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Final Hearings Officer Report to the  
Oregon Environmental Quality Commission  
On Noise Rulemaking Standards for Wind Energy Facilities

(amending OAR 340-035-0035 and adopting new OAR 340-035-0110)

by  
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April 19, 2004

## **SUMMARY OF CHANGES FROM DRAFT HEARINGS OFFICER REPORT**

This Final Hearings Officer Report makes a few changes from the Draft Report issued on March 22, 2004, as a result of discussion at the Environmental Quality Commission meeting of April 9, 2004. These changes include the following:

- 1) reference to a specific version of the International Electrotechnical Commission's (IEC) protocol for measuring noise generated by wind turbines, IEC 61400.
- 2) language as to which legal instruments can be used for waiver of the ambient noise standard by a willing landowner.
- 3) a provision making clear that the noise rule provisions apply to wind energy facilities of any size.
- 4) reference to the IEC protocol in a manner that does not restrict the existing ability of a person to bring an action to assure compliance with the Commission's noise rules.

In addition some minor editing and clarifications which do not change the substance of the recommendations are also included in this Final Report.

## **I. INTRODUCTION**

### Nature of This Rulemaking

This is a joint rulemaking by the staff of the Oregon Department of Energy (ODOE) and the Oregon Department of Environmental Quality (DEQ) to amend the existing noise

control regulations of the Environmental Quality Commission (the Commission) to explicitly address requirements and standards for wind energy facilities.

As a result of an inter-agency agreement between ODOE and DEQ, staff from ODOE prepared the first draft of the rules; ordinarily, DEQ would staff a rulemaking proceeding for the EQC. However, at present, DEQ does not have authority or funding to work on noise-related issues. More than 12 years ago, the Legislature eliminated funding for the program, and DEQ enforcement of the State noise program was suspended.

Before beginning the formal rulemaking, ODOE staffed an informal period of comment and discussion with interested parties. The informal phase began in August 2003 and continued through October 2003. The first draft of the proposed rules were submitted to the Secretary of State's Office and were posted on the ODOE website on 12/15/2003 ; they are referred to as the 12/15/03 proposed rules in this report. The 12/15/2003 proposed rules were published for hearing in the Secretary of State's Bulletin on January 2, 2004. ODOE staff conducted hearings and prepared this Hearings Officer report for the Commission to consider.

#### Summary of Hearings Officer Recommendations

As a result of the record developed in this proceeding, I recommend that the Commission adopt noise rules specific to wind energy facilities. I also recommend changes in the 12/15/03 proposed rules based on information provided by written and oral comments. Briefly, the revised rules proposed in this Hearing Officer's report would do the following:

- 1) Maintain the Commission's Table 8 limits on all wind energy facilities.
- 2) Provide that the background baseline is 26 dBA for ambient wind energy facility noise unless evidence shows that the actual background level is higher.
- 3) Provide that any willing landowner may waive the ambient noise degradation standard for his or her property, while maintaining the Table 8 limits; such waiver must be recorded with the county to accompany the legal title to the property.
- 4) Create a standard protocol based on IEC 61400, developed by the International Electrotechnical Commission, the recognized international body for standards development activities. This standard would be used for modeling and measuring noise impacts from wind energy facilities to ensure compliance with the Commission's standards.
- 5) Add a provision clarifying the Commission's suspension of the administration of the noise program.

The reasons for my recommendations are explained below, along with a more complete description of the changes. Also included in this package is a set of the revised proposed changes to the Commission's rules. A summary of all the written and oral comments is provided as an attachment to this report.

## **II. BACKGROUND AND REASON FOR RULEMAKING**

### **Energy Facilities and the Commission's Noise Standards**

The Commission determines the level of allowable noise impact through the noise regulations adopted in OAR Chapter 340, Division 35. The rules in OAR 340, Division 35, make up a statewide program of noise control to protect the health, safety and welfare of Oregon citizens from the hazards and deterioration of the quality of life imposed by excessive noise emissions. These rules implement Oregon law under ORS Chapter 467.

The Energy Facility Siting Council (EFSC) makes decisions whether to approve large energy facilities. EFSC's review process is a centralized process, consolidating the permits which would otherwise be issued by other state and local agencies. In addition to standards developed by EFSC, Oregon law gives EFSC authority to apply the standards of other state agencies, including the Commission's state noise rules, in the siting of energy facilities. "Energy facilities," which are within EFSC's jurisdiction as defined by ORS 469.300, include electric generation facilities above specified generation capacities. ODOE provides staff services to EFSC, including the technical review of applications for EFSC approval.

