BEFORE THE MINNESOTA PUBLIC UTILITIES COMMISSION

COMMENTS AND RECOMMENDATIONS
OF THE
ENERGY FACILITY PERMITTING STAFF

DOCKET NO. IP-6701/WS-08-1233

Meeting Date: June 30, 2011 .....Agenda Item # _____

Company: **AWA Goodhue, LLC**

Docket No. **PUC Docket Number: IP-6701/WS-08-1233**

In the Matter of the Application of AWA Goodhue, LLC for a Large Wind Energy Conversion System (LWECS) Site Permit for the 78 MW Goodhue Wind Project in Goodhue County.

Issue(s): Should the Commission grant a site permit to Goodhue Wind, LLC for the 78 MW Goodhue Wind Project?

DOC EFP Staff: Larry B. Hartman 651-296-5089

Relevant Documents

AWA Goodhue Response to EFP Request ..... June 15, 2011
EFP Letters to MnDNR and USFWS ..... June 15, 2011
ALJ (Sheehy) Findings of Fact, Conclusions and Recommendations..... April 29, 2011
EFP Supplemental Comments and Recommendations, with Addendum.....October 20, 2010

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EFP Comments and Recommendations…….....…….October 13, 2010
ALJ (Lipman) Summary of Public Testimony ..... September 7, 2010
ALJ (Lipman) Master Exhibit List from Public Hearings .....July 30, 2010
Hearing Transcripts, Volumes 1 through 4.....August 23, 2010
Site Permit Application for Goodhue Wind.....October 24, 2009

The enclosed materials are work papers of the Department of Commerce Energy Facility Permitting (EFP) Staff. They are intended for use by the Public Utilities Commission and are based on information already in the record unless otherwise noted.

Documents Attached:
1. Goodhue Wind Project Site Maps
2. Proposed Findings of Fact and Conclusions
3. Proposed Exhibit List
4. Proposed Site Permit

Note: see eDockets filings at (08-1233) or the Commission website at: http://energyfacilities.puc.state.mn.us/Docket.html?Id=25631 for additional project related documents.

Statement of the Issue

Should the Commission grant a site permit to AWA Goodhue, LLC for the 78 MW Goodhue Wind Project?

Introduction and Background

AWA Goodhue, LLC applied for a site permit on October 19, 2009; it was accepted by the Commission on November 30, 2009.

The Commission decision in this matter relies on two distinct, but related records. The first, presented to Commission in October 2010, was based on the record created pursuant to Minnesota Rules chapter 7854, the wind permit rules, and included extensive information presented to Administrative Law Judge (ALJ) Eric L. Lipman who prepared a "Summary of Public Testimony" from the July 2010 public hearing. Prior to Commission consideration of that record, Goodhue County, on October 5, 2010, enacted amendments to its Wind Energy Conversion System Ordinances that are more stringent than the standards currently applied by the Commission.

In an Order dated November 2, 2010, the Commission determined:

> … that it cannot satisfactorily resolve, on the basis of the record before it, all questions regarding the applicability of an ordinance adopted by the Goodhue County Board of Commissioners on October 5, 2010, including whether there is good cause for the Commission not to apply any

standards adopted by the Goodhue County Board that are more stringent than the standards currently applied to LWECS by the Commission.

The Commission referred the matter to the Office of Administrative Hearings (OAH) for a contested case proceeding to develop a record on these standards and whether there is good cause not to apply them. On April 29, 2011, ALJ Kathleen D. Sheehy, filed Findings of Fact, Conclusions and Recommendations regarding "good cause" and concluded, with a few minor exceptions, that there is good cause not to apply Goodhue County's standards. Judge Sheehy's Findings support the Comments and Recommendations previously submitted to the Commission in this matter by EFP staff in October 2010.

These EFP comments and recommendations, proposed findings of fact and proposed permit assume Commission adoption of ALJ Sheehy's Findings of Fact, Conclusions and Recommendations regarding Goodhue County's standards and whether there is good cause not to apply any of those standards. They incorporate relevant portions of ALJ Sheehy's report and also provide updates based on new information from ongoing surveys and studies associated with the Project through June 16, 2011.

Project Location and Land Control

The proposed Goodhue Wind Project will be located in southeastern Goodhue County on agricultural land west of the city of Goodhue and north of the city of Zumbrota. The project boundary encompasses approximately 32,684 acres and includes portions of Belle Creek (sections 1-5, 8-17, 20-29, 32-36); Goodhue (sections 17-19, 30 and 31); Minneola (sections 1-5, 8-17); Vasa (sections 35 and 36), and Zumbrota (sections 4-6, 7-9, 16-18) Townships. The topography within the site is relatively flat, but includes hills and ridges associated with water drainage. Elevation varies from 929 to 1,243 feet above mean sea level. The project area is predominantly rural and is zoned agricultural. Crops include corn, soybeans, small grains and forages. Windbreaks are common around farmsteads; willows, grasses, and sedges are found near streams and ditches.

Goodhue Wind has obtained leases and wind rights from approximately 200 landowners, for approximately 100 parcels of land totaling more than 12,000 acres of land within the project boundary. These wind and land rights easements will be used to site the turbines, associated facilities, and provide the necessary wind access buffers and setbacks defined by conditions in the site permit. The project's collector and feeder lines will be located on lands for which AWA Goodhue has the rights to use or in public rights-of-way.

Project Description

The Project for which a permit is being requested includes the following facilities:

1. The Goodhue Wind Project involves construction of a combination of up to 50 GE 1.5 MW xle and 1.6 MW xle wind generators mounted on 80 meter (262.5 foot) towers with a rotor diameter of 82.5 meters (271feet). The overall height of the tower, nacelle and blade will be approximately 121 meters (397 feet) when one blade is in the vertical position
2. Gravel access roads
3. An underground energy collection system

4. An underground automated supervisory control and data acquisition system (SCADA) for communication purposes
5. Permanent meteorological towers (up to two) that will be used as part of the communication system

Other project components and associated facilities include a concrete and steel foundation for each tower, pad-mounted step-up transformers, an operation and maintenance (O&M) building and two project substations. The northern 39 MW of the project will interconnect to an existing 69 kV transmission line adjacent to the existing Vasa Substation approximately three miles north of the project via a new 69 kV transmission line. The southern 39 MW will interconnect to an existing 69 kV transmission line near the existing Goodhue Substation. The O&M building will be located near the Vasa Substation located in the northern portion of the site.

The Project is now scheduled for an expected in-service date of June 2012.

Regulatory Process and Procedures

A site permit from the Commission is required to construct a Large Wind Energy Conversion System, which is any combination of wind turbines and associated facilities with the capacity to generate five megawatts or more of electricity. This requirement became law in 1995. The Minnesota Wind Siting Act is found at Minnesota Statutes Chapter 216F. The rules to implement the permitting requirement for LWECS are in Minnesota Rules Chapter 7854.

Certificate of Need

A Certificate of Need (CN) from the Commission for a large electric power generating plant is also required because the Project exceeds 50 MW in size (Minn. Stat. 216B.243). On October 15, 2009, AWA Goodhue filed an Application for a CN and on December 30, 2009, a Commission Order accepted the CN application [See PUC Docket No. IP-6701/CN-09-1186]. A site permit cannot be granted before a CN is issued. DOC EFP staff combined portions of the site permit public participation process with portions of the environmental review process in the CN proceeding for the Project, as has been done in several recent cases to achieve efficiencies. This included combining notices, a public information and environmental review scoping meeting and comment periods. An Environmental Report (ER) was prepared by EFP staff on June 29, 2010, for the CN proceeding. Upon completion of the environmental report, EFP posted notice of Public Hearing and Environmental Report Availability on eDockets and the Commissions web page. Notice was also published in the *Cannon Falls Beacon* on July 8, 2010, the *Red Wing Republican Eagle* on July 7, 2010, and the *Zumbrota News-Record* on July 7, 2010. The Office of Administrative Hearings conducted a public hearing on the CN proceeding, including the environmental report, on July 21 and 22, 2010.

Site Permit Application and Acceptance

On October 19, 2009, Goodhue Wind filed a revised site permit application and on November 30, 2009, a Commission Order accepted Goodhue Wind's site permit application for the Goodhue Wind Project. An EFP notice of site permit application acceptance was issued on December 4, 2009. The applicant distributed the site permit application and notice of application acceptance to local, state and federal governmental agencies and to landowners.

Preliminary Determination on Draft Permit
On May 3, 2010, a Commission Order made a preliminary determination that a Draft Site Permit may be issued for the Goodhue Wind Project and corrected the Order on May 6, 2010, by attaching the Draft Site Permit to the Order, which was not attached to the May 3, 2010, Order. This Order allowed EFP staff to proceed with the notice requirements of Minnesota Rules 7854.0800 and 7854.0900. On May 20, 2010, "Notice of Availability of Draft Site Permit" was distributed to residents and governmental agencies as required by rule. The "Notice of Availability of Draft Site Permit" was published in the *Cannon Falls Beacon*, the *Red Wing Republican Eagle*, the *Zumbrota News-Record* and the *EQB Monitor*.

Public Participation Process and Public Comments
The rules provide opportunities for the public to participate in deliberations on the LWECS site permit application. The public was advised of the submission of the site permit application after the site permit application was accepted. Public comments on information in the application and application completeness were accepted through January 22, 2010.

EFP staff received public comments on the site permit application from 10 citizens and four government agencies, and they are summarized in the EFP Comments and Recommendations presented to the Commission at its April 15, 2010, meeting in conjunction with the request for issuance of a Draft Site Permit for the Goodhue Wind Project.

On February 12, 2010, EFP staff issued a "Notice of Public Information and Scoping Meeting" to provide information about the proposed Project and to announce that a public meeting would be held on March 4, 2010 to take public comment and input on issues to be considered in the scope of the Environmental Report to be prepared for the Certificate of Need.

The EFP staff held public information and scoping meeting on March 4, 2010, at the Zumbrota-Mazeppa Middle School in Mazeppa, Minnesota, to provide an overview of the Commission permitting process and to receive comments on the scope of the Environmental Report. Approximately 200 people attended the meeting. Representatives from AWA Goodhue were also present, as was a representative of the Commission. EFP staff provided an overview of CN and LWECS site permitting processes and responded to questions. EFP staff and AWA Goodhue responded to project specific questions and general questions about wind energy. The deadline for submitting comments regarding the scope of the Environmental Report was March 26, 2010.

