10-2865-EL-BGN

FILE

September 14, 2011

Testimony in RE:
Black Fork Wind Energy LLC
Case # 10-2865-EL-BGN
BEFORE THE OHIO POWER SITING BOARD

My name is Gary J. Biglin. I am a landowner and farmer in Sharon township Richland county. My family and I have lived and farmed in this area for generations. My family and I also belong to Sacred Heart of Jesus parish in Bethlehem, Ohio which is located about 3/4 of a mile from me on the Ohio Crawford and Richland County line. The parish was founded in 1833 and the parish school in 1837. The Biglin's were one of the original families to settle here when the parish was founded. I believe the rights of property owners for safety and happiness (as stated in Our Ohio Constitution in the Bill of Rights, Article #1 Inalienable Rights) should apply to all and be foremost to that of wind farm developers. We non-participating property owners living here deserve the same respect and justice as participating landowners and developers.

1) I believe the setbacks as referred to and described in the Case application and Staff Report to be inadequate in addressing the safety of non-participating property owners and people using public roadways in this project, based on information I have referenced in the following documents.

A) Staff Report (pp. 37-38) in regard to blade shear and ice throw.

B) The case application p. 46 and p. 83 in regard to ice throw and blade shear when turbines are normally set back from recidences and roadways.

C) Wind Energy Production in Cold Climate (WECO) as it states five (5) measures necessary where risk of ice throw is believed to exist for the public or operational staff.

D) G.E. Energy Safety Manual (pp. 49/68 and 50/68 from case application Appentix E, and as referenced in Staff Report.

E) Vestas Safety Manuels safety requirements for workers and employees during construction and operation at a wind farm facility, in regard to Snow and Ice Hazards and Extreme Weather Conditions.

F) Letters to OPSB and Staff from Ohio Senator Seitz about: Wind Turbine Setbacks (January 12, 2011) and Wind Siting (May 30, 2008.)

I believe the safety setbacks should be determined from adjacent property lines and roadways and not from adjacent property owners residences.

2) I believe information about a future development of a 200 MW. Phase II should be shared with area residences now rather than later. The application says adjacent land is being leased for a Phase II in project application on p. 40.

H)

3) I believe wind turbines should be kept away from Sacred Heart of Jesus Church Bethlehem, Ohio. this is a cultural land mark in this area. Especially turbines 81, 82, & 83. References to Sacred Heart of Jesus Church are in the application p. 134 and Appenix O, CRA Report.
6)

Please except this as a Testimony.

Respectfully Yours,

Gary J. Bigler

Also please except the provided Exhibits.

September 14, 2011

Copies have been sent by Regular Mail To:

All parties of Record

Gary J. Bigler

September 6, 2011

Gary J. Biglin

5331 State Route 61 South

Shelby, Ohio 44875

Ph. 419-347-7573

To; Docking Division

PUCO, Ohio Power Siting Board

180 East Broad Street

Columbus, Ohio 43215

FAX: 614-466-0313

Re: Case No. 10-2865-EL-BGN

Black Fork Wind Energy LLC, Project

Sent by regular mail and fax on above date.

Gary J. Biglin

Issues list pertaining to case no. 10-2865-EL-BGN,

1) The close proximity of wind turbines to public roads.

   While the Staffs Report on (pp. 37-38) regarding blade shear and ice throw mentions the safe distance from structures and roads using a formula of 1.5X(hub height + rotor diameter) and that turbines 44 and 51 would need to be relocated or resized because of their location on site map seems to be addressing their distances from a structure. There are other turbines locations near public roads (1, 58,60,76). Why would not this formula apply to turbines that are near roads as well as structures?

2) Non-Participating landowners and property owners rights and safety.

   Why would not the formula of 1.5X(hub height + rotor diameter) mentioned in the Staff Report (pp. 37-38 blade shear and ice throw) in regard to structures and roads not be applied to adjacent non-participating property. These property owners should feel safe while anywhere on their property not just while in their home.

3) Future Development of up to 200 MW for a Phase II.

   In which direction would a future phase II project be from the project boundaries of the current proposed project?

4) Wind Turbines near Sacred Heart Church, Bethlehem.

   Need the actual distances of wind turbines from Sacred Heart Church, Bethlehem (5742 State Route 61) of which I am a member. Sacred Heart Church was founded in 1833. The Parish school on the same property has grades pre-school thru 8th grades and was established in 1837.

5) No map that clearly shows receiver identification numbers in relation to receiver residences in Sound Impacts Report.

6) No map that clearly shows receptor identification numbers in relation to receptor residences in Shadow Flicker Report.

Staff Report of Investigation

Black Fork Wind Project
Case Number 10-2865-EL-BGN

August 31, 2011

John Kasich, Governor **Todd Snitchler**, Chairman

Ohio | Power Siting Board

Ice Shedding Protection

Another safety concern is ice shedding, also known as ice throw, which is caused by the buildup of ice on the turbine's blades. Ice shedding typically occurs when ice accumulates on a stationary blade and then thaws as the temperature rises. If the blades are stationary, the ice will fall near the turbine base; but once the blades begin to rotate, under certain wind speeds and directions, ice fragments on the blade may be thrown. When temperatures are below or just above freezing, the risk of ice buildup exists and can occur as a result of two types of events: riming and freezing rain.

Research generally indicates that the risk of being struck from ice shedding is low if turbines are set back from residences and roadways. The throwing distance of the ice fragments will vary based on rotor azimuth, rotor speed, local radius, ice garment size and weight, and wind speed. Smaller ice fragments produce less aerodynamic drag and thus increase the throwing distance. Large and long ice fragments experience more drag and will hit the ground closer to the turbine.