When a proposed facility is within the jurisdiction of EFSC, the developer must obtain a site certificate from EFSC before beginning construction of an energy facility. To issue a site certificate, Oregon law requires EFSC to apply the Commission's noise standards to the proposed facility and decide whether the facility would comply with those standards.

In general, wind power projects that have an average electric generating capacity less than 35 megawatts do not need site certificate approval from EFSC. EFSC does not administer or enforce the noise control regulations for these smaller wind power projects. Instead, local land use approval is typically required before construction. Local governments may address noise impacts from smaller wind power projects under their land use ordinances.

### **Why ODOE Believes Wind Energy Facilities Need a Specific Noise Standard Provision**

ODOE supports the development of electric generation from the state's wind resources as part of Oregon's energy policy goal in ORS 469.010: "to promote the efficient use of energy resources and to develop permanently sustainable energy resources." Wind energy facilities create no polluting emissions. Greater use of wind instead of fossil-fueled power plants can avoid the pollution created by use of oil, coal and natural gas to generate electricity.

Wind energy facilities are also generally quieter than fossil-fueled power plants, and other industrial facilities. However, wind energy facilities, if improperly sited, can produce noise in excess of the noise levels allowed under the Commission noise standards. Wind energy facilities generate noise from the turbine generator and gearbox as well as from the effect of the turbine blades cutting through the air.

Although the rules that are currently in place address noise emissions from industrial noise sources, the dependence of a wind energy facility on wind speed, both to generate power and to generate noise, makes wind energy facilities different from other types of industrial

facilities. The Commission did not consider wind energy facilities as a potential noise source when it initially adopted the rules in 1974. The Commission has not amended the rules to address wind energy facilities before now.

The purpose of this rulemaking proceeding is to recognize the special characteristics of wind energy facilities while protecting the public from unreasonable or harmful noise levels.

#### Application of the Current Noise Standards to Wind Energy Facilities

Under the current rules, a new noise source on a previously unused site must comply with two standards. These two standards are known as the “Table 8 test” and the “ambient degradation test.”

The Table 8 test refers to a table that lists maximum permissible statistical noise limits. Noise emitted from industrial sources must not exceed the Table 8 limits. In addition, under the ambient degradation test, noise from industrial sources must not increase ambient noise levels by more than 10 dBA (decibels) in any one hour at the noise sensitive property.

To determine whether a new noise source meets the ambient degradation test, the rules require measurement of the *background* ambient noise level; that is, the ambient noise at the noise sensitive property without the new noise source present. The background level is then compared with the new ambient noise level, which includes the noise from the new noise source. By comparing these two ambient noise levels, one can determine whether the noise from the new source has increased the ambient noise level by more than 10 dBA.

Under the current rules, measurement of background ambient noise levels must conform to the Sound Measurement Procedures Manual (NPSC-1), which specifies that measurements “shall not be taken when the wind speed exceeds 10 mph” at the noise sensitive property. For most industrial noise sources, measuring ambient levels under low-wind conditions is not complicated.

The current noise rules do not address a source of noise that is dependent on, and varies with, the wind. Unlike other industrial noise sources, wind energy facilities produce noise only when the wind speed is high enough at the wind turbine to allow the turbine to begin generating electricity. This is called the wind turbine “cut-in speed.” As the wind speed increases up to a certain point, turbines produce higher noise levels. At very high wind speeds, turbines automatically shut down to avoid turbine damage (“cut-out speed”). Thus, noise emissions that may be subject to the existing noise control regulations occur only under those wind conditions that are within the operating range of the wind turbine.

To demonstrate compliance with the ambient noise rules, the developer of a wind energy facility must provide noise measurement data under very specific wind conditions. It is difficult to predict when those conditions will occur. Collecting the data needed for demonstrating compliance with the current noise standards is complicated and more expensive for a wind energy facility than it is for a gas-fired power plant.

The Stateline Wind Project in Umatilla County is the only wind energy facility in Oregon that has applied to EFSC for a site certificate. EFSC has approved a site certificate for Stateline and has approved two subsequent amendments that added to the total number of

wind turbines that can be built at Stateline. In addressing the noise issue, EFSC applied the current noise rules for a “new industrial source located on a previously unused site” (OAR 340-035-0035). Testimony in this rulemaking proceeding indicated that the current ambient noise rule required the Stateline developer to reduce the number of wind turbines installed, without any benefit to residences or landowners.