Approximately 110 separate written comments were received during the comment period on the scope of the Environmental Report. Concerns raised at the public meeting and in written comments included: potential impacts to property values, aesthetics, public health and safety related issues, livestock, wildlife (birds, bats, game animals and other wildlife in the project area), wildlife habitat, TV and radio reception, internet connections, GPS interference, stray voltage, loss of productive agricultural land, radar facilities, the Prairie Island nuclear facility, private landing strips, Mayo One emergency medical helicopter service, aerial crop applications, population density, setbacks, shadow flicker, noise (audible and infrasound) as a result of turbine installation, quality of life issues, water quality, road damages and turbine lighting. Other

comments raised concerns regarding the need for wind energy and suggested other fuel types, such as solar, nuclear, biomass, hydropower, and methane digesters and locating the proposed facilities elsewhere.

Goodhue Wind Truth filed a request for a contested case hearing in this matter on February 12, 2010. On April 15, 2010, the Commission considered whether to grant a contested case for this matter and whether to issue a draft site permit for the Project. On May 3, 2010, the Commission issued an Order Approving Distribution of the Draft Site Permit and Denying Contested Case but ordered that "the scope of the public hearing on the Applicant's request for a Certificate of Need proceeding in Docket No. IP-6701/CN-09-1186 is hereby expanded to the extent feasible to include siting matters related to the Draft Site Permit issued in this Order."

On July 21 and 22, 2010, a public hearing was held at the Goodhue High School in Goodhue, Minnesota, to receive public testimony on need and siting matters. Approximately 200 persons attended the public hearings, which included one afternoon and one evening session each day, and 56 persons provided oral testimony. Public comments and exhibits were recorded and entered into the record, with additional written comments allowed to be submitted on or before August 6, 2010.

Administrative Law Judge (ALJ) Eric L. Lipman presided over each session of the public hearing on July 21, 2010, and July 22, 2010. The ALJ's Summary of Public Testimony was submitted to the Commission on September 7, 2010. See Relevant Documents and Master Exhibit List.

On October 5, 2010, Goodhue County enacted amendments to its Wind Energy Conversion System Ordinances.

On October 21, 2010, the AWA Goodhue Wind Project dockets (Certificate of Need and Site Permit) were presented to the Commission for its consideration.

Commission Referral to Office of Administrative Hearings (OAH)

On October 21, 2011, the Commission addressed the question of the applicability of the requirements of Minn. Stat. 216F.081 [Application of County Standards]. In an order dated November 2, 2010, the Commission determined: "…that it cannot satisfactorily resolve, on the basis of the record before it, all questions regarding the applicability of an ordinance adopted by the Goodhue County Board of Commissioners on October 5, 2010, including whether there is good cause for the Commission not to apply any standards adopted by the Goodhue County Board that are more stringent than the standards currently applied to LWECS by the Commission." Therefore, the Commission referred the matter to the Office of Administrative Hearings (OAH) for a contested case proceeding to develop the record and to receive the ALJ's recommendations on the issues identified in its Notice and Order.

In a related order, dated November 5, 2010, the Commission appropriately decided to delay consideration of the CN docket decision (IP-6701/CN-09-1186) pending consideration of the ALJ's recommendations regarding the site docket (IP-6701/WS-08-1233).

A contested case hearing was held from March 15-17, 2011, at the Offices of the Minnesota Public Utilities Commission. The OAH record closed on April 8, 2011. Five parties participated in the hearing. EFP staff was a participant in these hearings, asking questions of witnesses as is typical in Power Plant Siting Act contested proceedings, but did not appear as a party in the proceeding.

On April 29, 2011, Kathleen D. Sheehy, Administrative Law Judge, filed with the Commission the ALJ's Findings of Fact, Conclusions and Recommendations regarding "good cause" in the matter of the Application of AWA Goodhue Wind, LLC, for a Large Wind Energy Conversion System Site Permit for the 78 MW Goodhue Wind Project in Goodhue County (Docket Number(s): OAH 3-2500-21662-2 and PUC IP-6701/WS-08-1233).

As stated in ALJ Sheehy's Findings of Fact, Conclusions and Recommendations, the purpose of the contested case proceeding was to develop the record as follows:

- Development of a record on every standard in Article 18 of the Goodhue County Ordinances on Wind Energy Conversion Systems that is more stringent that what the Commission has heretofore applied to large wind energy conversion systems (LWECS), for the purpose of making recommendations regarding whether the standard should be adopted for LWECS in Goodhue County;

- Development of a record on the question of "good cause" as that term appears in Minn. Stat § 216F.081, for the purpose of making recommendations on whether there is good cause for the Commission to not apply the standard to LWECS in Goodhue County; and

- Development of a record to determine whether there is sufficient evidence regarding health and safety to support two specific portions of Article 18: the 10-rotor diameter setback for nonparticipating residents, contained in section 4, and the stray voltage requirements, contained in section 6. (ALJ Finding 34.).

EFP staff believes that the ALJ's Findings of Fact, Conclusions and Recommendations provide the necessary basis for informing the Commission. Subsequent sections of these revised EFP Comments and Recommendations incorporate appropriate findings from ALJ Sheehy's Findings of Fact, Conclusions and Recommendations.

Standard for Permit Issuance

The test for issuing a site permit for a Large Wind Energy Conversion System is to determine whether a project is compatible with environmental preservation, sustainable development, and the efficient use of resources. Pursuant to Minnesota Statutes section 216F.02, certain sections of Minnesota Statutes chapter 216E (Minnesota Power Plant Siting Act) apply to siting LWECS, including 216E.03, subd. 7 [Considerations in designating sites and routes]. Also, the law allows the Commission to place conditions in LWECS permits [Minnesota Statutes 216F.04 (d)]. Minn.

Rule, 7854.0100 defines "Site permit" as a document issued by the Commission authorizing a person or persons to construct a large wind energy conversion system under the terms and conditions specified in the document.

EFP Staff Comments and Analysis

This comment and analysis section is based on information in the record. Where appropriate, EFP has updated this comment and analysis section to reflect new information regarding eagle activity in the project area, the possible presence of the Northern long-eared bat (*Myotis septentrionalis*), Loggerhead Shrike habitat and the Findings of Fact, Conclusions and Recommendations submitted by ALJ Sheehy on April 29, 2011. The EFP proposed findings of fact and site permit also have been revised to reflect these updates. The October 2010 EFP supplemental comments on stray voltage, neighboring dwellings and other items are also included in this section, as appropriate, and in the proposed findings of fact and site permit.

"Relevant Documents" referenced earlier, include ALJ Lipman's "Summary of Public Testimony," the "Hearing Transcript," and the "Master Exhibit List," which includes the pre-filed testimony of AWA Goodhue, LLC and AWA Goodhue Wind Truth, as well as their post-hearing comments and all other comments received at the hearing and by August 6, 2010, the deadline for comment submittal. The relevant documents also include the findings of fact, conclusions and recommendations submitted by ALJ Sheehy from the March 2011 contested case hearing as discussed above.

EFP staff has prepared a separate exhibit list, which includes many jurisdictional documents that are also part of the record, but not identified in the Master Exhibit List, submitted by ALJ Lipman in 2010. This list also includes additional exhibits efiled by EFP staff and AWA Goodhue, including correspondence from the United States Fish and Wildlife Service and Minnesota Department of Natural Resources. The exhibit list provides links to exhibits identified. All documents that are part of the site permit proceeding are available for viewing on eDockets 08-1233.

ALJ Lipman's "Summary of Public Testimony" provides a clear, but concise, overview of the issues covered by extensive oral testimony and numerous written comments submitted into the hearing record in 2010. The applicant, AWA Goodhue, and Goodhue Wind Truth both submitted pre-filed testimony and post-hearing comments into this 2010 public hearing record.

The following EFP comments and analysis are organized as follows:

Items A through D – cover topics or issues that are common to ALJ Lipman's "Summary of Public Testimony" and ALJ Sheehy's "Findings of Fact, Conclusion and Recommendations" and are immediately followed EFP analysis. These items include:

A. Turbine Noise
B. Shadow Flicker
C. Stray Voltage
D. Setbacks

Items E through K – cover topics or issues covered by ALJ Lipman's "Summary of Public Testimony" that are not covered by ALJ Sheehy's findings, followed immediately by EFP analysis. These items include:

E. Ice Throw
F. Impacts to Aircraft Radar and Air Traffic Control
G. Access to Adjacent Homes by Medical Helicopters
H. Impacts on Groundwater
I. Turbines as a "Use" within Agricultural Areas
J. Impacts on Property Value
K. Post-Installation Remedies for Damages

Item L – covers topics or issues covered by ALJ Sheehy's Findings of Fact, Conclusions and Recommendations that are not covered by ALJ Lipman's "Summary of Public Testimony" but are relevant to the site permit proceeding, followed immediately by EFP analysis. Item L reviews the following:

L. Application of specific miscellaneous provisions of Goodhue County's Wind Ordinance that apply to the AWA Goodhue Wind Project:

- Liability Insurance
- Lighting
- Feeder Line(s)
- Avoidance and mitigation of damages to Public Infrastructure

Item M – covers issues that are relevant to the site permit proceedings that generally fall outside the scope of the ALJ documents. The only topic in Item M is wildlife issues.

As noted by ALJ Lipman, in his Summary, "the record developed in this matter is considerable – including books, charts, photographs, scientific treatises and documents of every size and description…"

ALJ Lipman's observation also applies as well to the contested case hearing and exhibits offered by the parties and interested persons in the proceeding presided over by ALJ Sheehy.

A. Turbine Noise

Excerpt from ALJ Lipman's Summary

> "Numerous residents (26) of Goodhue County objected to the noise that will be produced by the wind turbines.
>
> An important focus of the hearing testimony and the later comments was the decibel level at which residents are thought by some to begin to suffer serious health impacts. The threshold level is vigorously disputed – and

both proponents and opponents of the project point the Commission toward the underlying scientific literature.