The risk of ice throw striking a fixed dwelling will be minimized by Project set-back distances, which will be 1,250 feet from residences and 563 feet (1.1 times the maximum turbine height of all turbine makes and models considered) from property lines and roads. This 1,250 feet setback from residences exceeds the OPSB required setback of 914 feet (750 feet in horizontal distance from the tip of the turbines nearest blade at 90 degrees, to the nearest habitable structure). While the operations staff working in and around the turbines may be at risk of ice shed from the blades if they are beneath the blades when icing conditions exist, staff will be trained to recognize the potential for ice shed and to follow specific protocols when such conditions exist.

Risks of impacts due to ice throw will be further minimized by safety features incorporated into the design of the turbines and constant monitoring of operations. The SCADA system can detect imbalances if ice builds up on the blades, allowing the operator to shut down turbines when the imbalance is detected with operations resuming once operators determine that safe conditions exist.

Aviation

A lighting plan will be finalized in coordination with the FAA after the FAA issues it's Determination of No Hazard. The Applicant submitted the Notice of Proposed Construction for each of the turbine locations to the FAA (Form 7460-1) on February 23, 2011. Select turbines, as specified by the FAA, will be lit with red strobes during the night, with the minimum intensity and duration of time illuminated allowed by the FAA.

(b) Reliability of Equipment

The Vestas V100 turbines, as well as the other GE and Siemens models, are designed to have a lifespan of 20 years. The turbines, regardless of the final model selected, will conform to all applicable industry standards.

(4) Ice Throw

Ice shed, or ice throw, is caused by the buildup of ice on the turbine's blades and can occur under certain conditions. This generally takes place when ice accumulates on a stationary blade and then thaws as the temperature increases. If the blades are stationary, the ice will fall near the turbine base; but once the blades begin to rotate, under certain wind speeds and directions, ice fragments on the blade may be thrown. When temperatures are below or just above freezing, the risk of ice buildup exists and can occur as a result of two types of events: riming and freezing rain.

Researchers in Europe who have studied ice throw extensively have generally concluded that the risk of being struck by ice from a wind turbine is low if turbines are normally set back from residences and roadways. The throwing distance of the ice fragments will vary based on many variables including rotor azimuth, rotor speed, local radius, ice fragment size and weight, and wind speed. Smaller ice fragments produce less aerodynamic drag and thus increase the throwing distance. Large and long ice fragments experience more drag and will hit the ground closer to the turbine.

The risk of an ice throw event striking a fixed dwelling is virtually eliminated by setback distances implemented by the Applicant, which are 1,250 feet. While the operations staff working in and around the turbines may be at risk of ice shed from the blades if they are beneath the blades when icing conditions exist, the staff will be trained to recognize the potential for ice shed and to follow specific protocols when such conditions exist.

Risks of impacts due to ice throw will be further minimized by safety features incorporated into the design of the turbines and constant monitoring of operations. The SCADA system used to monitor the turbines can detect imbalances on turbine blades that result when ice begins to build up on the blades. When the system detects the imbalances turbines can be shut down until the icing conditions have abated.

(5) Blade Shear

Blade shear or blade throw is the structural failure of one or more parts of the wind turbine. Turbine failure is rare and can be attributed to improper design, manufacturing defects, extreme weather events, or the wrong application of technology (Garrad Hassan and Partners, Ltd. 2007). Proper turbine selection, inspection, maintenance and operation combined with setbacks from houses, roads, and other structures effectively eliminate the risk to public safety. Some instances of turbine failure have been documented in older turbine models which have resulted in a blade or portion of a blade being thrown from the nacelle while the turbine is operational. This safety concern has been notably reduced with the advancement of design utilized in modern turbines and through constant monitoring and auto-

Exhibit C

WIND ENERGY PRODUCTION IN COLD CLIMATE (WECO)

B. Tammelin, FMI
M. Cavaliere, ENEL
H. Holttinen, VTT
C. Morgan, GH
H. Seifert, DEWI
K. Säntti, FMI

FINNISH METEOROLOGICAL INSTITUTE

JOR3-CT95-0014

PUBLISHABLE REPORT

1 January 1996 to 31 December 1998

Research funded in part by
THE EUROPEAN COMMISSION
in the framework of the
Non Nuclear Energy programme

JOULE III

TABLE OF CONTENTS

conditions on the lifetime of the turbine's components are not predictable in general terms possible effects of icing on the fatigue loads are tabled below. The experiences drawn from the observations and different measurements are included in this table which is aimed at the designers of wind turbines and certification bodies.

Icing is increasing fatigue loads	**Icing is decreasing fatigue loads**
additional ice masses cause higher deterministic loads	icing might increase the aerodynamic damping and thus diminishes in some cases the vibration of components
asymmetric masses cause unbalance	shut down of the turbines due to frozen anemometer/rotor and the consequential stand still for longer periods reduces the number of load cycles
increased excitation of edgewise vibrations has been observed due to icing as well as higher tower vibrations.	operating at lower rotor speeds (two speed generators or variable speed operation) due to iced blades lead to lower load cycles but eventually higher amplitudes due to higher deterministic loads
Ice accretion affects the control system. Resulting vibrations have been observed during the WECO project.	
Yaw error due to frozen wind vane of the control system may lead to higher load amplitudes.	
Pitch turbines operating under stall conditions due to changed aerodynamics.	
Resonance may occur due to changed natural frequencies of components such as rotor blades. Especially for smaller turbines and light weight rotor blades.	

5.3 Safety

Ice throw from the rotating blades is an important problem when the site of the wind energy power plant is planned to be close to public roads, housing, power lines etc. Ice throw has been studied using both theoretical models (Garrad Hassan) and experimental data (the questionnaire etc.) from various WT sites. This work has progressed as far as possible with the data available. The preliminary results were reported in Gothenburg 1996. The results are given in the form the number of ice fragments likely to fall within a 1 m^2 patch in the vicinity of a wind turbines (N_{point}) in any one year as a distance from the wind turbine.

