manager for the AWA Goodhue, LLC (AWA Goodhue) 78
10 MW wind project in Goodhue County, Minnesota. I am primarily responsible for overseeing
11 development, site control and permitting activities.

12 **Q: Who is National Wind?**

13 A: National Wind is a privately held wind development company headquartered in
14 Minneapolis. National Wind created the initial Goodhue Wind project concept and pursued the
15 project aided by investment from local individuals. National Wind acts as the primary project
16 developer on behalf of its owner, AWA Goodhue.

17 **Q: Please summarize your educational background and professional experience.**

18 A: I hold a Bachelor of Arts degree from Macalester College with majors in Mathematics,
19 Computer Science, and Music and a Masters in Business Administration with concentrations in
20 Sustainable Enterprise, Real Estate, and Entrepreneurship from the University of North Carolina
21 at Chapel Hill. I also am a LEED Accredited Professional. Prior to joining National Wind, I
22 worked on and managed complex commercial and residential real estate projects.

23 **Q: For whom are you testifying?**

1 A: I am testifying on behalf of AWA Goodhue, the applicant in this proceeding.

2 **Q: What is the purpose of your testimony today?**

3 A: The purpose of my testimony is to provide information regarding the siting process AWA
4 Goodhue used to design the project by following the Minnesota Public Utilities Commission
5 (MPUC) General Wind Turbine Permit Setbacks and Standards (Docket No. E,G999/M-07-
6 1102) (MPUC General Permit Standards) and the conditions in Office of Energy Security's
7 recommended draft site permit. I describe the impacts to the project if the MPUC were to apply
8 the Goodhue County's "more stringent standards" against it and why there is good cause for the
9 MPUC not to apply the County's standard to this project.

10 **Q: Please summarize your testimony.**

11 A: The cumulative impact of the County's setbacks eliminates virtually all sitable land
12 within the project area. In particular, the County's property line setback, its wetlands setback,
13 and its neighboring dwelling setback each, even considered independently, prevent an LWECs
14 project from being sited in our project area. In addition, I describe why there are several good
15 reasons why the MPUC should not apply the County's more stringent standards, including that
16 the standards are not supported by health or safety considerations, there is nothing demonstrably
17 unique about Goodhue County that warrant such stringent standards, and because the standards
18 are inconsistent with Minnesota's renewable energy policies.

19 **II. PROJECT OVERVIEW**

20 **Q: Please provide a general description of the project area.**

21 A: The project is located in Goodhue County, Minnesota, just west of the City of Goodhue
22 and north of the City of Zumbrota. The project permit boundary includes 32,684 acres in Belle
23 Creek, Minneola, Goodhue, Vasa and Zumbrota Townships. A map of the project area,

1 including our proposed turbine layout, is attached as AWA Ex. 1-A to Mr. Ward's testimony.
2 The entire project area lies within an agricultural area of Goodhue County. In fact, according to
3 USGS data, more than 72 percent of Goodhue and essentially the entire project area is used for
4 agricultural purposes. This is shown on AWA Ex. 3-A. As shown on AWA Ex. 3-B, we have
5 approximately 12,000 acres under site control, representing the voluntary participation in the
6 project of approximately 200 local persons.

7 **Q: Why was this area selected for the project?**

8 A: We selected the area for three primary reasons: availability of transmission infrastructure,
9 commercially viable wind resource, and landowner interest.

10 **Q: What do you mean by transmission availability?**

11 A: Like other regions in the U.S., the Midwest electrical transmission system is most
12 developed near the population centers. This presents a challenge to renewable resources,
13 particularly wind, which is often found in rural areas. For renewable resources to be brought to
14 market, available transmission infrastructure needs to already exist or new transmission must be
15 built. The study, engineering, and permitting process for new transmission infrastructure takes
16 many years and sometimes decades. For the state to meet its renewable energy goals, it makes
17 sense to try and first develop renewable resources that have access to existing available
18 transmission infrastructure.

19 Recognizing this challenge, the State of Minnesota commissioned the Dispersed
20 Renewable Generation Study to identify locations within the state's existing infrastructure that
21 could accommodate additional energy generation without the need for significant system
22 upgrades. In June 2008, the first phase of that study identified the Goodhue and Vasa

1 substations, to which the project will connect, as points on the system capable of handling more
2 power with minimal necessary upgrades.

3 **Q: Please discuss the second reason for selecting the site – wind resource.**

4 A: Like our other projects, National Wind used a combination of sources when we examined
5 the wind resources for this project.