For example, the Goodhue County Planning Advisory Commission concludes that the nighttime residential noise standard of 50-55 dB set by the Minnesota Pollution Control Agency in Minn. R. 7030.0040 does not adequately protect the health of the citizens of Goodhue County. It points the Commission to the Minnesota Department of Health's 2009 publication "Public Health Impacts of Wind Turbines." In that publication, the MDH opined that the low frequency sound generated by wind turbines is a nighttime sleep issue because the walls and windows of homes block higher frequencies better than they shield out lower frequency noise. Further, MDH concluded that Minn. R. 7030.0040 appears to underweight penetration of low frequency noise into dwellings – with the possible result of sleep deprivation. The Advisory Commission believes that the research underlying the MPCA's standard is dated and that it should not be given deference by the Commission because it is not based upon current research and does not reflect current scientific knowledge. After consulting with the Goodhue County Public Health Director, the Advisory Commission advocates for a nighttime outdoor standard of 40 dB.

Goodhue residents Bruce and Marie McNamara hired sound engineer and acoustician Richard James to conduct noise tests and provide testimony relating the AWA Goodhue project. At the McNamara's request, Richard James, of E-Coustic Solutions, performed studies at test sites in Goodhue County between July 20 and 22, 2010. Mr. James opined that the nighttime noise level at an isolated residential lot in Goodhue County was 20 to 25 decibels (dBA). According to AWA Goodhue's sound modeling studies, this same property will experience a background sound level of 43 dBA once the wind turbines are in place. Mr. James concluded that the sounds of nature that currently comprise the nighttime soundscape will be replaced by the sound of wind turbines.

Moreover, Mr. James indicated that a 5 dBA increase in background sound levels is noticeable to people but unlikely to generate complaints. An increase of 10 dBA, however, often causes complaints from individuals. If there is a background sound level of 45 to 50 dBA at non-participating properties, Mr. James predicts a set of severe health impacts. Accordingly, Mr. James urges more stringent noise standards than those called for by the MPCA or the MDH.

The Applicant takes strong issue with Mr. James' calculations, methodologies, modeling techniques and the verifiability of his methods. It asserts that the average project-related noise level is quieter than the quietest average noise level in the community.

> The Applicant casts doubt on the merit of Mr. James' assessments when it argues that "Mr. James does not provide evidence of the measurements he claims to have made, does not provide an explanation of the monitoring methodology he used, and does not provide evidence concerning the quality and accuracy of the measurement equipment or if his work product has undergone a quality control review by a qualified environmental acoustician.
>
> John Meyer, a resident of Stewartville, Minnesota, argued that the noise concerns raised by those opposing the project are exaggerated. He claimed that the decibel measurements at the home sites are taken outside the residences and that the sound experienced inside these dwellings will be significantly less. He asserted the many residential air-conditioning units produce sound levels up to 76 decibels. Mr. Meyer argued that in the absence of conclusive scientific data as to the harmful effects of wind turbine noise, the Commission should approve the project."

ALJ Sheehy

ALJ Sheehy's findings (62 – 74) review the PCA noise standards for all outdoor noise, which covers both daytime and nighttime noise, and the Applicant's January 2011 updated noise study. In finding 74, ALJ Sheehy found that:

> The study results demonstrate that all of the wind turbine sites proposed by the Applicant are located sufficiently far from dwellings to meet the MPCA noise standards. The closest distance between an existing home and a proposed turbine in this project is 1,152 ft from the home of a participant.

In a separate, but related, finding (97) that addresses noise, ALJ Sheehy found that:

> The MPCA standards are consistent with the interim target level recently recommend by the World Health Organization; however, regardless of the recommendations made by the WHO or others, the MPCA's standards are the law in the State of Minnesota, and local communities are not free to disregard them.

EFP Response: Goodhue Wind evaluated the sound power level (Lp) information provided by the manufacturer of the GE 1.5 MW wind turbine to assess representative noise levels for the Project. The distance to the 50 dB (A) noise setback isolines was found to be 750 feet (229 meters). Goodhue Wind has incorporated setbacks of at least 1,000 feet (304 meters) from residences of project participants and 1,500 feet (457 meters**)** from the residences of non-participants to stay below the Minnesota Pollution Control Agency (MPCA) Nighttime Noise Limit of 50 dB(A). The noise setback was based on the calculated distance to the 50 dB (A) noise level for the highest noise or "worst case" noise scenario output associated with the wind turbines selected for this Project.

A *Wind Noise Assessment* for the Goodhue Wind Project, dated July 16, 2010, and updated in January 2011, prepared by HDR, Inc., evaluated the project noise levels at 492 receptors within and near the site. Using the Cadna-A wind turbine noise model, the maximum noise level from all wind turbines operating simultaneously at their highest rated operating speed is calculated to be 43 dB(A) at the nearest noise-sensitive receptor. The HDR analysis also indicate "noise levels of any residence will be more than 2 dB below a 45 dB(A) noise limit based on the MPCA nighttime L50 noise limit of 50 dB(A) with a 5 dB buffer as a surrogate for low-frequency noise suggested by the Minnesota Department of Health. " (ALJ finding 73 and 91)

Several members of the public have contested the appropriateness of the Cadna-A model. The Cadna-A model is based on internationally accepted acoustical standards used to calculate outdoor noise and has been used to model a variety of wind projects throughout the world, including many in Minnesota.

Some commenter's also testified that the state MPCA noise standards are inadequate to protect public health. For example, a subcommittee of the Goodhue County Planning Advisory Commission advocated for an outdoor nighttime standard of 40 dB (A). (Exhibit 18, fn.13). The MPCA's noise standards, when enacted, were based on the present knowledge for the preservation of public health and welfare. The standards adopted were consistent with speech, sleep, annoyance, and hearing conversation requirements for receivers within areas grouped according to land activities. ALJ Sheehy found that these standards are consistent with WHO interim target levels (finding 97) and that there is no scientific support in peer-reviewed literature for the proposition that wind turbines cause any adverse health effects in humans (ALJ finding 86).

The Applicant's modeling shows that, at the setback distances of 1,500 feet for non-participants and 1,000 feet for participants, the project complies with the MPCA's Nighttime L_{50} limit of 50 dB(A), its most stringent standard. Noise impacts to nearby residents and other receptors have been factored into the turbine micro-siting process, and conditions in the site permit require the project to comply with the MPCA noise standards (See section 4.3). The site permit also requires a post-construction noise study to determine compliance with the MPCA noise standards (See section 6.6).

At the Acoustical Society of America 159th Meeting Lay Language Papers, on April 19, 2010, Robert D. O'Neal from Epsilon Associates, Inc., presented a paper titled "*Low Frequency Sound and Infrasound from Wind Turbine.*" In his summary, Mr. O'Neal reported: Wind farms with Siemens SWT-2.3-93 and GE 1.5 sle wind turbines at maximum noise at a distance more than 1,000 feet from a residence do not pose a low frequency noise or infrasound problem. At this distance the wind farms:

1) Meet American National Standards Institute/ASA S12.2 indoor levels for low frequency sound for bedrooms, classrooms and hospitals;
2) Meet ANSI/ASA S12.2 indoor levels for moderately perceptible vibrations in light-weight walls and ceilings;
3) Meet ANSI S12.9 Part e thresholds for annoyance and beginning of rattles;

4) Meet United Kingdom Department for Environment, Food and Rural Affairs disturbance based guidelines;
5) Have no audible infrasound to the most sensitive listeners; and
6) Might have slightly audible low frequency noise at frequencies at 50 Hz and above depending on other sources of low frequency noises in homes, such as refrigerators or external traffic or airplanes. However, audible noise in these low frequencies already exists from other sources.

EFP staff believes that its analysis of the "Turbine Noise" is supported by ALJ Sheehy's findings at 62 - 74 and 97. As noted above, conditions in the site permit require the project to comply with the MPCA noise standards (see section 4.3). The site permit will also require a post-construction noise study (see section 6.6).

B. Shadow Flicker

Excerpt from ALJ Lipman's Summary

> "Several residents of Goodhue County expressed concerns over the impacts of shadow flicker from the rotation of the turbine blades. For example, Owen Scheffler, of Zumbrota, Minnesota, maintains that 38 residences outside the permitted footprint for the project will experience some impacts of shadow flicker.
>
> Still others worried that the shadow flicker could cause headaches and dizziness whether they were inside or outside of their homes when light was reflected off of spinning turbine blades.
>
> The Applicant's projections are that at the latitude of the project, flicker will occur during less than 1 percent of the daylight hours."

ALJ Sheehy

ALJ Sheehy's findings (75 - 80) describe the phenomenon of shadow flicker, summarize the results of the shadow flicker study prepared by the Applicant, and review the number of residences and homes and hours per year of expected flicker.

In finding (77 - 78) ALJ Sheehy noted that 278 of the 289 homes within 6,522 feet of a project turbine will be exposed to less than 20 hours of shadow flicker per year, while 248 are expected to experience less than 10 hours of shadow flicker per year. Of the 11 homes that are expected to experience more than 20 hours of shadow flicker per year, five are participants and six are non-participants. The greatest amount of expected shadow flicker at the home of a nonparticipant is 33 hours and 11 minutes per year.

In finding (101) ALJ Sheehy noted that the site permit could include conditions to address potential problems with shadow flicker, and stated that "the Commission could require the filing of a plan to mitigate any complains related to shadow flicker, through methods such as landscaping or use of blackout shades. " The ALJ also pointed out that "It is inequitable to expect that non-participating homeowners, in particular, should be wholly responsible for

mitigating those complaints" and that a permit condition would be a more targeted method of regulating potential problems with shadow flicker.

***EFP Response*:** Shadow flicker is the alternating change in light intensity when moving turbine blades cast shadows on the ground and objects, such as windows in residences. Shadow flicker is not caused by viewing the sun through rotating wind turbine blades or moving through the shadows of a wind energy facility, or by sunlight reflected from turbine blades.

Potential shadow flicker from wind turbines can only occur when (1) the sun is very low in the sky; 2) a receptor is very close to the turbine; (3) the receptor is oriented toward a turbine; (4) the receptor has an unobstructed line of sight; and (5) the weather conditions include bright sun.