According to the data and models developed and verified within the project it can be recommended for sites with high probability of icing to keep a distance d_{ice} between the turbines and nearest objects of about

- d_{ice} = 1.5·(hub height + diameter),
- or it can be recommended to stop the turbine automatically during the icing period and wind coming from unfavourable directions, if the public safety might be affected by ice throw.

The results of the ice throw calculations are given in the form the number of ice fragments likely to fall within a 1 m^2 patch in the vicinity of a wind turbines in one year at a certain distance from the wind turbine [10].

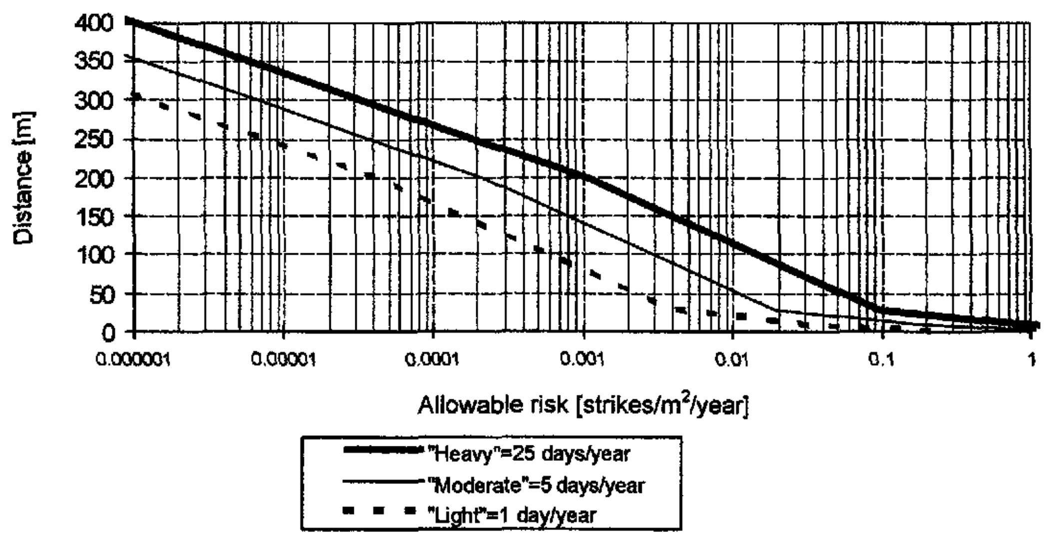

Figure 23. Safety distance for different icing levels (50m rotor) [7].

In a situation where a significant risk to the public or operational staff due to ice throw is believed to exist, the following measures are suggested:

i. Curtailing operation of turbines during periods of ice accretion.

ii. Implementing special turbine features which prevent ice accretion or operation during periods of ice accretion.

iii. Re-siting of the turbines to remove them from areas of risk.

iv. The use of warning signs alerting anyone in the area of risk.

v. Operational staff should be aware of the conditions likely to lead to ice accretion on the turbine, of the risk of ice falling from the rotor and of the areas of risk.

Existing building regulation deal very poorly with the icing problem, and of course ice throw from wind turbines is a new issue. For instance in Finland this given formula for d_{ice} is now used for some new WT sites close to skiing resorts. In Germany the insurance companies have a great interest in the possibility of ice throw, especially when the turbine is planned to be close to public roads.

Safety, and also productivity, of a wind turbine operating under icing conditions can significantly be improved also by using blade heating system [34], to avoid ice accretion on blades.

Exhibit D

The control system and interlocking as well as the monitoring and protective functions (thermal motor protection, speed monitoring, overcurrent, fault to ground, etc.) may not be set out of function, even during a test run.

8.2 Special Dangers – Hydraulic System

For maintenance work on the hydraulic system, maintenance staff must be completely acquainted with the hydraulic circuit diagram and must have been instructed about its function and the possible consequences of an operating error.

Prior to any work on the hydraulic accumulators, it must be ensured that the accumulator circuits have been depressurized. The shut-down device is clearly marked and independent of the system management.

Danger!

Danger through stored residual hydraulic energy!

FOLLOW THE RESPECTIVE LOCKOUT/TAGOUT INSTRUCTIONS! (cf. Chapter 13)

8.3 Special Dangers - Noise

The A-weighted equivalent continuous sound intensity level in the tower and the nacelle exceeds the permissible 70 dB(A) during operation. For some work, it may be necessary to place the WTG in operation or carry out a test run while personnel are in the nacelle.

Anybody carrying out work in the tower or the nacelle when the WTG is in operation must wear hearing protection as part of their personal protective equipment.

8.4 Special Dangers - Icing

8.4.1 Ice Build-up on the Rotor Blades

Ice build-up on wind turbine generator systems (WTG) and, in particular, the shedding of ice from rotor blades can lead to problems if wind turbine generator systems are planned in the vicinity of roads, car parks or buildings at locations with an increased risk of freezing conditions, unless suitable safety measures are taken.

If people or objects near the wind turbine generator system (within the distance **R***) could be endangered by pieces of ice thrown off during operation, GE Energy always recommends the use of an ice detector.

The ice detector is installed on the nacelle. It is possible to detect the build-up of a small amount of ice by means of the ice detector. If this is the case, the ice detector sends a signal to the turbine controller.
The turbine controller disconnects the wind turbine generator system from the grid and the rotor is brought to a standstill or rotates at a very low speed. A message about the icy condition is displayed on the monitor in the turbine. In addition, a message is sent to the service station and the operator via modem. The turbine does not

restart until the detector is free of ice or the operator has satisfied himself of the ice-free condition of the rotor blades, has acknowledged the ice alarm message and restarts the plant.

However, ice may form on the rotor blades considerably more quickly than on the ice sensor on the nacelle. As a result, there is a residual risk for the reliable detection of ice build-up on the rotor blades.

The detector on the nacelle must be set relatively sensitively, in order to ensure that the time from when ice starts to build up on the rotor blades until the detector sends a message about the build-up of ice is as short as possible. As a consequence, a certain number of spurious trippings cannot be excluded. Loss of energy yield may occur as a result of the spurious trippings.