6 The United States Department of Energy (DOE) and the Minnesota Department of
7 Commerce (DOC) have conducted wind resource assessment studies in Minnesota for more than
8 twenty years, and since 2006 the DOC has produced wind speed maps for Minnesota. In the
9 project vicinity, the mean annual wind speeds are mapped as 13.7 to 17.7 miles per hour (mph)
10 (6.14 to 7.95 meters per second) at 80 meters above ground and 15.3 to 19.0 mph (6.83 to 8.50
11 m/s) at 100 meters above ground, both of which support commercial wind projects.

12 Using this information, National Wind prepared example calculations using sample
13 turbine layouts to estimate energy production. These calculations also supported the project's
14 viability.

15 **Q: With respect to the third component, what do you mean by landowner interest?**

16 A: National Wind is a community wind developer. This means that our priority is to
17 develop projects where community members actively participate in a project's development, and
18 where the project's economic benefits flow to community members and other Minnesota
19 stakeholders. After being satisfied with the first two criteria, we then met with area landowners,
20 who then met with other landowners, and so on. Based on the strong support we received from
21 these initial landowners and investors, it made sense to further pursue developing the project.

1 From there, we held public and private meetings with more area residents to announce
2 the project and solicit interest. We raised seed capital from local investors, formed an advisory
3 board, hired field specialists, and began securing site control.

4 **Q: Please provide an overview of the process used to develop the turbine layout for the**
5 **project.**

6 A: The primary goal in siting turbines within a designated footprint is to place the turbines
7 on the most productive and efficient sites. The process is iterative and many of the inputs are
8 interrelated, meaning that as the project progresses through development, the layout is refined to
9 reflect the most up-to-date information. A turbine layout design balances a number of factors,
10 including site control, wind speeds, turbine characteristics, environmental concerns and
11 community and landowner considerations.

12 **Q: Does AWA Goodhue have a final turbine layout?**

13 A: Yes. Based on our site control, survey work, wind assessments and state and federal
14 permits, we have identified the final location for all of our structures. If the MPUC were to issue
15 a permit with the conditions in the draft site permit as prepared by the OES, and pending final
16 construction engineering, we plan to construct the project according to the layout presented in
17 AWA Ex. 1-A. To help visualize the project, HDR prepared three visual simulation photos in
18 July 2010, which are included with my testimony AWA Ex. 3-C.

19 **III. IMPACT OF COUNTY ORDINANCE**

20 **Q: Are you familiar with Goodhue County Zoning Ordinance Article 18 – the County**
21 **Wind Energy Conversion System (WECS) Ordinance?**

22 A: Yes. I have reviewed the County WECS Ordinance.

1 **Q: Are you familiar with the MPUC General Permit Standards and the conditions in**
2 **the draft site permit for this project?**

3 A: Yes. I have reviewed both the MPUC General Permit Standards and the conditions in the
4 draft site permit as prepared by the OES for this project. My understanding is that the conditions
5 in the draft site permit incorporate the provisions of the MPUC General Permit Standards as well
6 as project-specific conditions and certain other conditions that OES deems appropriate for best
7 practice. When referring to the MPUC General Permit Standards in my testimony, I am referring
8 to both the standards on their own and their incorporation into the draft site permit for this
9 project.

10 **Q: Have you analyzed the impact of the County’s “more stringent standards” identified**
11 **in the ALJ’s Second Prehearing Order.**

12 A: Yes.

13 **A. SETBACKS**

14 **Q: Section 4, subd. 1, of the County WECS Ordinance contains a setback from**
15 **property lines. What does this provision require?**

16 A: As I read it, the County WECS Ordinance requires turbine towers to be placed no closer
17 than 3 rotor diameters (RD) (i.e., the diameter of the rotor swept area) in the direction of the non-
18 prevailing wind and 5 RD in the direction of the prevailing wind from the property line of all
19 parcels of land owned by persons not participating in the project. The County WECS Ordinance
20 defines the direction of the prevailing wind as the azimuth between 290° to 30° and between
21 130° and 230°. The ordinance also defines non-prevailing wind as the azimuth between 30° and
22 130° and between 230° and 290°.

1 **Q: Is the County property line setback more stringent than the MPUC General Permit**
2 **Standards?**

3 A: Yes. The comparable setback in the MPUC General Permit Standards is its Wind Access
4 Buffer. While the County property line setback distance appears equal to that of the MPUC's
5 Wind Access Buffer setback, the two standards differ in their definition of prevailing and non-
6 prevailing wind direction. As mentioned, the County ordinance defines a 100° arc for the
7 prevailing wind direction. The MPUC General Permit Standards, however, allow applicants to
8 identify a single compass direction of the prevailing winds based on actual wind data obtained at
9 the project site.