When all these factors exist, they may produce a pulsating shadow which may or may not be perceptible. Shadow flicker frequency is related to the rotor speed and number of blades on the rotor, which can be converted into a "blade pass frequency" measured in alternations per second or hertz (Hz). The existence and intensity of shadow flicker are also affected by a number of factors including:

- The strength of the sun as affected by cloud cover.
- The line of sight of the observer relative to the sun and the turbine. This is related to the sun's height in the sky, which varies with latitude and longitude, time of day, and time of year.
- The distance between the observer and the turbine affects the distinctness of the shadows.
- The presence of obstructions such as buildings or vegetation.
- The orientation of the turbine depending on wind conditions. When the turbine is facing the sun, shadow flicker is greater behind the turbine; when the turbine is rotating in line with the sun, there is much less flicker.

In some instances the flickering of light can induce epileptic seizures in people who are photosensitive (about 3-5 percent of the 1 percent of Americans who are epileptic are photosensitive); however, shadow flicker from wind turbines is too slow to induce epileptic seizures. Whether light flicker will provoke a reaction depends on its frequency, light intensity, visual area, image pattern, and color (Epilepsy Foundation 2009). Flicker frequency due to a turbine is on the order of the rotor frequency, i.e., 0.6-1.0 Hz. The flicker frequency that provokes seizures in photosensitive individuals is 5-30 Hz, well above the maximum of approximately 1 Hz for wind turbines. There is no scientific data or peer-reviewed studies that suggest a link between epileptic seizures and rotor blade revolutions.

A *Shadow Flicker Assessment of the Goodhue Wind Project* was prepared by HDR, Inc., for AWA Goodhue, dated July 10, 2010, and updated in January 2011. The assessment calculated shadow flicker exposure for 289 potential receptors within the project vicinity. The assessment calculated the "actual expected shadow" based on the following inputs: (1) location of the wind turbines and receptors; (2) the topography in the project area; (3) the type of turbine used for the project (GE 1.5 MW and 1.6 MW xle turbines); (4) sunshine probability statistics from the NOAA's National Climatic Data Center; and (5) wind direction. The "actual expected shadow"

model also includes several conservative assumptions, such as assuming the wind turbines operate 100 percent of the time and that all receptors live in a "greenhouse," meaning that a receptor's view is never obstructed from any direction by walls, vegetation, other buildings or other items.

Considering these assumptions, the results of the shadow flicker modeling indicated 248 of the 289 receptors will experience less than 10 hours of shadow flicker per year, and 278 of the 289 receptors are anticipated to receive less than 20 hours of shadow flicker per year. For some receptors, shadow flicker is expected during working hours when residents may not be at home. Also, as noted above, the shadow flicker model assumed several conservative assumptions. Thus, shadow flicker is expected to be less than suggested by the modeling assumptions. More than 96 percent of the 289 receptors are expected to experience fewer than 20 hours of shadow flicker per year.

In finding 93, ALJ Sheehy found that "The Applicant has demonstrated that shadow flicker should not be a significant issue for the vast majority of participants and nonparticipants in this project area, using a 1,500-ft setback for nonparticipants."

Staff believes that Goodhue Wind has strived to minimize flicker through its micro-siting efforts, and the proposed permit calls for it to continue to do so. The proposed revised site permit at 6.2 directs the applicant to document its efforts to avoid, minimize and mitigate shadow flicker impacts. Thus, the now proposed site permit language addresses shadow flicker mitigation, as suggested by ALJ Sheehy.

There are no published standards for shadow flicker and no examples of turbines causing photosensitivity related problems. In Germany, 30 hours of shadow flicker per year is acceptable. The 30 hour number is based on the premise that the sun is shining, the building affected is occupied, the occupants are awake and the turbine is operating. The site permit does not contain shadow flicker limits.

C. Stray Voltage and Testing

Excerpt from ALJ Lipman's Summary

> "A number of residents expressed concern over the effects of stray voltage on dairy cattle.
>
> For example, Ann and David Buck, of Goodhue Township, Minnesota, own a large dairy farm within the footprint of the project. They relayed the story of an Ontario dairyman who lives near a wind farm. The dairyman notes that after a set of turbines were erected nearby, his livestock exhibited aggressive and erratic behavior, a decline in fertility, weight loss, and a high incidence of stillbirths. The dairyman believes that he was ultimately driven out of the dairy business by the health problems in his livestock. The Bucks predict that within weeks of completion of the Applicant's project, the milk production of their cows will drop significantly and the immune systems of their livestock will be compromised."

ALJ Sheehy
ALJ Sheehy's findings (145 - 155) provide a review and discussion of:

a) the requirements of the Goodhue County wind ordinance [Article 18, Section 6 Subd 1 through 3], that requires the developer of a commercial WECS to pay for two pre-construction stray voltage tests for all registered feedlots within the project boundary and within one-mile radius beyond the project boundary, informing the property owners of the results and correcting the problem if caused by the Commercial WECS;

b) the source of stray voltage; and

c) the costs of testing.

With regard to stray voltage, the ALJ in finding 151 states:

> There is no evidence that any wind farm operation has ever caused stray voltage problems of any sort. No reports of stray voltage have been associated with any of Minnesota's existing wind farms.

EFP Response: A great deal of research on the effects of stray voltage (NEV) on dairy cows has been conducted over the past 40 years. A comprehensive review of this research is presented in a report to the Ontario Energy Board (Literature Review and Synthesis of Research Findings on the Impact of Stray Voltage on Farm Operations, 2008, Prepared by Douglas J. Reinemann, Ph.D.). See eDockets 08-1233 (Doc. Id. 201010-55392-01).

Stray voltage (neutral to earth voltage, or NEV) is an extraneous voltage that appears on grounded surfaces in buildings, barns and other structures. Stray voltage (NEV) and its impact on dairy farms is normally an issue associated with electrical distribution lines and is a condition that can exist between the neutral wire of a service entrance and grounded objects in buildings. The source of stray voltage is a voltage that is developed on the grounded neutral wiring network of a farm and/or the electric power distribution system. In addition, stray voltage may result from a damaged, corroded, or poorly connected wiring or damaged insulation (contact voltage).

NEV is not associated with transmission lines. The electrical collection system proposed for the Goodhue LWECS is designed to be "a separately derived system" as defined in the National Electric Code. The system will have no direct electrical connection (including grounded circuit conductors) to conductors originating in another system. It will not connect with the local distribution systems. The wind farm collection system will have its own substation and transformers and will be connected to the transmission grid via dedicated 69 kV lines.

In addition, EFP staff has not been able to document any instances of a wind farm causing stray voltage. No reports of stray voltage have been associated with any of Minnesota's existing wind farms. Staff has also checked with the state of Wisconsin and the Province of Ontario and is unable to document any instances of a wind farm leading to or being associated with stray voltage on a dairy farm or feedlot. This was also confirmed by Dr. Reinemann (the author of *Literature Review and Synthesis of Research Findings on the Impact of Stray Voltage on Farm Operations* cited in EFP proposed finding 80), in a reply email dated October 19, 2010.

Because of the type of transformers used at each turbine and the design of the collection system, there are no ground currents in the collection system, whether the system is operating at zero generation or maximum generation. Therefore, under normal operating conditions, the grounding for the wind farm collection system has no current with which to create stray voltage.

Consequently, staff concluded in its October 2010 Comments and Recommendations that it was not necessary for the Commission to consider stray voltage testing requirements as a site permit condition. ALJ Sheehy's finding 151 on stray voltage is consistent with the EFP Comments and Recommendations.

D. Setbacks

Excerpt from ALJ Lipman's Summary

> "Related to the concerns expressed about the externalities from turbine construction, placement and operation, is a debate over the length of the appropriate setbacks. Much of the public testimony and comments received centered on this question. While differing as to their recommendations, these commentators all urge the Commission to select a setback length in the siting permit that balances the rights of interests of those participating in the project with the rights and interests of those were are not participating in the project.
>
> Mindful of both the Commission's *Order Establishing General Wind Permit Standards* provides for a minimum 500 foot setback from a home, and the Applicant's proposal for a 1,500 foot setback from non-participating residences, many commentators urged a still-larger setback of at least one-half mile. For example, Bruce and Marie McNamara urged adoption of a one-half mile minimum setback on the grounds that the Minnesota Department of Health's White Paper *Public Health Impacts of Wind Turbines* found that low frequency noise from a wind turbine is not easily perceived beyond one-half mile.
>
> Supporters of the project argued that the Applicant's tripling of the minimum setback set forth in the Commission's *General Wind Permit Standards* is sufficient and strikes the right balance between the property rights of landowners and the interests of adjacent residents.
>
> The Minnesota Department of Natural Resources (DNR) reviewed the project's site permit application, environmental report, and draft site permit, and offered several comments. First, the DNR believes that AWA Goodhue has adequately addressed the project's proximity to Pioneer State Trail and has incorporated the appropriate wind access buffer. The DNR suggests, however, that AWA Goodhue seek to further clarify the permit language by adding state-owned trails to the list of public lands included in the condition labeled "III.C.4 Public Lands" or by including a special permit condition."

ALJ Sheehy

ALJ Sheehy's findings (86 – 140) cover a number of different types of setbacks, which are as follows:

Setback Topic	Finding Numbers
Evidence Regarding Health and Safety to Support the 10-RD Setback	86 – 102
Setbacks for Roads	103 – 106
Setbacks for Other Rights of Way	107 – 113
Setbacks from Public Conservation Lands	114 – 118
Setbacks for Wetlands	119 – 130
Setbacks for Other Structures	131 – 133
Setbacks for Other Existing WECS and Internal Turbine Spacing	134 – 136
Setbacks from Bluffs	137 – 140

With regard to "Evidence Regarding Health and Safety to Support the 10 – RD Setback," the ALJ states in finding 102 that "there is good cause not to apply this section of the ordinance" and states in finding 86:

> There is no scientific support in peer-reviewed literature for the proposition that wind turbines cause any adverse health effects in humans. Although some people respond negatively to the noise qualities generated by the operation of wind turbines, there is no scientific data to show that wind turbines cause any disease process or special health condition. In addition, there are no known human health effects from shadow flicker generated by wind turbines in the scientific literature.

With regard to "Setbacks from Roads," the ALJ finds that:

> The Applicant's proposed site plan does not place any wind turbine within 438 feet from the edge of any road right-of-way. Although the County ordinance provides for a setback that is more stringent than the Commission's general wind permit standards, the Applicant's site plan would comply with both standards.