If an ice detector is not used, it is advisable to cordon off an area around the wind turbine generator system with the radius **R*** during freezing weather conditions, in order to ensure that individuals are not endangered by pieces of ice thrown off during operation (cf. also Section 11.1).

> ***R** = 1.5 x (hub height [m] + rotor diameter [m])
> (Recommendation of the German Wind Energy Institute DEWI 11/1999)

8.4.2 Icy Condition of the Access Route

During the winter months, access to the plants may be very slippery due to ice or hard-packed snow. There is an increased danger of slipping.

cf. Section 11.1 on approaching and entering WTGs which may be frosted.

8.4.3 Icy Condition of the Tread of the Steps outside the Nacelle

In the winter months, the tread of the steps outside the nacelle can be icy as a result of ice and hard-packed snow.

8.5 Exceptional Dangers – Earthquakes

In the case of an earthquake, the operator must inspect the WTG for damage. The following procedure is recommended:

- Determination of the acceleration values in the tower top which arose during the earthquake (PCH BOX).
- Contact GE Energy, in order to agree on the further procedure and possible inspection schedules.

Exibit E (1)

FILE

Confidential Release

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Case Number: 10-654-EL-BGN
11-757-EL-BGN

Date of Confidential Document:

March 24, 2011

Today's Date: 7/21/2011

Page Count 512

Document Description

Exhibit B

"Health Safety & Environment Manual"

Part 1 of 3

Contents

1. Purpose

The purpose of this procedure is to ensure a safe work environment prior to and during the performance of work, to prevent exposure to hazards while working in extreme weather conditions, and to identify hazards and restrict work where necessary to ensure the safety of Vestas employees.

2. Scope

Vestas Americas – All locations

3. Definitions

Word:	Definition
Heat	The measure of energy in terms of quantity
JSA	Job Safety Analysis (DMS# 0008-7897)
LCTU	Lightning Current Transfer Units
OSHA	Occupational Safety and Health Administration
PTP	Pre Task Plan

4. Regulatory References

- OSHA Act 1970 Section 5(a)(1)
- OSHA 3156
- OSHA Tech Manual Directive Number: TED 01-00-015

5. General Requirements

5.1 Localization

5.1.1 For those areas where this Safety Manual differs from the Vestas Group requirements, this manual shall prevail.

5.1.2 In some cases, Vestas Americas has implemented a requirement that may exceed a state or provincial requirement. The higher level requirement in the Safety Manual will prevail.

5.1.3 In the event that a state or provincial requirement exceeds a Safety Manual procedure, the higher level requirement will prevail.

6. Responsibilities

6.1 Service / Construction Managers

It is the responsibility of Service and Construction Managers to:

6.1.1 Recognize environmental and workplace conditions that lead to potential hazards, illnesses [redacted] injuries [redacted].

6.1.2 Train the workforce about extreme weather conditions and appropriate actions.

6.1.3 Select and supply proper PPE [redacted] clothing for applicable weather conditions.

6.1.4 At the beginning of the work shift, give an overview of the working conditions and weather concerns to the work group.

6.1.5 Allow a period of adjustment to [redacted] weather conditions before embarking on a full work schedule and permit employees to set their own pace and take extra work breaks when needed.

6.1.6 Notify the customer under the terms of the customer contract - explain our safety policy regarding hazards [redacted].

6.1.7 Monitor conditions and update customer as conditions change or if further delays are needed.

6.1.8 Once conditions have improved and it is determined that it's safe to work, providing clearance for work and notifying the customer.

6.2 Technicians

The following are the responsibilities of Technicians:

6.2.1 If conditions are determined to be unsafe, do not proceed with work; [redacted] and note this condition on a Service Report [redacted].

6.2.2 If any adverse weather conditions are spotted in your immediate surrounding area, contact the Site Manager immediately.

6.2.3 Do not start work in a turbine until the clearance for work has been approved by the Service/Construction Manager or designee.

6.2.4 Each crew must acknowledge all warnings either by radio or cell phone.

6.2.5 All personnel in the field and towers must be prepared to seek cover on short notice if lightning occurs.

6.2.6 Wear the appropriate PPE for the existing and anticipated weather conditions.

6.2.7 Complete a JSA (DMS# 0008-7897) and PTP (DMS# 0008-7900) as required to document hazardous conditions and actions.

7. Instructions for Extreme Weather Conditions

7.1 Cold

[redacted]In regions relatively unaccustomed to winter weather, near freezing temperatures are considered "extreme cold." Whenever temperatures drop decidedly below normal and as wind speed increases, heat can leave your body more rapidly. This weather-related condition [redacted] lead to serious health problems. [redacted]

7.1.2 During freezing temperatures with high humidity, ice is likely to accumulate on wind turbine blades and nacelles. This ice can be thrown off blades and / or fall from nacelles (whether the turbines are operating or not) during icing conditions or while the ice is melting. This presents a significant hazard to any personnel working in the area. Special precautions must be taken prior to performing any work on or near any turbine during these conditions.

7.1.3 Prior to starting work perform an Ice Check per Pre-Work Ice Checklist (DMS# 0008-7909)

a) A visual inspection is to be completed prior to performing work whenever there is a risk of ice build-up on a turbine (binoculars may be necessary).

b) Turbines should be ***remotely stopped*** before inspection. This will include any turbine not being inspected, but in close proximity to where personnel might be stationed to complete the ice check.

c) Park a minimum of 300' away from the turbine to be inspected (or any other turbine).

d) If the flowchart ends in a "STOP" message (see Pre-Work Ice Checklist (DMS# 0008-7909)), the risk of ice is considered too high for work to safely continue. Notify Lead Tech / Site Manager / Customer of hazardous conditions.

e) If ice is discovered after completion of the ice check (build-up throughout the day, previously unseen ice on nacelle roof, etc.); a look-out must be established before exiting the base of the turbine.

f) The lookout will remain a minimum of 300' away from the turbine, observe through binoculars and advise affected personnel by radio when it appears clear to exit the turbine.

g) If any dangers present themselves during exiting the turbine, the lookout will immediately warn the affected personnel via vehicle horn, air horn, radio or other effective means previously established to remain in the turbine.