10 **Q: What is the purpose of the MPUC Wind Access Buffer and the County's property**
11 **line setback?**

12 A: The purpose of the Wind Access Buffer is generally to preserve non-participating
13 residents' future ability to construct a wind turbine generator on their property. In that way, the
14 Wind Access Buffer provides enough space between turbines and non-participating parcels to
15 ensure that construction of the wind farm will not obstruct or diminish the viability of a later
16 wind energy conversion system on neighboring, non-participating parcels. I assume the
17 County's property line setback is intended to serve the same purpose.

18 **Q: Would application of the County property line setback change the project's current**
19 **layout?**

20 A: Yes, it would significantly change the project's current layout. Consistent with the
21 MPUC General Permit Standards and the definition of prevailing wind direction used by the
22 American Meteorological Society Glossary of Meteorology, AWA Goodhue used its onsite wind
23 data to determine that the wind blows most often from the West/Northwest along a directional

1 line of 300°. Thus, when AWA Goodhue applied the Wind Access Buffer setback to the project,
2 it used 300°, rather than the County's 290°-30° arc to determine the 5 RD prevailing wind
3 setback.

4 The map on the left side of AWA Ex. 3-D shows the areas within the project boundary
5 available to place a turbine after applying the MPUC's Wind Access Buffer. In contrast, the map
6 on the right side of AWA Ex. 3-D shows the available areas after applying the County's property
7 line setback.

8 Both of these maps show the cities of Goodhue and Zumbrota as well as US Highway 52
9 and MN Highway 58 for general context and orientation. The red line indicates the permit
10 boundary in AWA Goodhue's site permit application. The dark blue shaded areas indicates
11 property for which we signed lease agreements with the landowners and the light blue represents
12 property for which we have signed participation agreements (in which a landowner waives
13 property line setbacks in return for compensation). The yellow shaded areas indicate the
14 available area for siting turbines within our site control after applying the MPUC Wind Access
15 Buffer (map on the left) or the County property line setback (map on the right). Thus, when
16 there is a property line shared by a participating landowner and non-participating landowner,
17 both the MPUC Wind Access Buffer and the County's property line setback require that a
18 turbine be no closer than the greater of 3 RD in any direction to the property line or 5 RD along
19 the prevailing wind direction. Because the County defines 100° arcs for prevailing wind
20 direction, however, the 5 RD applies in far more directions than the single direction in the
21 MPUC Wind Access Buffer. The end difference in the setbacks are seen in AWA Ex. 3-D. The
22 available land represented in yellow is much smaller on the map on the right under the County
23 ordinance than the available land in yellow on the map on the left representing the MPUC Wind

1 Access Buffer. Thus, application of County property line setback, ignoring all others in the
2 County ordinance, precludes placement of 35 of the proposed 50 turbines. So in effect,
3 application of the County property line setback alone kills the project.

4 **Q: Is there good cause not to apply the County's setback from property lines?**

5 A: Yes. Application of the County's definitions of prevailing wind and non-prevailing wind
6 would have a significant and adverse impact on the project's current layout without providing
7 any measurable benefits to non-participating residents or the County. I assume that the intent of
8 the County property line setback and MPUC Wind Access Buffer are similar. It may make sense
9 for the County to define a range of prevailing and non-prevailing winds for small wind energy
10 conversion systems (SWECS), which are those projects under 5 MW that are actually regulated
11 by the County, because those small projects may not have access to onsite data. However,
12 because AWA Goodhue has used wind direction data that is specific to our project area, and
13 because the MPUC General Permit Standards match the technical definition used by
14 meteorologists, it makes more sense to follow the MPUC General Permit Standards here.

15 **Q: Section 4, subd. 1, of the County WECS Ordinance contains a setback from roads.
16 What does this provision require?**

17 A: I interpret this section to require that all wind turbine towers be placed at least 1.1 times
18 the total height, in our case 438 feet, from the edge of all road rights-of-way, unless that distance
19 is reduced for minimum maintenance or other low traffic roads.

20 **Q: Is the County road setback more stringent than the MPUC General Permit
21 Standards setback from roads?**

22 A: Yes.

1 **Q: What is the difference between the County road setback and the MPUC General**
2 **Permit Standards setback from roads?**

3 A: The MPUC's standards as incorporated in the OES' draft site permit require a 250 foot
4 setback from road rights-of-way, while the County requires 1.1 times the total height of the wind
5 turbine generator. For this project, the total height of the GE 1.5 xle and GE 1.6 xle wind turbine
6 generators is 438 feet. So the difference is 188 feet.