With regard to "Setbacks for Other Rights of Way," the ALJ states in finding 113 that "there is good cause not to apply this provision of the ordinance." The ALJ findings make note of some inconsistencies regarding "fall zone" language for guyed towers that would not apply to free standing towers, indicate that the Applicant has already negotiated setback agreements with the owners of rights-of-way that would be impacted by placement of a wind turbine near their property, and make note that the term "other rights of way" is not specifically defined. The ALJ

also found that there was no evidence in the record that any owner of a right-of-way in the project area has failed to adequately protect the right-of-way through agreements entered into with the applicant.

With regard to "Setbacks from Public Conservation Lands," the ALJ states in finding 118 that "there is good cause not to apply this section of the ordinance." ALJ findings (104 – 118) review what is covered by the County's definition and note that the wind buffer defines prevailing winds on fixed 100 degree north-south arcs rather than on actual prevailing wind direction information for the Project area. ALJ finding 117 states: "The County offered no evidence as to the need for a setback of this magnitude for public lands or the reason why this setback was selected.

With regard to "Setbacks from Wetlands," the ALJ states in finding 130 that "there is good cause not to apply this provision of the ordinance." The ALJ, in finding 128, found that "There is no evidence that wetlands require a setback of this magnitude to protect the environment" and also noted that wetlands and wind turbines are mutually exclusive, in that wetlands are typically located in areas of low elevation, and wind turbines are located at higher elevations.

With regard to "Setbacks for Other Structures," the ALJ states in finding 133 that "there is good cause not to apply this ordinance provision." The ALJ found (131) the County Ordinance does not define "other structures" and that the definition of "fall zone" applies only to guyed structures.

With regard to "Setbacks for Other Existing WECS and Internal Turbine Spacing," the ALJ notes in finding 136 that the "Applicant has not indicated that it has any objection to application of this provision." These findings review the county's internal turbine spacing requirements of "3 rotor diameter (RD) non-prevailing by 5 RD prevailing" setback. They also indicate that the proposed draft site permit provides for a 3 by 5 RD setback for non-prevailing and prevailing winds, with exceptions for up to 20 percent of the towers to be located closer than the above spacing, to account for topographical differences or other unforeseen circumstances.

With regard to "Setbacks for Bluffs," the ALJ states in finding 140 that "there appears to be no reason to apply this ordinance provision." The findings note that although some type of setback for bluffs would be reasonable, the project area does not include bluffs.

***EFP Response*:** Much of the discussion associated with setbacks relates to health and safety related issues, which includes health effects, shadow flicker and noise. Some of these issues are examined elsewhere in these comments; that examination is not repeated here.

Setback issues elicit sharp differences of opinions, with no consensus. Extensive information on noise, health and safety related to wind turbines is available in peer reviewed articles and in print and electronic format documents produced at all levels of government, academics, business and industry. Both the Department of Health Services in the State of Wisconsin letter dated July 19, 2010, from Seth Foldy, State Health Officer and Administrator, to Edward Marion [eDockets 08-1233, Doc Id. 201010-55414-01], and an August 13, 2009, letter from the Commissioner of the Minnesota Department of Health to Mr. and Mrs. Anderson offer summaries of this information.

State of Wisconsin Department of Health Services

DPH recognizes that wind turbines create certain exposures; audible sound, low-frequency sound, infrasound and vibration, and shadow flicker. Certain ranges of intensity or frequency of audible sound, low frequency sound, vibration and flicker have been associated with some objectively-verifiable human health conditions. Our review of the scientific literature concludes that exposure levels measured from contemporary wind turbines at current setbacks do not reach those associated with objective physical conditions, such as hearing loss, high blood pressure, or flicker-induced epilepsy.

DPH staff previously reviewed the five reports you referenced in your letter. They also reviewed over 150 reports from the scientific and medical literature (published and unpublished) pertinent to the issue of wind turbines and health. DPH has also taken time to listen to, and respond to concerns voiced by local residents, municipalities, and local health department officials from across the State of Wisconsin. We have discussed this issue with colleagues at UW School of Medicine and Public Health, the Minnesota and Maine state health departments, and the Centers for Disease Control and prevention. From this we conclude that current scientific evidence is not sufficient to support a conclusion that contemporary wind turbines cause adverse health outcomes in those living at distances consistent with current draft rules being considered by the Public Service Commission.

This is different from saying that future evidence about harm may not emerge, or that wind turbines will not change over time, or that annoyance and other quality-of-life considerations are irrelevant. DPH does not endorse a specific setback distance or noise threshold level relating to wind turbines. Nevertheless, in keeping with standard public health practice, DPH favors a conservative approach to setbacks and noise limits that provides more-than-minimum protection to those who live or work near wind turbines. These will help minimize local impacts on quality of life and serve as a buffer against possible unrecognized health effects.

… The most valuable studies would assess subjective complaints and objective clinical measurements in the setting of controlled or known environmental exposures. Such clinical studies fall outside the scope of standard public health investigations.

As additional scientific evidence becomes available, DPH will continue to appraise its relative strength, credibility, and applicability to the issue of wind turbine development in Wisconsin.

Minnesota Department of Health

> In a letter to Mr. and Ms. Anderson, [Docket No. 08-1449 (Doc. ID. 20098-40926-01)], dated August 13, 2009, MDH Commissioner, Sanne Magnan, M.D. Ph.D, responded to specific questions posed by Mr. Anderson as follows:
>
> *Are current standards in Minnesota safe?* Regulatory standards protect health and safety, but whether for air, water or Noise, regulators do not set "bright line: standards without also considering cost, technical difficulties, possible benefit and alternatives. No regulatory standard offers absolute safety. The Minnesota Department of Health can evaluate health impacts, but it is the purview of regulatory agencies to weight these impacts against alternative and possible benefits.
>
> *Are the proponents of wind turbines syndrome mistaken?* As noted in the "White Paper," the evidence for wind turbine syndrome, a constellation of symptoms postulated as mediated by the vestibular system, is scant. Further, as also noted, there is evidence that the symptoms do not occur in the absence of perceived noise and vibration. The reported symptoms may or may not be caused by "discordant" stimulation of the vestibular system.
>
> *Does more study of adverse effects need to be undertaken?* More study may answer questions about the actual prevalence of unpleasant symptoms and adverse effect under various conditions such as distance to wind turbines and distribution of economic benefit. However, there is at present enough information to determine the need for better assessment of wind turbine noise, especially at low frequencies. Such assessments will likely be beneficial for minimizing impacts when projects are sited and designed. Also, even without further research, there is evidence that community acceptance of projects, including agreement about compensation of individuals within project areas, will result in fewer complaints. Therefore more research would be useful, but the need will have to be balanced against other research needs.

Similar conclusions and positions have also been taken by the state of Maine, the province of Ontario and others.

EFP staff agrees with ALJ Sheehy's findings regarding setbacks and, therefore, has not included these Goodhue County ordinance requirements in the proposed permit. However, the proposed permit does include the applicant's commitment to setbacks of 1,000 feet and 1,500 feet from participating and non-participating landowners, respectively, and the proposed findings of fact note that the applicant's proposed site plan does not place any wind turbine within 438 feet from the edge of any road right-of-way.

Turbine setback requirements are included in the site permit in numerous places and specifically address setbacks related to residences, non-participating landowners, public lands, roads, microwave beam paths, compliance with state noise standards, site permit boundary, wind rights, wake loss and wetlands.

With regard to the DNR's comment on setbacks from state-owned trails, staff notes that setbacks from trails are evaluated in a Commission dockets on a case by case basis, in keeping with the Commission's Order issuing the General Permit Standards. In this instance, the DNR has not provided any information in support of a setback for the Pioneer Trail. It should be noted that DNR commented that: "AWA Goodhue Wind has adequately addressed the project's proximity to the Pioneer State Trail…." Further, EFP staff does not believe that "trails or snowmobile trails" warrant the same treatment as public lands.

E. Ice Throw

Excerpt from ALJ Lipman's Summary

> "A number of residents expressed concern over the damage that could be caused if large chunks of ice were permitted to build up on turbine blades and were later thrown from the moving blades.
>
> For example, Douglas and Eileen Sommer criticized as unworkable AWA Goodhue's plan to "provide a means of alerting people coming within 300 meters (984 feet) for the potential of an icing condition near the turbine." The Sommers assert that there should be minimum setbacks on heavily traveled roads of between 1000 to 1500 feet. Included with their comments was a booklet published by turbine manufacturer General Electric, entitled "Ice Shedding and Ice Throw – Risk and Mitigation."
>
> Eager to protect snowmobilers in the event of ice throw, the Department of Natural Resources (DNR) recommends that any siting permit include a condition requiring either a setback from snowmobile trails in the area for safety purposes, or a requirement that the Applicant consult with DNR staff regarding trail locations."

EFP Response: In winter months, ice (rime or glace) can form on a turbine given the right combination of temperature and moisture. Rime ice occurs when objects such as trees, power lines or wind turbines are exposed to low temperatures when fog is present. Depending on the duration of the ice conditions, significant amounts of rime ice can build up on the turbine and blades, which will lead to an increase in static and dynamic load conditions on turbine blades. Glace ice occurs when a warm front moves in above cold air. The subsequent falling rain can cool down to temperatures below the freezing point without freezing into solid ice. If the cold rain hits the surface or objects with temperatures below 32 degrees, it will turn into a layer of solid ice.

Studies indicate that the majority of ice throws are small, typically less than two ounces, though larger ice fragments can occur. The majority of ice throws occur within the turbine rotor diameter.

Typically under icing conditions, the turbine would shut down if the blades become unbalanced and the vibration sensors stop the turbine. As weather conditions change, any ice will normally drop off the blades in relatively small pieces before the turbines resume operation. This is due to flexing of the blades and the blades' smooth surface.

Long-term data from the Minnesota Climate Center indicate that icing occurs about 2.5 days per year in Minnesota. Although turbine icing is an infrequent event in Minnesota, it remains important that the turbines are not sited in areas where regular human activity is expected below the turbines during the winter months. Staff believes that turbine setbacks from residences and roads are adequate to minimize impacts from ice throw. No impacts from wind turbine ice throws have been documented in Minnesota. See Finding 76 and site permit at section 4.