7.2 Heat

Age, weight, degree of physical fitness, degree of acclimatization, metabolism, use of alcohol or drugs, and a variety of medical conditions such as hypertension all affect a person's sensitivity to heat. However, even the type of clothing worn must be considered. Prior heat injury predisposes an individual to additional injury.

It is difficult to predict just who will be affected and when, because individual susceptibility varies. In addition, environmental factors include more than the ambient air temperature. Radiant heat, air movement, conduction, and relative humidity all affect an individual's response to heat. **See Appendix B of this document ("Heat Index Chart").**

7.2.1 Heat disorders and health effects

a) Heat Stroke - Occurs when the body's system of temperature regulation cannot cope with ambient conditions and body temperature rises to critical levels.

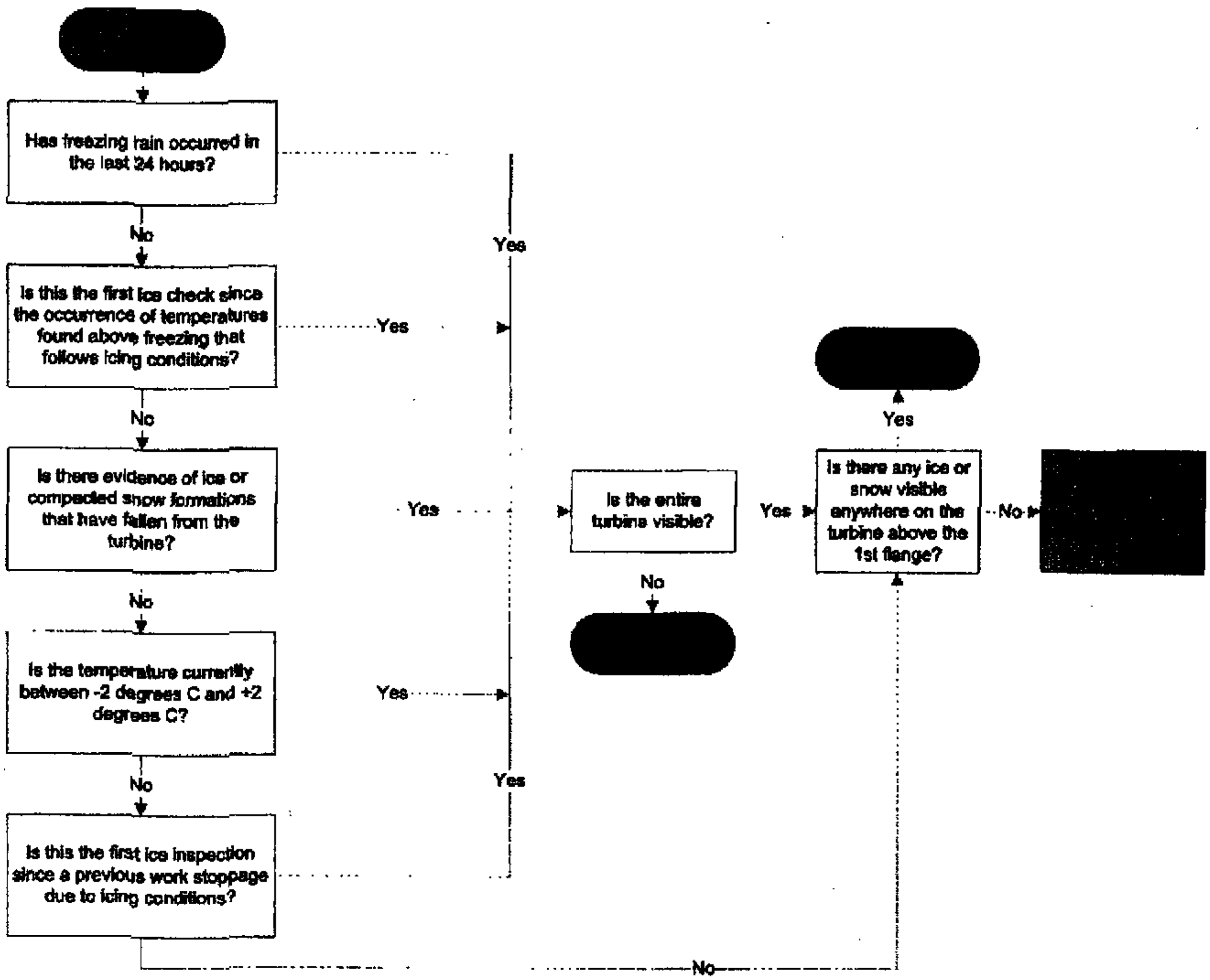
Heat stroke is a medical emergency. The primary signs and symptoms of heat stroke are confusion, irrational behavior, loss of consciousness, convulsions, a lack of sweating (usually), hot, dry skin, and an abnormally high body temperature, e.g., of 41°C (105.8°F).

b) Heat Exhaustion - The signs and symptoms of heat exhaustion are headache, nausea, vertigo, weakness, thirst, and giddiness.

This condition responds readily to prompt treatment. Heat exhaustion should not be dismissed lightly; fainting is associated with heat exhaustion. Also, signs and symptoms of heat exhaustion are similar to those of heat stroke.