### **III. RULEMAKING PROCESS**

Four hearings were held on the 12/15/03 proposed rules. Hearings were held in Portland and The Dalles on February 9, 2004, in Tillamook on February 23, 2004, and in Pendleton on March 9, 2004. Public comment was accepted on the 12/15/03 proposed rules through March 12, 2004. The comment period was extended through the Commission’s meeting of April 8 and 9, 2004 so that rulemaking participants could address the Commission directly and give their comments on the Draft Hearings Officer Report issued on March 22, 2004.

### **IV. SUMMARY OF THE DECEMBER 15, 2003 PROPOSED RULES**

The 12/15/03 rules proposed by ODOE recommended the following changes in the current noise rules:

- 1) In determining the increase in the ambient statistical noise level, the background baseline is assumed to be 26 dBA. The wind developer would have the option to show that actual ambient background level is greater than 26 dBA.
- 2) The “actual ambient background level” is the measured noise level at the noise sensitive property, when the nearest turbine’s hub-height wind speed is at turbine cut-in speed. This would establish a standardized protocol: i.e., a wind speed equal to the speed which starts the turbine (cut-in speed) at the turbine nearest the noise sensitive property.
- 3) The noise levels from a wind energy facility may increase the ambient statistical noise level by up to 15 dBA if the landowner where the wind turbine would be located consents. The consent must be in writing describing the increased condition of environmental noise due to the wind energy facility. The property where the wind turbine would be located must be the same parcel of land owned by the landowner who is agreeing to the increased noise level. This proposal was intended as a compromise to allow landowners some ability to waive ambient noise standards. Combined with the new exception provided in 6) below, the 12/15/03 proposed rules would provide more flexibility for landowners than current noise standards provide, while still complying with Table 8 limits.
- 4) For determining compliance with the ambient degradation noise standards the noise levels are predicted assuming that all turbines in the wind energy facility are operating at cut-in speed. This provision establishes a standardized protocol for modeling the

expected noise levels and for determining compliance after a wind energy facility has been built.

- 5) For determining compliance with Table 8, a wind energy facility is modeled and monitored for compliance at a hub-height wind speed of 16 meters per second (about 35 mph). This establishes a uniform method of determining compliance and takes into account the variation in turbine height and size that now exist.
- 6) An exception which can be issued by DEQ (if DEQ were implementing the program, and by EFSC for large wind facilities) for ambient noise levels exceeding 10 dBA up to 15 dBA is authorized for a landowner where the wind turbine is not located on the landowner's property. To request this exception, landowner written consent must be provided as in (3) above. In contrast to (3) above, an exception under this paragraph would have to be granted by DEQ (or by EFSC for large facilities) for the landowner's consent to become operative.
- 7) A provision is added clarifying the Commission's suspension of its administration of the entire noise program, including processing requests for exceptions, variances and other administrative procedures. This provision was included at DEQ's request.

## **V. SUMMARY OF MAJOR POINTS IN COMMENTS**

### **Introduction**

The testimony largely fell into three broad categories. Most people who testified supported establishing noise standards for wind energy facilities, but felt that the 12/15/03 rules only partially accomplished the necessary changes. Some persons testified in support of the changes proposed in the 12/15/03 draft but they also believed that further changes beyond the 12/15/03 draft were not necessary to accommodate wind. A third perspective was that the current Commission noise rules were adequate and that wind needed no special rules; these persons opposed any rules changes including the 12/15/03 draft. Each of these perspectives is summarized in more detail below.

### **Testimony of Those Supporting New Standards for Wind Energy Facilities**

Many people who testified, including wind energy supporters, farmers, ranchers and environmental organizations, supported the purpose of the rulemaking to establish more workable standards for wind energy facilities, but they believed that changes in the 12/15/03 draft did not effectively accomplish this goal. They supported the establishment of a baseline at 26 dBA and some of the other changes in the 12/15/03 draft. However, they believe that the rules should be amended further to provide the following:

- 1) any owner of property impacted by noise may consent to waive the ambient degradation rule on their property. The increase in ambient degradation can exceed 10 dBA up to any level so long as the levels in Table 8 continue to be

met. Any affected landowner, whether or not the wind turbines would be located on that land, may exercise this waiver. The waiver would be recorded as an easement on the property and would not require a separate memorandum describing environmental conditions required by the 12/15/03 draft;

- 2) the existing ambient rule of a 10dBA limit would apply to any landowner who did not wish to waive the ambient rule;
- 3) the Table 8 maximum limits would still apply to all wind energy projects.

These wind energy supporters also believe that the rules should address the pre-project L10, background level. (L10 refers to a noise level that is exceeded 10% of the time. L50 is a noise level exceeded 50% of the time.) They support deleting the L10 portion of the ambient degradation standard for wind project for two reasons: 1) the continuous nature of the noise source for wind facilities and; 2) meeting the L50 limit also meets the L10 requirements.