F. Impacts to Aircraft Radar and Air Traffic Control

Excerpt from ALJ Lipman's Summary

> "Several residents expressed concern that rotation of large numbers of turbine blades would interfere with radar for military aircraft and air-traffic control. Particularly because the project footprint is not far from the Prairie Island Nuclear Facility, these individuals expressed the concern that untoward effects upon civilian and military radar presents a national security threat.
>
> Rochelle Nygaard, of Belle Creek Township, Minnesota, submitted the statement of Nancy Kalinowski, Vice President for System Operations Services with the Federal Aviation Administration. Ms. Kalinowski testified before the U.S. House Armed Services Committee in July of this year regarding the impact of wind farms on military readiness. Ms. Kalinowski testified that "[t]he clutter that is created by wind turbines can result in a complete loss of primary radar detection above a wind farm. When that clutter occurs, it appears at all altitudes, so simply directing the aircraft to a different altitude does not solve the problem."

EFP Response: Wind turbines may impact radar systems, e.g., radar used for aviation, if they are in the radar line of sight. Impacts may include an impairment of the ability to detect and track aircraft. Impacts can be mitigated by avoiding the placement of wind turbines in radar lines of sight. All structures in excess of 200 feet in height must be authorized by the Federal Aviation Administration.

FAA review through its airports division coordinates review with the Air Force, which also represents the Army and Navy, and Homeland Security and includes coordination and review with: a) the service area office which is responsible for evaluating the proposal from the standpoint of safe and efficient use of airspace by aircraft; b) the flight procedures office which is responsible for evaluating proposals to determine impacts on instrument procedures and whether aircraft instrument operation can be conducted safely; c) the flight standards division which is responsible for reviewing proposal to determine the safety of aeronautical operations, and of persons and property on the ground; d) the flight standards district office which is responsible for seaplane bases and heliports; and e) and the technical operations services area office which is responsible for reviewing engineering studies on airport proposals to evaluate their effects upon commissioned and/or proposed navigation aids, electromagnetic studies to evaluate the project on air navigation and communication facilities, and line-of-site (shadow) studies to determine impact on control tower visibility and frequency management problems and reserving frequencies.

Turbine locations in the proposed site plan have cleared the required reviews. If any turbine locations are changed prior to construction, Goodhue Wind must provide notice to and receive a determination of "no hazard" from the FAA and Minnesota Department of Transportation, Aeronautical Division. The project will comply with FAA requirements with respect to turbine location and lighting requirements. This is addressed in the site permit at section 4.12 and 7.18.

G. Access to Adjacent Homes by Medical Helicopters

Excerpt from ALJ's Summary

> "Some Goodhue County residents expressed concern about the ability of emergency medical helicopters to fly and land within the project area.
>
> At the public hearing and thereafter, residents debated whether "Mayo One" helicopters could safely respond to medical emergencies occurring in the vicinity of placed turbines. Proponents and opponents of the project differed sharply as to whether the presence of wind turbines greatly increased the safety risks to helicopters, crew and passengers during such missions. Moreover, each side claimed that officials of the Mayo Clinic subscribed to their view as to the relative impacts turbines had on rescue missions."

EFP Response: There is no reason to conclude that the project poses any more risk to medical helicopters than any other wind farm located in the state. Officials at Mayo Clinic in Rochester have noted that impacts on helicopter operations due to wind projects in the area have been insignificant. (Environmental Report, p. 43.) (Exhibit 24).

H. Groundwater

Excerpt from ALJ's Summary

> "Some commentators expressed concerns over the potential for groundwater contamination from the project and the run-off that might be created by establishing additional impervious surface adjacent to the turbines.
>
> For example, Erin Logan, a resident of Mineola Township, Minnesota, expressed concern that there would be significant impacts to groundwater when establishing the foundations for the proposed turbines. She asserts that the current siting of the project endangers one area that is highly-sensitive to groundwater contamination and four other areas that are very-highly-sensitive to groundwater contamination. Ms. Logan likewise disputed the accuracy of the Applicants estimate of the number of domestic wells within the project area."

EFP Response: Minnesota has nearly 2,000 wind turbines in operation or under construction. EFP staff is not aware of any adverse impacts to groundwater from the installation of wind turbine foundations. AWA Goodhue Wind will also design and implement a Storm Water Pollution Prevention Plan that identifies control measures for storm water pollution prevention during all phases of construction. Control measures will be inspected and documented on a weekly basis and within 24 hours of a 0.5-inch rain.

I. Turbines as a "Use" Within Agriculture Areas

Excerpt from ALJ Lipman's Summary

"Several commentators questioned whether wind turbines were the best – or an appropriate – use on agricultural lands. Thus, a key question that divided commentators during the public hearings was whether turbines "harvest the wind" in the same way that heavy farm machinery harvests crops, or rather that wind turbines are better categorized as an "industrial" use. The commentators part company over the meaning of "farming" in modern day.

This debate manifests itself in the record in a number of different ways, but perhaps none more sharply than as to the residents' competing interests in the scenery along and above the horizon. Among the most difficult policy questions raised during the proceedings is the extent to which a landowner in an agricultural area has an interest in the "view shed" that lies above neighboring properties. Several commentators noted that they reside in Goodhue County precisely because of its rolling hills and picturesque landscapes – and the investments that they have made in their homes would be harmed by the siting of wind turbines along the horizon. Still other commentators argued that the ability to access the wind above a particular parcel is a central part of the land's productive potential and its value.

State Representatives Steve Drazkowski and Tim Kelly urge the Commission to sharpen this question still further by focusing on the special features of agricultural uses within the Project Area. They draw a distinction between Goodhue County and the areas in western and southern Minnesota that have successfully hosted wind farms. They argue that western and southern Minnesota is better suited to wind farms because it has flat terrain, is dominated by large crop farming operations, is not densely populated, and has fewer livestock operations. Conversely, Goodhue County has rolling hills and bluffs, is more densely populated per square mile and is home to many dairy farms. Within the AWA Goodhue Wind site boundary, some portions of the site preclude turbines because of population density. As with other windfarms located elsewhere in Minnesota, turbines are located so as to comply with setback requirements in Commission issued site permits. Population density is a significant factor in determining where wind turbines may be located. If the population density is too high, developers will not be able to comply with the site permit setback requirements from homes.

A different, but related question is whether the installation of turbines unreasonably interferes with the expectations of adjacent cities. For example, in August of 2009, the City of Goodhue passed a Resolution memorializing its opposition to "any wind tower facilities within two miles of the limits of the City of Goodhue." Similarly, in January of 2010, the City Council of the City of Zumbrota urged the Commission to "restrict the project area to two miles from the Zumbrota Corporate Limit." City officials, and others, assert that such zones without wind turbines are needed so as to permit later orderly development by these same cities. For its part, the Applicant asserts that the Cities' concerns over land for future development are not well grounded – because "less than 50

acres of farmland within the over 32,000 acre boundary are estimated to be permanently impacted by the Project."

Lastly, Erin Logan, a resident of Mineola Township, expressed concerned that the proposed project will utilize more prime farmland than is allowed under the Prime Farmland Exclusion. She urges the Commission to inquire into the number of prime farmland acres impacted by the project. As to this point, the Applicant asserts that the cited exclusion does not apply to the siting of Large Wind Energy Conversion Systems."

EFP Response: Minnesota has been a host to large wind energy conversion systems since 1993. LWECS projects permitted by the state and nearly all projects permitted by local units of government, primarily counties, have been located on agricultural lands. Over these 17 years, wind energy development has proven itself to be compatible with a variety of agricultural practices, including dairy, beef, poultry and a variety of field crops. Numerous farms in Minnesota that host wind turbines are similar in size and practices to the farms in the project area. While there may be more dairy farms within the footprint of this project, dairy operations are not inconsistent with wind energy development.

Legislative policies in Minnesota presently restrict development of nuclear and coal facilities and have directed utilities to add a significant percentage of renewable energy facilities to their generation assets. Consequently, utilities and independent power producers are advancing projects to implement this legislative directive. Development of wind energy facilities in Minnesota took place where the wind resource was most abundant, namely Buffalo Ridge in southwestern Minnesota. Over time and with advances in wind turbine technology, other parts of the state have become viable areas for wind energy development.

The Goodhue Wind Project will be located in an area that is zoned for agriculture, which is an important economic sector in Goodhue County. The Project is consistent with the Goodhue County Comprehensive Plan, adopted in 2004, and lies completely outside the city limits of any incorporated municipality and outside any Urban Fringe District identified in the 2004 Goodhue County Zoning Districts map.

Large wind energy conversion systems have been identified in the comprehensive plan as a compatible land use that complements and enhances existing agricultural infrastructure. The plan encourages cities to recognize the surrounding agricultural needs in their comprehensive plans. The county's policy regarding lands outside city growth zones stipulates they "will be considered rural and shall be managed to preserve the rural character and the continued operation of agricultural uses, their inherent activities, and lifestyle." The Economic Development policy related to agricultural industry includes ways to "preserve the land to support agricultural industry…and support the development of innovative industrial agricultural uses such as ethanol production, wind generation, buckwheat cleaning."

The project also lies outside the Low Density Residential/Urban Fringe/Agriculture land use zone identified in the 2003 Future Land Use/Transportation Plan map developed as part of the *TH 52 Corridor Zumbrota Sub-area Land Use/Transportation Study.* The city of Zumbrota,

Goodhue County and Minneola, Pine Island, Roscoe and Zumbrota townships participated with Mn/DOT – District 6 in the study.

While both the cities of Goodhue and Zumbrota have requested that no turbines be placed within a two-mile buffer of each city's municipal boundaries, neither has an adopted comprehensive plan relating to future growth or expansion out two miles. In the proposed layout, no turbines will be sited within two miles of Goodhue; however, the proposed layout includes four turbines located on private land within two miles of Zumbrota, with the closest turbine approximately 1.5 miles from Zumbrota's northern municipal boundary.

Minnesota Statutes section 216F.07, provides that a site permit issued by the Commission "supersedes and preempts all zoning, building, or land use rules, regulations, or ordinances adopted by regional, county, local, and special purpose governments." None the less, land use issues are an important factor in siting wind projects and staff believes that local government planning and zoning have been appropriately considered in this docket and in development of the permit for this project.