Contents

1. Process Flowchart



2. Guidelines

The following guidelines should be followed to safely perform an ice check:

- Turbines should be ***remotely stopped*** before inspection. This will include any turbine not being inspected, but in close proximity to where personnel might be stationed to complete the ice check. (Close proximity = 1000')
- Park a minimum of 300' away from the turbine to be inspected (or any other turbine).
- Use binoculars or other magnifying visual aids to effectively inspect the turbine.
- If the flowchart ends in a "STOP" message, the risk of ice is considered too high for work to safely continue. Notify Lead Tech / Site Manager / Customer of hazardous conditions.

If ice is discovered ***after*** completion of the ice check (build-up throughout the day, previously unseen ice on nacelle roof, etc.), work is to stop ***immediately***, all affected personnel are to climb down-tower and a look-out will obtained *before* exiting the base of the turbine. The lookout will remain a minimum of 300' away from the turbine, observe through binoculars and advise affected personnel by radio when it appears clear to exit the turbine. If any dangers present themselves during evacuation, the lookout will immediately warn the affected personnel via vehicle horn, air horn, radio or other effective means to be previously established.

Exhibit E

(2)

Large Filing Separator Sheet

Case Number: 09-546-EL-BGN

File Date: 1/8/10

Section: 1 of 2

Number of Pages: 200

Description of Document: Appendix D

FILE

Confidential Release

Case Number: 09-546-EL-BGN

Date of Confidential Document: November 10, 2009

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Today's Date: January 8, 2010

Exhibits released per Entry filed January 6, 2010.

FILE

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DOCKETING DIVISION
Public Utilities Commission of Ohio

CONFIDENTIAL

Confidential treatment has been requested for the following document:

Case # 09-546-EL-BGN

- ***Page Count*** 390
- ***Date Filed*** 11/10/09
- ***Filed by*** Black Fork Wind LLC ***on behalf of*** Karen Winters

- ***Summary of document:*** Supplier Site Rules.

1. Purpose:

The purpose of this procedure is to ensure a safe work environment prior to performing work and to prevent exposure to hazards while working in icing conditions by identifying dangerous conditions and restricting work where necessary to ensure the safety of Vestas employees.

During freezing temperatures with high humidity, ice is likely to accumulate on wind turbine blades and nacelle. This ice can be thrown off blades and / or fall from nacelles (whether the turbines are operating or not) during icing conditions or while the ice is melting. This presents a significant hazard to any personnel working in the area. Special precautions must be taken prior to performing any work on or near any turbine during these conditions. The scope of work performed must also be limited dependent upon the specific conditions present.

2. Scope:

Vestas Americas – All locations

3. Definitions:

Word:	Definition
None	N/A

4. Regulatory References:

4.1 None

5. General Requirements:

5.1 Localization:

5.1.1 For those areas where this Safety Handbook differs from the Vestas Group requirements, this Handbook shall prevail.

5.1.2 In some cases, Vestas Americas has implemented a requirement that may exceed a state or provincial requirement – the higher level requirement in the Safety Handbook will prevail.

5.1.3 In the event that a state or provincial requirement exceeds a Safety Handbook procedure – the higher level requirement will prevail.

6. Responsibilities:

6.1 Site or Project Supervisory Personnel:

6.1.1 A visual inspection is to be completed prior to performing work whenever there is a risk of ice build up on a turbine (binoculars may be necessary).

6.1.2 The Pre-Work Ice Checklist must be completed and appropriate actions must be taken as described in the checklist.

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6.1.3 If icing conditions are suspected, do not approach within 1000 feet (305 meters) of any turbine while it is running. If not operating, do not approach within 300 feet (91.5 meters) of any turbine. This applies to vehicle proximity as well.

7. Instructions:

7.1 Site Supervisors / Designee:

7.1.1 At the beginning of the work shift, give an overview of the working conditions, weather concerns to the work group if there is a concern that icing conditions may be present.

7.1.2 Send a team (normally a qualified technician and a work partner) to review site conditions, (document this using the Pre-Work Ice Checklist). Follow the safety perimeters outlined in the instructions.

7.1.3 The team will inspect the site conditions safely and report back to the site supervisor or designee.

7.1.4 ~~If conditions are determined to be unsafe – do not proceed with work – note this condition on a~~ Service Report and file the completed Pre-Work Ice Checklist in the Site Safety Records.

7.1.5 Notify the customer under the terms of the service contract - explain our safety policy regarding ice hazards. No Vestas or Vestas contracted employees are authorized to work in or around any Vestas wind turbine during icy conditions. Our goal however is to monitor the situation and have technicians working as soon as it is safe to do so.

7.1.6 Monitor conditions and update customer as conditions change or further delay is needed.

7.1.7 ~~Once conditions have improved and it is again safe to work – complete the Pre-Work Ice~~ Checklist form noting the improved conditions – providing clearance for work and file the completed form in the Site Safety Records. Notify the customer.

7.2 Technicians:

7.2.1 If conditions are such that work is not safe - document the situation on the Service Report and the Pre-Work Ice Checklist.

7.2.2 Do not start work in a turbine until the Clearance for Work has been approved by the Site Supervisor or their designee.

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8. History of this Document

Rev. no.:	Date:	Description of changes
00	2005-Sep-26	First edition - Reformatted & new number 13-Apr-2007

CONFIDENTIAL

Vestas. Vestas Americas

Pre-Work Ice Checklist

Use this Checklist when icing conditions are suspected

Site Location:		Date:	
Turbine No(s):		Time: ______ AM/PM	
Technician Names:			

		Yes	No
1	Has freezing rain occurred in the last 24 hours?	☐	☐
2	Has the temperature hovered at or around freezing during precipitation?	☐	☐
3	Is ice or compacted snow visible on any part of the turbine? *Inspect from a distance via binoculars	☐	☐
4	Has any ice or compacted snow fallen off the turbine in the last 24 hours?	☐	☐
5	Is there ice or compacted snow formations present anywhere in the vicinity of the turbine?	☐	☐
6	Is the temperature above 32°F / 0°C after icing conditions were present?	☐	☐
7	Is the *current* temperature between -2 and +2 degrees Celsius? (28.4 and 35.6 F)	☐	☐
8	Will the weather condition apply to "force majeure" definition in your contract with the customer?	☐	☐