7 **Q: Would application of the County road setback change the project's current layout?**

8 A: No. Under our current layout, all turbines are at least 438 feet from any road right of
9 way.

10 **Q: Does AWA Goodhue object to application of the County's road setback?**

11 A: No.

12 **Q: Section 4, subd. 1, of the County WECS Ordinance contains a setback from other**
13 **non-road rights-of-way. What does this provision require?**

14 A: The County WECS Ordinance requires a setback of the lesser of 1.1 times the total height
15 or the distance of the "fall zone" from "railroads, power lines, etc." With no definition of "other
16 rights-of-way" and the use of an open ended "etc.", it is unclear to me what other rights-of-way
17 are intended to be included. For example, the ordinance could be interpreted such that pipelines,
18 telephone lines and microwave beam paths should also be included within this setback.

19 **Q: Is the County's right-of-way setback more stringent than the MPUC's General**
20 **Permit Standards' setback from other rights-of-way?**

21 A: Yes. The MPUC's General Permit Standards do not include a setback for other rights-of-
22 way, so application of the County's setback is more stringent.

1 **Q: Would application of the County right-of-way setback change the project's current**
2 **layout?**

3 A: AWA Goodhue adhered to a variety of setbacks from infrastructure in the area including
4 pipelines, transmission lines, and microwave beam paths, based on best practices and agreements
5 with the private owners of those easements. Assuming the definition of the County's "other
6 rights-of-way" includes pipeline easements, the result of applying the County's "other" rights-of-
7 way setbacks precludes the placement of four of our proposed 50 turbines.

8 **Q: Is there good cause not to apply the County's other right-of-way setback?**

9 A: Yes. First, the ambiguity in the ordinance language makes it difficult for the applicant,
10 the OES or the MPUC to verify whether or not the ordinance can be fulfilled for any given
11 project design. Second, we are not aware of any reports, studies, findings of fact or other
12 evidence to suggest that there is a public benefit from applying such a setback. Third, it is
13 unnecessary for the County to define a specific setback from other private rights-of-way. In
14 order to site facilities across or near these rights-of-way, AWA Goodhue must obtain a voluntary
15 private agreement with the owner of the right-of-way, and AWA Goodhue has negotiated such
16 agreements. These private owners are in the best position to evaluate the relative risk of having
17 wind farm equipment sited on or near their property and to negotiate appropriate setbacks with
18 the wind developer. It is unnecessarily restrictive for the County to dictate a specific setback in
19 these situations. Again, we believe it makes more sense to handle this according to the MPUC's
20 General Permit Standards and the OES' draft site permit.

21 **Q: Section 4, subd. 1, of the County WECS Ordinance contains a setback from**
22 **wetlands. In your view, is there any ambiguity in this section of the County WECS**
23 **Ordinance?**

1 A: Yes. Two aspects of the County wetland setback are ambiguous. First, the County
2 ordinance does not define “wetland.” It is unclear if the term is meant to include all
3 jurisdictional wetlands as defined by existing federal and state regulations, a subset of those
4 wetlands, or something entirely different.

5 Second, the setback distances says “1000 feet or 3 RD non-prevailing and 5 RD
6 prevailing.” It is unclear when the 1000 foot versus the 3 or 5 RD setback would be applied to
7 any particular wetland.

8 **Q: What did the project do to address wetlands?**

9 A: As part of the MPUC site permit process, AWA Goodhue hired Westwood Professional
10 Services to delineate all wetlands in areas likely to be impacted by construction and siting of the
11 wind turbines and associated facilities. Mr. Ronald Peterson’s direct testimony includes the full
12 wetland delineation report prepared for the project, and a summary of Westwood’s work with
13 respect to wetlands. We are not proposing to site any turbines within any wetlands.

14 **Q: Is the County wetland setback more stringent than the MPUC General Permit
15 Standards setback from wetlands?**

16 A: Yes.

17 **Q: What is the difference between the County wetland setback and the MPUC General
18 Permit Standards setback for wetlands?**

19 A: The MPUC General Permit Standards do not include a setback from wetlands.
20 Therefore, any County setback under any interpretation of the ordinance would be more stringent
21 than the MPUC General Permit Standards.