With regard to Ms. Erin Logan's inquiry concerning compliance with the Prime Farmland Exception in Minnesota Rules 7850.4400, subp. 4, that section of Minnesota Rules applies to thermal energy facilities, not LWECS. The siting of LWECS is covered by Minnesota Statute section 216F.02 and Minnesota Rules chapter 7854. The wind turbines and access roads are expected to permanently displace approximately 50 acres of agricultural land, which is considerably less land than what is expected to be displaced by ex-urban development in the project area or lands removed from agriculture to accommodate growth projections by the cites of Goodhue and Zumbrota. The site permit in section 7 and elsewhere provides for numerous mitigation measures on agricultural lands.

J. Property Values

Excerpt from ALJ's Summary

> "A number of those participating in the public hearing, and submitting comments thereafter, expressed concerns over the impact of the wind farm project on property values in Goodhue County. State Representatives Steve Drazkowski and Tim Kelly, for example, noted that their discussions with local real estate agents, as well as landowners who have listed their property for sale, lead them to believe that property values will be negatively affected by the installation of the wind farm project. Some commentators suggested that land values could drop by 30 percent or more.
>
> Schleck and Associates, appearing on behalf of Steve Groth and Ann Buck, suggested that AWA Goodhue be required to buy Property Value Guaranty Insurance for the non-participating property owners whose property values will be negatively affected by the project."

EFP Response: The value of a particular property is influenced by numerous factors, making it difficult to ascertain the impact of one factor, such as the presence of a wind turbine. The best evidence on the subject matter is the Lawrence Berkley National Laboratory "The Impact of

Wind Power Projects on Residential Property Values in the United States" (Dec. 2009) study. That report shows an absence of negative impacts to property values from wind farms within a project view shed. "A Study of Wind Energy Conversion System in Minnesota," prepared by the Stearns County, Minnesota, Assessor's Office (June 1, 2010) asked assessors from Dodge, Jackson, Lincoln, Martin, Mower and Murray counties "if they have seen any changes on properties hosting a wind energy conversion system and on properties adjacent to property with a tower located on it." Their responses noted that there were "no changes," but also indicated that "The collected data is insufficient to allow for a reasonable analysis of the effects of wind energy development on land values."

Because it is difficult to determine what effect the construction of the turbines will have on property values, some residents suggested that the Permittee be required to purchase property value guaranty insurance for non-participating property owners. The Commission has not required any other wind project in Minnesota to purchase such insurance and EFP staff finds no rationale for doing so here.

K. Post-Installation Remedies for Damages

Excerpt from ALJ's Summary

> "…Robert Weiss, General Manager of Hector Communications, commented on behalf of Sleepy Eye Telephone Company. Sleepy Eye Telephone Company has buried copper cables and fiber optic cables in the right-of-ways of Goodhue County roads. The company is concerned that the transmission lines carrying the electricity generated by the wind turbines may create electrical interference with the underground cables, rendering them unusable. Mr. Weiss asserted that a similar situation occurred near Lake Benton, Minnesota, at the Buffalo Ridge wind facility. The company contends that any costs to mitigate or eliminate noise problems on the company's buried cables that can be linked to the wind project should be borne by AWA Goodhue."

***EFP Response*:** Sleepy Eye Telephone Company, a wholly owned subsidiary of Hector Communications, and the telephone service provider in the project area expressed concern about the potential for its telephone service being impacted by interference from overhead power lines paralleling public rights-of-way where its copper cables are located. Hector Communications asked that the electrical noise and interference issue be addressed in the final order issued by the Commission. In an October 4, 2010, memorandum to Goodhue County staff, Goodhue Wind indicated that:

a) The GE 1.5 and 1.6 MW state-of-the art MW wind turbine generators have full AC/DC/AC converters to eliminate electrical noise and interference by electrically isolating the WTG from the grid.
b) Road crossings will be made as necessary to mitigate interference.
c) Goodhue Wind plans to install an optional electrostatic shield on the transformers between the high side/low side windings which will eliminate any coupling due to capacitor resonance as a good practice measure.
d) Goodhue Wind also plans to be fully compliant with MISO/FERC/Xcel/GRE Good Electric Industry practice which includes IEEE 519 and 820 compliance standards.

e) Goodhue Wind will also conduct a detailed harmonic analysis to eliminate any coupling due to harmonics above the 14th harmonic.

Goodhue has also indicted that it will make every effort to keep the electrical noise and interference below established threshold levels and work closely with Sleepy Eye Telephone Company and Goodhue County during the design and engineer phase. Interference issues are also addressed in the site permit at section 4.15 and 6.4, which requires the permittee to alleviate any disruptions or interference of services caused by turbines or associated facilities.

L. Application of specific miscellaneous provisions of Goodhue County's Wind Ordinance that apply to the AWA Goodhue Wind Project

ALJ Sheehy
ALJ Sheehy's findings (156 – 169) identified several "Miscellaneous Sections" from Goodhue County's Wind Energy Conversion System Ordinance that could be applied without conflicting with the Commission's general permit standards.

Liability Insurance
Findings (156 – 158) examined the County's requirements (section 3, subd. 6) for commercial WECS to "provide proof of liability insurance covering the towers/project covering the lifespan of the project from the initial construction to final decommissioning." The ALJ noted that the requirements of the Power Purchase Agreements approved by the Commission and Development Agreement with the County contain similar requirements.

ALJ Sheehy's finding (158) found that:

> The Commission's general permit standards do not explicitly require liability insurance, but liability insurance is a requirement of the Power Purchase Agreement (the approval of which is a condition of the site permit). The ordinance could be applied without conflicting with any of the Commission's general permit standards."

Lighting
Findings (159 – 161) reviews County's ordinance (Section 5, subd. 6) that require "a commercial WECS to adhere to, but not exceed, FAA permits and regulations. It further provides that red strobe lights are preferred for night-time illumination to reduce impacts on migrating birds, and that red pulsating incandescent lights should be avoided."

The ALJ also noted that "it appears that the ordinance is generally consistent with the Commission's permit standards and is not more stringent. The FAA has issued a Determination of No Hazard for all 50 turbines in the current layout. The ALJ concluded that "The ordinance could likely be applied without conflicting with the general wind permit standards."

Feeder Lines
Findings (163 – 166) examined the County's requirement (Section 5, subd. 8) "that all feeder lines equal to or less than 34.5 kV, installed as part of a WECS, shall be buried where reasonably feasible." The ALJ's findings noted that the Commission allows for overhead or underground placement of feeder lines; however, it must be done with the concurrence of the landowner if on private property or located in public rights-of-way, upon obtaining the required permits from the responsible governmental unit.

In finding 166, ALJ Sheehy found that:

> It is hard to stay that the ordinance is "more stringent" than the Commissions' general wind permit standards, because the ordinance requires "burial where reasonably feasible" and the Commission's standard requires the Applicant to do whatever the landowner wants to be done. These standards are virtually identical. It would not be necessary to apply the ordinance to achieve the same result.

Avoidance and mitigation of damages to Public Infrastructure
Findings (167 – 169) examined the County's requirements (Section 5, subd. 10) for "commercial WECS to provide a cash escrow or irrevocable letter of credit in an amount equal to 125% of the cost to repair anticipated damages to public infrastructure, including public roads and drainage systems as determined by the road authority."

The ALJ in finding 169 states: "The ordinance provision could be applied without conflicting with the Commission's general permit standards."

EFP Response: The site permit in the Commission's packet at section 13.2, Application of Goodhue County Standards, contains language the covers liability insurance, lighting, feeder lines, and avoidance and mitigation of damages to public infrastructure.

M. Impacts on Wildlife

Excerpt from ALJ Lipman's Summary

> "Several residents expressed concern over the impacts that wind turbines would have upon birds and wildlife in Goodhue County. They assert that the development of the project is likely to cause increased bird and bat mortality due to collisions with the turbines or their infrastructure; decreases in population due to loss and fragmentation of habitats; and disruption of migration flyways. For example, Betty Olson, of Zumbrota, Minnesota, submitted several articles as to the effect that wind turbines have had on wildlife.
>
> Second, while mindful that AWA Goodhue proposes to avoid an area of significant biodiversity (in Township 112N Range 16W Section 36), the DNR recommends that avoidance of this area be included by the Commission as a condition of the permit.

Likewise, the DNR urges AWA Goodhue to consult with it and the U.S. Fish and Wildlife Service upon completion of two pending surveys commissioned by AWA Goodhue: the Loggerhead Shrike Habitat Assessment and the Pre-Construction Avian Spring Migration Survey.

Finally, while commending AWA Goodhue for its pledge to notify the DNR whenever a large number of birds or bats are killed by collisions with the turbines, the DNR recommends that the site permit clearly establish the Applicant's reporting responsibilities. The DNR suggests that AWA Goodhue be obliged to make a report to the DNR in the event that five or more birds or bats are killed by the turbines within a single week."

2011 Update on Avian, Bat and Loggerhead Shrike Survey and Monitoring

EFP staff on June 3, 2011, sent a letter to AWA Goodhue requesting an update on natural resource features and survey work undertaken since the Commission's October 2010 meeting. AWA Goodhue Wind responded to this request on June 13, 2011 (See Exhibit 22 or Relevant Documents). AWA Goodhue's responses and subsequent follow up are summarized below.

<u>Eagles</u>

Spring 2011 reports from concerned citizens, filed with several federal and state agencies, commented on the presence of observed bald and golden eagle activity and potential new eagle nest sites within the project footprint.

Westwood wildlife biologists, consultants for the Applicant, investigated these locations on June 6 and June 8, 2011. Of the 12 nesting locations, five documented active bald eagle nests were observed; three were previously known and documented, and two were new since last year. The other reported nests were determined to be sites that were already documented, new but abandoned, or duplicate locations. The recent field verifications concluded an additional 22 hours of survey work.