If you answered **NO** to all of the above questions:

1. **Proceed with work as usual.**

If you answered **YES** to any of the above questions, do not approach the turbine unless all of the following steps have been completed:

1. Consult with the Site Supervisor to determine if the "force majeure" clause in the contract will apply in this particular situation. If not, proceed to step 2.
2. **Entering a turbine area during icing/melting conditions:**
   a) Stop a minimum of 1000 feet of any turbine while it is running. There may be a need to temporarily shut down an entire string of turbines to approach the turbine in question for observation. Once you are 1000' beyond a tower which had been shut down temporarily for access purposes, they may be restarted remotely until you leave the area again.
   b) Observe with Binoculars – looking for signs of ice on the ground, inconsistencies on the blade, ice hanging off the Nacelle & radiator area. (If ice has developed on the vehicle antenna, that is a good indicator of potential ice on the tower/blades)
   c) If ice is noticed, inform a Site Lead Tech, Site Supervisor, Assistant Site Supervisor or Safety Coordinator of the unsafe condition & instruct a temporary remote stop on all the turbines in the immediate area (1000' radius of the vehicle approach area). **Do not E-stop the machine.** Flying ice can impose significant damage to other turbines and is hard on internal components.
   d) If possible - Yaw the turbine **remotely** so that the greatest hazard above (typically ice on the blades) is on the opposite side of the tower from the entrance door.
   e) *Wait 5 minutes after the machine has been shut down or once yawing has completed.* Observe again with the binoculars from a safe distance. (look for ice/snow which has become loose (falling) due to the Nacelle's movement)
   f) Proceed to park a minimum of 300 feet away if no ice is falling off at this point.
   g) 1 person may now approach the turbine wearing all standard PPE, constantly observing potential snow/ice sliding off the nacelle, tower & blades which may have been loosened during yawing.
   h) Stay clear of the blades & be aware of potential wind drift (if the door is down wind of the blades). The partner must observe from a safe distance.

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Pre-Work Ice Checklist

i) Once the door has been opened and the "all clear" sign given by the entrant, the second technician (and any others) may also approach with the vehicle cautiously. While Unloading tools/equipment, all participants must be conscious of potential hazards above, and enter the turbine as quickly as possible.

j) Take note of wind direction

k) One individual at this time must take the truck back to the designated parking area (300' away from the down turbine, yet 1000' from any others) It is highly recommended to park on the access road, NOT on the turbine pad as it is typically not far enough away.

l) Once ALL employees are inside the turbine to do the assigned work, a call can be made to restart the other turbines that were temporarily shut down to access the site (outside the 1000' radius)

3. If the task is to de-ice the anemometers, and other equipment on the roof of the Nacelle:
   a) Yaw the blades down wind (so when you open the hatch, the wind is pushing the potential unseen ice away from you)
   b) Lockout as per policy
   c) Ensure you have proper tools & PPE (included Ice Traction Slip-Ons/Boots) *non-studded style
   d) Open the Nacelle roof hatch farthest away from the blades
   e) Inspect the blades visually for ice build up

   If the blades still have any ice attached, **DO NOT GO ON THE NACELLE ROOF TO FURTHER DE-ICE!!! (wind may unexpectedly shift & blow ice onto the roof off the blade)**

   Work will be halted until the ice is off the blades

   f) Complete the "Work Stopped Due to Unsafe Conditions" section below and notify the customer
   g) If no ice is present on the blades: put on non-slip boots, ensure hard hat is being worn, tie off to a "fall restraint" standard, and continue to remove ice build up off the equipment.

4. **Do not re-start any turbine at the bottom controller.** Re-start all turbines must be done remotely during icing conditions.

If any of these steps cannot be completed remotely, <u>do not perform any work</u> in the immediate area until the conditions & safe options have been properly evaluated, addressed and re-inspected.

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Exhibit F (1)

MEMORANDUM

TO: Ohio Power Siting Board Members
Beth Trombold

FROM: Senator Seitz

DATE: January 12, 2011

SUBJECT: Wind Turbine Setbacks

I am once again writing concerning the process by which the Power Siting Board determines the appropriate setbacks for wind turbines, pursuant to the language in House Bill 562 of the 127th General Assembly. I am still receiving correspondence from citizens in Logan and Champaign counties who do not believe the minimum setback established by HB 562 is sufficient. They have specifically protested the Board's disregard of the manufacturers' own setback standards in a recent case – Nordex standards were disregarded in favor of oral testimony from the applicant's witness that the standards were irrelevant. Since the language in HB 562 was finalized, I have emphasized to the citizens of these counties that the statute allows the PSB to establish more stringent setback requirements and that the setback standard in statute is not the maximum standard. It is my recollection that all parties involved in the drafting of this language agreed that the PSB would use this authority to provide more stringent siting criteria if and when necessary. The citizens who have contacted me do not believe the PSB is utilizing this authority.

In light of the continued correspondence, I would respectfully request that the PSB seriously consider the wind turbine manufacturers' standards for setbacks when determining setbacks for wind turbines in Ohio. As we learned while writing this language and as we continue to be reminded, many of the manufacturers call for setbacks that are more stringent than those provided for in the statute. When scientifically based studies exist that demonstrate a minimum setback that is greater than what is provided for in statute, I do not believe that those studies should be disregarded.

Exhibit F (2)

THE OHIO STATE SENATE

MEMORANDUM

TO: Jen Lynch
Alan Schriber
Kim Wissman
Beth Trombold

FROM: Senator Seitz

DATE: May 30, 2008

SUBJECT: Wind Siting

I am enclosing a number of documents for your consideration in the Power Siting Board rules process established by the wind siting amendment. I continue to get emails and calls from disgruntled citizens in Logan and Champaign Counties, who feel the minimum setback established in the statutory provision is not sufficient. Of course, I was somewhat between a rock and a hard place, as Jen did not wish to be any more expansive than what the legislation provides. I keep telling these folks that the legislation specifically empowers the Power Siting Board to make reasonable additional setback requirements.