22 **Q: Would application of the County wetland setback change the project’s current
23 layout?**

1 A: Yes. Application of the County's wetland setback will eliminate 45 of the project's 50
2 proposed turbines.

3 If we assumed that "wetlands" means all wetlands in the National Wetland Inventory
4 (NWI) and Minnesota DNR designated streams, AWA Ex. 3-E shows the impact of applying the
5 County wetland setback. The map on the left side of AWA Ex. 3-E shows our turbine layout,
6 which avoids all delineated wetlands within the project area, in accordance with the MPUC
7 General Permit Standards. In contrast, the map on the right side of AWA Ex. 3-E shows the
8 impact of applying the County's wetland setback.

9 On both maps, the green lines are streams as identified by the Minnesota Department of
10 Natural Resources. The dark blue dots and slivers are wetlands of all types as identified in the
11 National Wetland Inventory. On the map on the right, the gray shaded area shows the impact of
12 applying the County's setback. Because of the impracticality of drawing a 3x5 setback on a line
13 or on an irregular shape such as a wetland, we chose a constant 5 RD setback to illustrate the
14 impact of the County's wetland setback. This is a worst-case analysis given the ambiguity in the
15 County ordinance, since 5 RD here is 1,353 feet and greater than the alternative setback of 1,000
16 feet. As shown in the map's legend, the County's wetland setback as represented by the shaded
17 area eliminates 30,241 acres, or 93% of the project area. Thus, application of the County's
18 wetland standard, ignoring all other County standards, precludes placement of 45 of the proposed
19 50 turbines.

20 **Q: Is there good cause not to apply the County's wetland setback?**

21 A: Yes. A setback from wetlands is unjustified for environmental and other reasons. AWA
22 Goodhue has already complied with a comprehensive federal, state and local regulatory scheme
23 to evaluate and mitigate impacts to wetlands, including applying for and receiving a wetlands

1 permit from the U.S. Army Corps of Engineers. Our wetland expert, Ron Peterson, discusses
2 these regulations in his direct testimony. Those regulations do not require a setback from
3 wetlands, as a setback does nothing to protect the existence of the wetland.

4 Moreover, applying even the 1,000 foot setback eliminates an enormous amount of
5 otherwise suitable acres with little perceived benefit. In the General Permit Standards docket
6 (Docket No. E,G999/M-07-1102) in 2007, OES calculated that a 1,000 foot setback from a
7 small, one acre wetland would exclude wind development on approximately 112 acres of land.
8 (DOC Comments and Recommendations, p. 5, December 20, 2007). In that docket, the MPUC
9 concluded that there was insufficient evidence to justify taking such large amounts of land out of
10 possible production.

11 Last, the ambiguity of the setback is reason enough not to apply it.

12 **Q: Section 4, subd. 5, of the County WECS Ordinance contains a setback from**
13 **neighboring dwellings. What does this provision require?**

14 A: The County WECS Ordinance requires a minimum setback distance of 750 feet from
15 commercial wind turbines to participating dwellings (including dwellings, schools, churches,
16 health care facilities, and campgrounds) and 10 RD from non-participating dwellings. It also
17 allows the 10 RD setback to be reduced through agreements with non-participating residences.

18 **Q: Is the County neighboring dwelling setback more stringent than the MPUC General**
19 **Permit Standards setback from residences?**

20 A: Yes.

21 **Q: What is the difference between the County's neighboring dwelling setback and the**
22 **MPUC General Permit Standards setback?**

1 A: The MPUC General Permit Standards require a minimum of 500 feet plus the distance
2 required to meet the Minnesota Pollution Control Agency noise standards from residences, both
3 participating and non-participating. They do not include the additional setbacks from schools,
4 churches, health care facilities or campgrounds that are required by the County WECS
5 Ordinance.

6 **Q: What setback is needed to meet the applicable MPCA noise standards?**

7 A: According to GE's specifications for the GE 1.5 xle and GE 1.6 xle wind turbine
8 generators, the setback distance to meet the MPCA noise standards from one turbine would be
9 approximately 750 feet. We provided this information in our site permit application.

10 Because multiple turbines in a specific layout near a residence can create a cumulative
11 sound impact, we hired HDR to perform sound modeling to determine the maximum sound level
12 to all residences within the project area from the cumulative effect of all of our proposed
13 turbines. To be conservative, we instructed HDR to use a 5 dB buffer below the MPCA noise
14 standards. In addition, to accommodate the concerns of landowners as much as possible, we
15 volunteered a setback of 1,500 feet for non-participating owners and 1,000 feet for participating
16 landowners. The OES adopted these setbacks in its draft site permit.