On June 9, 2011, Applicants, U.S. Fish Wildlife Service (USFWS), DNR and EFP staff held a conference call to determine the scope and duration of ongoing bald eagle monitoring activities. Future monitoring efforts will be shifted to turbine cluster locations near known nests to document eagle movements in these areas. AWA Goodhue is developing survey protocol that will identify proposed point count locations, suggested count duration and number of survey visits. Multiple point count visits would be conducted over the next month to cover the remainder of the 2011 nesting season (eaglets are expected to fledge by mid-July). Additional point counts would be conducted in the fall of 2011 and the winter of 2011-12. It was suggested that details of this plan be included in AWA Goodhue's Avian and Bat Protection Plan.

Citizen reports also suggested the presence of Golden Eagles in the project area. AWA Goodhue Wind verified that two Golden eagles with radio transmitters were in Minnesota and southwestern Wisconsin in the winter months. The movement of these birds is tracked by the National Eagle Center and the Minnesota Audubon Society. One of the birds was found to have made forays into Goodhue County, but no nests or sightings were seen.

Bats

Applicants conducted a desktop avian and bat risk assessment in October 2009 and determined that: (1) bats found in the project area are common species, and (2) fatalities would likely range from 1-2 bats/turbine/year.

In a June 2, 2011, letter from the USFWS, it was noted that the Northern long-eared bat (*Myotis septentrionalis*) is under consideration for listing, thus affording the species protection under the Endangered Species Act. Northern-long eared bats have been documented within five miles of the project boundary. Due to the change in status of this species, the USFWS is recommending the installation of anabat detectors for collecting site specific bat data regarding bat activity and species composition within the project area. Monitoring of bats will be included in AWA Goodhue's Avian and Bat Protection Plan (Site Permit section 6.7 and 13.1).

AWA Goodhue's Avian and Bat Protection Plan will address strategies, based on the survey results, for mitigating impacts to bats (Site Permit section 6.7.2 and 13.1).

Loggerhead Shrike

The July 2010 Loggerhead Shrike Habitat Survey identified suitable habitat for the state-listed threatened Loggerhead Shrike which occurs within the project area. Letters from DNR from October 2010 and June 2011 indicate a need to consider shrike habitat when siting turbines to avoid and minimize impacts.

Based on the preliminary turbine layout, five turbines are located in quarter sections identified by the Loggerhead Shrike Habitat Assessment (July 19, 2010) as Very Highly Suitable habitat for Loggerhead Shrike. Six alternate turbine locations in the preliminary turbine layout are in quarter sections ranked as Unsuitable, Slightly More Suitable, and Moderately Suitable habitat for Loggerhead Shrike.

Subsequent review of aerial photography and field visits conducted by AWA Goodhue, DNR and USFWS on June 13, 2011, revealed that three of the five turbine locations identified in the July 2010 Loggerhead Shrike Habitat Assessment as Highly Suitable or Very Highly Suitable were in fact not of concern because they were located in cropland or other less suitable habitat within the identified quarter sections. Thus two sites of concern remain.

EFP Response: The majority of the project area (over 72 percent) is used for agriculture. There are no DNR Wildlife Management Areas, State Scientific Natural Areas, Waterfowl Production Areas, State Parks or State Forests within the project area.

AWA Goodhue completed a desktop avian and bat risk assessment in October 2009 to identify species of concern and assist in the development of field survey protocols focusing on those species. The assessment concluded that there are no federally listed birds or bats breeding records within Goodhue County. Goodhue County includes nine state-listed threatened, endangered or special concerns avian and bat species. AWA Goodhue then conducted a Loggerhead Shrike Habitat Survey and Pre-Construction Spring Migration Survey to observe avian and bat species present within the project area. The habitat survey and spring migration

survey were completed in 2010. These assessments satisfy Tiers 1 and 2 and portions of Tier 3 of the USFWS Draft Guidelines for Wind Turbine Siting.

Based on the results of those efforts and input from DNR and USFWS, the proposed site permit contains the special conditions (section 13.1), in addition to the Avian and Bat Protection Plan required in section 6.7, for monitoring and reporting on eagles, bats and Loggerhead Shrike. Through these conditions, AWA Goodhue Wind will:

- Continue to monitor for the presence of Bald and Golden Eagles
- Monitor of bats and address strategies, based on the survey results, for mitigating impacts to bats
- Develop a Loggerhead Shrike Protection Plan and conduct two years of post-construction monitoring if impacts to the two remaining sites of concern cannot be avoided.

*****

The Administrative Law Judge's "Summary of Public Testimony" from July 2010 and the record of this proceeding accurately reflect the considerable controversy associated with the Goodhue Wind Project, and acknowledge that there are proponents and opponents with regard to nearly all facets of the project and distinct viewpoints and opinions that may be beyond reconciliation. It is worth noting that nearly all information in the record with regard to perceived impacts and concerns is based on information from other states and countries, not Minnesota.

To date, the Environmental Quality Board and the Commission have issued site permits for more than 25 LWECS projects representing more than 2,000 MW that are in commercial operation, some for more than 10 years. Another 300 to 400 MW have also been permitted by local units of government that are also in commercial operation. Presently another 200 MW are under construction. Several thousand Minnesota landowners and their neighbors are hosts to LWECS and associated facilities in their communities. Complaints and concerns about any aspect of the operational wind turbines and associated facilities have been uncommon.

The setbacks in the proposed site permit are similar to setback requirements in other Commission issued site permits. Although the Goodhue Wind Project area has a somewhat higher population density than some other areas where there are LWECS, AWA Goodhue has demonstrated that it can comply with the setback requirements and the permit conditions ensure that it will. The setback requirements have eliminated considerable portion of land within the project area. Unlike the city of New Ulm which sought an exemption from setbacks, Goodhue is not seeking or asking for an exemption from any of the setback requirements in the permit. Far from giving AWA Goodhue, LLC unlimited discretion, the proposed site permit imposes a number of setback, conditions and other requirements with which AWA Goodhue must comply. These standards and requirements have been applied on a uniform and consistent basis and do provide developers with strong guidance that also protects the public health and safety of both project participants and non-participants, consistent with Minnesota's legislative policy for development and siting of LWECS in Minnesota.

The EFP staff believes the record in this matter is sufficiently robust to allow the Commission to make a decision on the site permit application. EFP also believes the proposed site permit provides sufficient measures to provide necessary guidance regarding project design,

construction, restoration, monitoring and operation of the proposed Goodhue Wind Project. There are numerous site permit requirements that protect natural resource features as well as public health and safety.

Based on the record of this proceeding, EFP staff concludes that the Goodhue Wind Project meets the procedural requirements and the criteria and standards for issuance of a site permit identified in Minnesota Statutes and Rules. The site permit application has been reviewed pursuant to the requirement of Minnesota Rules Chapter 7854 (Wind Siting Rules).

In accordance with Minnesota Rule 7854.0500 Subp.2, the Commission may not issue a site permit for an LWECS, for which a certificate of need is required, until an applicant obtains such a certificate from the Commission.

EFP staff has prepared for Commission consideration proposed Findings of Fact, Conclusions and Order, an Exhibit List for the Goodhue Wind Project and a proposed Site Permit.

Proposed Findings of Fact

The proposed Findings (see Attachment 2 in the Commissioner's packet) address the procedural aspects of the process followed, describe the project, and address the environmental and other considerations of the project. The relevant site considerations addressed in the Findings of Fact (such as human settlement, public health and safety, noise, recreational resources, community benefits, effects on land based economies, archaeological and historical resources, animals and wildlife and surface water) track the considerations described in the Minnesota Power Plant Siting Act for other types of power plants that are pertinent to wind projects. The proposed Findings of Fact reflect some findings that were also made for other LWECS projects. The following outline identifies the categories of the Findings of Fact.

Category	Findings
Background and Procedure	1 – 23
The Permittee	24 – 25
Interconnection Agreement	26
Project Description	27 – 37
Site Location, Characteristics, Topography	38 – 40
Wind Resource Considerations	41 – 43
Land Rights and Easement Agreements	44 – 45
Site Considerations	46
Demographics and Human Settlement	47 – 51
Land Use and Zoning	52 – 63
Property Values	64
Public Health and Safety Setbacks	65 – 68
Aviation and National Security	69 – 73
Medical Helicopters and Emergency Response	74 – 76
Ice Throw	77 – 78
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Visual Values .....98 – 101
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Effects on Land Based Economics .....112 – 118
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Archaeological and Historical Resources .....131 – 133
Air and Water Emissions 134
Animals and Wildlife .....135 – 151
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Soils.....153
Surface Water and Wetlands.....154
Future Development and Expansion .....155 – 158
Efficient Use of Wind Resource .....159 – 162
Maintenance 163
Decommissioning and Restoration .....164 – 165
Site Permit Conditions .....166 – 169

Exhibit List

DOC EFP staff has prepared an exhibit list of documents that are part of the record in this permit proceeding. See Attachment 3 in Commissioner's packet. Other exhibits referenced are from ALJ Lipman's Public Hearing Master Exhibit List or eDockets (08-1233). Please note that when exhibits were submitted "OES EFP" was commonly cited; however, that name or reference is no longer being used and the lists have been modified to cite "DOC EFP" or just "EFP."

Proposed Site Permit

The EFP Staff has prepared a site permit for the Commission's consideration. See Attachment 4 in the Commissioner's packet. The conditions in this proposed Site Permit are similar to other conditions included in other LWECS site permits issued by the Environmental Quality Board and the Commission. The proposed site permit is different from the preliminary site permit issued by the Commission in May 2010. First, it has been reorganized and modified to reflect the structure of permits currently issued by the Commission, and, second, the conditions noted in these Comments and Recommendations have been added.

Commission Decision Options

A. Goodhue Wind Project Findings of Fact and Conclusions

1. Adopt the attached Findings of Fact, Conclusions of Law and Order prepared for the 78 MW Goodhue Wind Project and associated facilities in Goodhue County.

2. Amend the Findings of Fact and Conclusions of Law as deemed appropriate.

3. Make some other decision deemed more appropriate.

B. LWECS Site Permit for the 78 MW Goodhue Wind Project

1. Issue the proposed LWECS Site Permit for the 78 MW Goodhue Wind Project to AWA Goodhue, LLC.

2. Amend the proposed LWECS Site Permit as deemed appropriate.

3. Deny the LWECS Site Permit.

4. Make some other decision deemed more appropriate.

OES EFP Staff Recommendation: The staff recommends Options A1 and B1.