We are obviously placing a lot of trust in the executive branch and the Power Siting Board to do the right thing and to use science-based credible evidence in determining the correct criteria for where these wind turbines should go. My files are now quite full of manufacturer standards, wind working group recommendations, etc. – most all of which point to a minimum setback standard that is in excess of what we put into the statute. The citizens' concern is that the minimum standard would default to the maximum standard. I hope this is not the case, but perhaps it would be a good idea for us to meet as a small working group in advance of the rules process to get some better handle around how OPSB intends to address this issue in rules. I don't want to make it too hard to develop wind power in Ohio, and I am sure you don't either, but the quicker we could get the executive branch and agency "powers that be" to issue some sort of statement that they intend to take the rules process seriously and to base the rules on a reasoned and scientific approach consistent with best practices and industry standards, the better off we would all be. What do you think?

Enclosures

Exhibit G

lines include locations near the substation where multiple collection lines run parallel into the substation and space or land access limitations will not allow proper spacing of the collection lines for underground installation. Use of overhead collection lines may also be necessary. The overhead collection line will be affixed to 45 to 55 foot wooden utility poles similar to existing utility poles in the area. The ROW required for the overhead collection line will be cleared of any trees and large woody vegetation that may pose a hazard to the line. The final locations of the overhead collection lines have not been determined yet, but will be provided to the OPSB as part of the final design layout.

Substation and Switchyard

The substation and switchyard will require excavation and the pouring of a small concrete pad for the main transformer and other substation components. In addition to pad construction, outdoor circuit breakers, capacitor banks, relaying equipment, high-voltage bus work, metal clad switchgear, steel support structures, an underground grounding grid, and overhead lightning-suppression conductors (see Appendix A for substation typical) will occur within the substation footprint. Crushed stone will be placed around the control house and a chain-link fence erected around the substation to restrict access to the location.

(5) Future Development

The current Project will have up 200 MW of generation capacity; however, given the magnitude of the Project area and anticipated demand for renewable power in the region, an additional development of up to 200 MW Phase II is being considered by the Applicant for a later date. This additional 200 MW Phase II development, if pursued, will be a project separate and apart from the current Project and as a result will be the subject of a separate application to the OPSB, submitted at a later date. Land adjacent to the Project is being leased and an Interconnection Request for an additional 200 MW has been submitted to PJM Interconnection LLC for tie-in with the Howard Substation located at Vernon Junction, Richland County.

(C) Equipment

As discussed, the Project as constructed will comprise up to 91 wind turbines and associated access roads, electrical collection lines, a substation and switchyard, a temporary concrete batch plant and laydown area, and an O&M building.

(1) Wind Powered Generation Equipment

Turbines

The final wind turbine model selection will be made based on turbine availability, the projected efficiency in the wind resource at this site, economy of scale, availability of service and replacement components, and the manufacturer's reputation. Currently, the Applicant intends to install up to 91 Vestas V100 turbines with a 1.8-MW nameplate capacity. The total generating capacity for these turbines is 163.8 MW. While the Vestas V100 turbine is the preferred turbine model, the Applicant has considered a variety of other turbine models, including but not lifor the proposed project, indirect effects (visual, audible, cumulative, etc.) to the preservation and continued meaningfulness of these properties should also be considered. While some of the previously identified properties that have not been evaluated for NRHP eligibility are scattered in the Project Area and others are located in the rural parts of the Study Area, the majority are concentrated in the Study Area's numerous towns and villages including Shelby, Crestline, New Washington, and Plymouth. There is also a concentration located along the US 30 corridor in the southern part of the Study Area. Due to established setback requirements for turbine locations, direct effects to above-ground resources located in the Project Area are not anticipated. Given the nature of the proposed project, the most common effects will likely be indirect visual effects, as the introduction of dozens of large wind turbines to the area may alter people's perceptions of the traditional rural character of the landscape and alter the settings of character-defining historic resources.

Viewshed analysis utilizing ArcView GIS software indicates that the turbines will be visible throughout most of the Study Area. There are some small areas in the northeastern, southeastern, and western parts of the Study Area where no turbines will be visible due to topography. This analysis did not consider the shielding effect of vegetation and other buildings. In the portions of the Study Area where the turbines are visible, the perception of the turbines will vary depending on a property's distance from them and the characteristics of the surrounding landscape. For the properties located closest to the facility, the turbines may become a part of their immediate setting, perhaps impacting people's perceptions of individual properties and the landscape as a whole. For properties located farther from the project area, the turbines will become a part of their surrounding viewshed, in some cases appearing only as distant features on the horizon. In addition, it is anticipated that the visual impact will be less for those resources located in urban areas because their site lines and defining characteristics are typically oriented toward, or associated with, the interior of the city rather than the surrounding rural landscape. Thus, based on the locations of the known NRHP listed and eligible properties, there is low potential for indirect effects to the majority of these properties.

One property, the Sacred Heart of Jesus Church, is located in the rural community of Bethlehem to the east of the Project Area. The church is located approximately one mile from the nearest proposed turbine, so there is moderate potential for visual impacts to this property. Formal evaluation of indirect effects will occur during the survey work proposed in the work plan.

Archaeological Landmarks

As described in the *Work Plan for Completing a Phase I Archaeological Survey for the Proposed Black Fork Wind Farm in Crawford And Richland Counties, Ohio* (Appendix O), the review of the relevant literature and Ohio Archaeological Inventory (OAI) forms identified 872 previously recorded archaeological sites within the Study Area. These sites include 638 archaeological sites (73 percent) that have been determined not eligible for listing on the NRHP, and an additional