17 **Q: How long is the County's 10 RD setback as applied to the project's turbines?**

18 A: First, it is important to point out that the ordinance is based on rotor diameters for a
19 specific turbine, not a fixed-distance. For the GE 1.5 xle and GE 1.6 xle turbines proposed for
20 the project, the County's 10 RD neighboring dwelling setback would require a minimum setback
21 of 2,707 feet from a non-participating residence. This is a distance of over one-half mile, over
22 5.4 times as far as the 500 foot minimum in the MPUC General Permit Standards, and more than
23 3.6 times as far as the 750 foot setback necessary to meet the MPCA's noise standards from a

1 single turbine. It also works out to be more than 1,200 feet longer than the setback in the draft
2 site permit prepared by the OES. It is our understanding that it is longer by far than any uniform
3 setback which either the OES or MPUC have ever required for any wind project in Minnesota.

4 **Q: Would application of the County neighboring dwelling setback change the project's**
5 **current layout?**

6 A: Yes, dramatically.

7 AWA Ex. 3-F shows the impact of applying the County's neighboring dwelling setback.
8 The map on the left side of the exhibit shows the application of our voluntary 1,500 foot setback
9 from non-participants. In contrast, the map on the right side of AWA Ex. 3-F shows the impact
10 of applying the County's neighboring dwelling setback. Participating residences are shown with
11 a green house icon while non-participating residences are shown in blue. As shown in the
12 legend, our voluntary setback excludes 19,003 acres, which is already 58% of the project area.
13 Applying a 10 RD setback excludes 31,283 acres, which is 96% of the project area. The
14 application of the County neighboring dwelling setback, ignoring all others in the County
15 ordinance, would preclude placement of 43 of the proposed 50 turbines, again essentially killing
16 the project.

17 **Q: The County 10 RD setback allows turbines to be placed as close as 750 feet of**
18 **participating residences. Can't you put your turbines 750 feet from your participating**
19 **landowners?**

20 A: No. As the AWA Ex. 3-F also shows, the County's 10 RD setback for non-participating
21 landowners swallows the 750 foot setback for participating landowners in all but a few places.
22 In addition, our lease provisions require us to meet the 1,500 foot voluntary setback or other
23 minimums agreed to by our landowners.

1 **Q: Did AWA Goodhue evaluate whether it was possible to design an alternative turbine**
2 **array or even a modified project in order to abide by the 10 RD setback?**

3 A: Yes. AWA Goodhue examined three scenarios in which we attempted to site the project
4 using a modified turbine design while incorporating the County 10 RD setback.

5 **Q: What did the evaluation show?**

6 A: It showed that it is both physically impossible and economically implausible to site any
7 project within AWA Goodhue's existing site control.

8 **Q: Why?**

9 As discussed earlier, the GE 1.5 xle and GE 1.6 xle turbines are not feasible under the
10 County's 10 RD setback. As a result, we contemplated using fewer, larger turbines. In
11 particular, we looked at GE 2.75-103 turbines. These turbines generate 2.75 MW and have a
12 103-meter rotor diameter. It would take 28 turbines to fulfill the project's 78 MW PPA
13 obligation. It quickly became apparent, however, that larger turbines only made the problem
14 worse, because with larger rotor diameters, a 10 RD standard would work out to 1030 meters, or
15 3,379 feet, thus knocking even more available land out of consideration.

16 Last, we looked at using a smaller turbine. We wanted to see if there was a wind turbine
17 with a rotor diameter that would, under the County ordinance, make the setback close to our
18 1,500 foot design. For example, the 10 RD for a 45 meter rotor diameter would be 450 meters,
19 or 1,476 feet. We inquired of many turbine manufacturers but found only one of about that size
20 – an 850 kW (0.85 MW) rated turbine with a rotor diameter of 47 meters – which would be
21 available in the U.S. in 2011. Using this turbine also presented several problems, however.

22 For the smaller turbine, a 10 RD would work out to 1,706 feet, which would preclude 13
23 of our 50 turbine sites. Second, even if we mixed in the seven GE turbines that will fit with a 10

1 RD standard, we would be left with only a 36 MW project, which is less than half of the
2 project's contractual obligations. Mr. Cole Robertson's testimony further describes the
3 economic infeasibility of this concept.

4 **Q: Is there good cause not to apply the County's 10 RD setback from non-participating**
5 **dwelling's?**

6 A: Yes. There are a number of good common sense reasons not to apply the County's 10
7 RD standard. First, there are no health and safety justifications for a 10 RD setback. It is far
8 longer than necessary to protect against any plausible concerns, including either noise or shadow
9 flicker. Second, there are no unique geographic or demographic features about Goodhue County
10 that warrant application of the standard when the MPUC has not applied such standards
11 elsewhere. Last, application of the standard is inconsistent with Minnesota's renewable energy
12 policies.

13 **Q: Regarding health and safety setbacks, what leads you to conclude that 10 RD is**
14 **unnecessary to eliminate noise concerns?**

15 A: First, the testimony from our expert on noise, Tim Casey, shows that the sound levels
16 from our turbines are significantly lower than the noise limits set by the state of Minnesota. It is
17 our understanding that the sound regulations and standards set by the state are designed to be
18 protective of human health and welfare.

19 In addition, recent permits issued by the OES and MPUC for other wind farms, even
20 those subsequent to AWA Goodhue's application, contain minimum setbacks of 1,000 feet, or
21 500 feet less than the project is proposing here. I know of no site-specific features or
22 circumstances that would justify a different standard for Goodhue County.

23 **Q: Is a 10 RD needed to mitigate shadow flicker?**

1 A: No. First, shadow flicker is understood as a possible annoyance, not a concern regarding
2 health or safety. AWA Goodhue did, however, perform a shadow flicker analysis to assess the
3 expected impacts of the current layout. According to HDR's analysis, 96 percent of residences
4 within the project experience less than 20 hours of flicker each year, and all residences would
5 experience less than one percent of the total available sunlight hours in a year. Mr. Scott Zilka's
6 testimony contains the full shadow flicker report, describing the cause of shadow flicker and the
7 predicted shadow flicker impact within the project area.

8 **Q: What do you mean when you say there are no unique factors about Goodhue**
9 **County that warrant different rules?**

10 A: At the first prehearing, for instance, Goodhue County commented that it should be
11 entitled to greater setbacks because of its higher density land use patterns, etc. In other words,
12 Goodhue County appears to believe that because of its higher densities, wind energy turbines
13 may not be appropriate for the County.

14 Demographic information, however, shows that areas where the AWA Goodhue turbines
15 will be sited in Goodhue County are rural in character and are not materially different from other
16 Minnesota counties that host wind energy conversion projects. For instance, Mower County has
17 developed approximately 400 MW of wind with similar population densities to Goodhue
18 County, without significant complaints regarding health or safety. Below is a chart we compiled
19 from Minnesota State Demographic Center statistics that compares our project to a much larger
20 nearby project. As it shows, the households per square mile is not materially different between
21 counties/townships with concurrently permitted large wind projects.

1

Pleasant Valley (300W)		
Township	Households per square mile	No. of Turbines scheduled to be sited (GE 1.5)
Dexter	3.0	63
Pleasant Valley	3.5	11
Red Rock	8.1	11
Sargeant	2.9	62
Waltham	4.2	27
Average	4.34	174

AWA Goodhue (78MW)		
Township	Households per square mile	No. of Turbines scheduled to be sited (GE 1.5)
Belle Creek	4.6	38
Minneola	7.1	12
Average	5.85	50

2 Even at the township level, Belle Creek and Minneola townships, townships within the
3 project footprint, are not dissimilar to other townships that host wind energy conversion projects,
4 including the 300 MW Dodge and Mower County wind project the MPUC approved on October
5 21, 2010 just before hearing the AWA Goodhue wind project. The Mower County project
6 proposed, and the MPUC accepted, a 1500 foot setback for non-participating
7 residences/landowners.

8 In addition, we disagree that a greater population density would even require greater
9 setback distances. There are no facts that I am aware of to suggest that people's sensitivity to
10 sound, for example, is amplified by a greater number of people in proximity.

1 **Q: When you state that application of the County's standards against this project**
2 **would be inconsistent with Minnesota's renewable energy policies, what policies do you**
3 **mean?**

4 A: I generally mean Minnesota's renewable energy goals as embodied in Minnesota Statutes
5 section 216B.1691, which requires Xcel Energy to obtain 30% of its electric energy from
6 renewable resources by 2020 and for the state's other utilities to obtain 25% of their electric
7 energy from renewable resources by 2025. Other Minnesota laws also favor renewable energy
8 over non-renewable energy.

9 **Q: Why is application of the County standards inconsistent with these policies?**

10 A: The MPUC approved the two PPAs in this matter after determining that Xcel Energy
11 needed the energy to help meet its renewable energy goals in part and that the cost of the project
12 was fair to Xcel's ratepayers. If the Commission were then to impose a setback requirement that
13 makes this project effectively impossible to site, that seems to us to be counter-productive to, and
14 inconsistent with, the state's commitment to obtaining meaningful amounts of cost-effective
15 renewable energy.

16 Application of the County standards to this project is inconsistent with state policy for
17 other reasons. What the County has done with its enactment of a 10 RD setback essentially
18 makes commercial wind farms off limits within its borders. One of Minnesota's renewable
19 energy policies says that wind energy should, to the greatest extent practicable, be developed
20 before natural gas, coal, nuclear, and other nonrenewable resources. Allowing a single county to
21 essentially decide that it has no obligation to help the state meet its renewable energy goals is
22 contrary to state policy and, we believe, sends the wrong message. What if other counties were
23 allowed to adopt similar setbacks? Attached to my testimony as AWA Ex. 3-G is a map that

1 shows how little land in Minnesota is not within a half-mile of a residence. If other counties
2 adopted similar setbacks in response to project opponents, I feel that the use of the state's
3 renewable energy resources would be in jeopardy, including areas in the state with the best wind
4 resources and available transmission interconnection points.

5 Last, unreasonably long setbacks like those proposed by the County will result in
6 extremely inefficient use of the state's strong wind resource, require additional transmission
7 infrastructure, and drive up the cost of wind power, leading ultimately to higher costs for
8 Minnesota ratepayers. That is expressly counter to the state's renewable energy commitments.

9 **Q: What are the cumulative effects of the County's more stringent standards?**

10 A: The cumulative effect of the County ordinance is depicted on AWA Ex. 1-C, attached to
11 Mr. Mark Ward's testimony. As the map on the right side of that exhibit shows, by excluding
12 32,622 acres, or 99.8% of the project area, application of the County standards precludes all 50
13 of the project's proposed 50 turbines from being built.

14 **B. OTHER COUNTY STANDARDS**

15 **Q: The County's WECS Ordinance also requires stray voltage testing. Is stray voltage**
16 **from wind farms a concern for this project, particularly given the number of dairy farms**
17 **in the County?**

18 A: No. Our electrical engineer, Pete Malamen of Consulting Engineers Group, addresses
19 stray voltage in detail. Based on the basic physics of electricity and the design of a wind project,
20 there is no risk of stray voltage from the wind farm and, therefore, the testing required by the
21 ordinance is unreasonable. The design approach to mitigate stray voltage is an industry standard
22 and AWA Goodhue will require that its general contractor guarantee the work to this industry
23 standard.

1 **Q: Section 5, subd. 6, of the County WECS Ordinance regulates project lighting and**
2 **requires the project to adhere to but not exceed requirements established by the FAA.**

3 **Does AWA Goodhue object to application of this standard?**

4 A: No. The FAA has issued a Determination of No Hazard for all 50 turbines in the current
5 layout. AWA Goodhue will comply with all FAA requirements related to project lighting.

6 **Q: Section 5, subd. 8, of the County WECS Ordinance requires that all**
7 **communications and feeder lines be buried where reasonably feasible. Does AWA**
8 **Goodhue object to application of this standard?**

9 A: No. AWA Goodhue plans to bury all communication and feeder lines when reasonably
10 feasible.

11 **Q: Section 5, subd. 10, of the County WECS Ordinance contains a number of**
12 **provisions designed to mitigate damage to public infrastructure. Does AWA Goodhue**
13 **object to application of this standard?**

14 A: No. In August and September 2010, AWA Goodhue engaged in extensive negotiations
15 with Goodhue County to develop a Development Agreement, including a Road Use and Repair
16 Agreement, which sets forth the financial and operational obligations of AWA Goodhue and its
17 contractors and subcontractors. The Development Agreement includes an obligation on the part
18 of AWA Goodhue to repair any damage to area roads and public drainage, contains financial
19 performance assurances and gives great deference to Goodhue County to determine compliance.
20 The Goodhue County Board of Commissioners approved the Development Agreement on
21 October 5, 2010. The provisions of the County Ordinance are consistent with the provisions of
22 the Development Agreement. A copy of the Development Agreement is attached to Mr. Ward's
23 testimony.

1 **Q: Section 7, subds. 1 and 2, require the project to provide an acoustic study**
2 **demonstrating that the project will comply with the MPCA's noise standards. Does AWA**
3 **Goodhue object to application of this standard?**

4 A: No. AWA Goodhue has already completed an acoustic study showing that its current
5 layout complies with the MPCA noise standard. A copy of that study is included with Mr. Tim
6 Casey's testimony.

7 **IV. CONCLUSION**

8 **Q: Does this conclude your direct testimony?**

9 A: Yes.