These wind energy supporters oppose the 12/15/03 rules' exception process from the noise rules. The exception would have to be approved by EFSC for large facilities, or by DEQ for small facilities, if the landowner gives written consent which must be recorded with the property deed. The exception would allow an increase in noise level of 15 dBA, resulting in a maximum noise level of 41 dBA.

These commenters believe that the exception is not helpful for providing certainty to wind developers because the exception is discretionary, i.e. an exception may not necessarily be granted even if the landowner is willing to agree. They believe that their proposal to allow any affected landowner to agree to waive the noise ambient standards as long as the Table 8 limits are met, is more workable and provides regulatory certainty for wind developers.

They are also concerned that the exception process would not be available as a practical matter since the 12/15/03 rules also provide that DEQ has suspended all requests for exceptions (as well as other procedures) under the noise program because of the lack of funding. They believe it is doubtful whether counties are delegated the authority to grant such exemptions in making local land use determinations.

Wind developers and their supporters also believe that the 12/15/03 draft provision to determine compliance by establishing a wind speed of 16 meters per second (35 mph) at hub height is not workable because sound power data at that wind speed are generally not available from the manufacturer. They believe sound power levels established according to IEC 61400 at the standard wind speed of 8 m/sec at 10 meter height are sufficient to determine compliance with Table 8. They indicate that turbine sound power levels determined in accordance with IEC 61400 are readily available from all manufacturers. They also suggest some clarification of compliance measurement conditions, so that noise generated by the wind alone (and not by the energy facility), does not constitute non-

compliance; and they believe that references to “indirect noise” are vague and should be eliminated.

#### Testimony of Those Supporting the 12/15/03 Draft Rules.

Some persons supported the 12/15/03 draft rules as more than adequate to take wind’s uniqueness into account; they would not support the changes proposed by the prior group of commenters on the 12/15/03 draft rules. They also believe that a waiver of the ambient noise standards by individual landowners through agreements with developers is not justified. They further believe that the existing process the Commission has to grant an exemption is a practical and workable alternative and provides greater protection to the public.

One witness had worked for DEQ for many years and is now consulting for private industry on noise compliance issues. He supports the 12/15/03 draft rules as a reasonable accommodation to wind, while maintaining the basic DEQ noise rules. He proposed two amendments: 1) to clarify that the DEQ rules apply to large wind energy facilities sited by EFSC and to smaller wind energy facilities sited by local governments. Only residential scale wind turbines should be exempt from the DEQ noise standards. 2) to determine compliance the proposed rules require determination only at 16 meters/sec (35mph). He also suggested the rules should indicate a specified height level and a wind speed “not to exceed 16 meters/sec”.

Another witness who is an acoustical engineer also supports the 12/15/03 draft in general but supports some other changes. He suggested that tests to determine compliance with the ambient standard be conducted at a range of 14-16 meters/second rather than just at 16 meters/second. He also supports a local government option to grant an exception to the ambient noise standard under the same conditions as provided for EFSC and DEQ in the 12/15/03 draft. He also suggested that DEQ provide guidance as to how local governments can use the noise standards, given the suspension of Commission and DEQ responsibilities in OAR 340-035-0110. He further believes the exception should have a requirement explaining why the noise regulation cannot be met in order for an exception to be granted.

In general, he supports the requirement that DEQ must issue an exception through an administrative process as the 12/15/03 draft provides, for a waiver of the ambient noise standard. He believes that the administrative process through DEQ provides added protection to the general public which would not be present in a private agreement between any landowner and a developer. He believes that the limited waiver provided to the landowner on whose land the turbine would be located as proposed in the 12/15/03, draft provides enough flexibility for wind and should not be expanded to any affected landowners as some commenters suggested.

### Testimony of Those Not Supporting Separate Noise Standards for Wind

Some persons who testified felt that wind should be treated the same as other industrial noise generators and that there was no justification for any rule changes to treat wind differently. Two acoustical engineers and an energy architect provided testimony from this perspective.

One acoustical engineer stated that Oregon's current noise standards are some of the best in the country. He sees no need to make any changes in Oregon's noise standards. He does not support any of the changes in the 12/15/03 draft. He believes that the current Commission exception process adequately provides flexibility for increases of noise levels; he believes there is no justification to treat wind facilities different from other industrial facilities or other energy facilities which create noise. He believes that noise levels for wind can be accurately monitored and the ambient levels determined. As such there would be no justification for assuming the background of 26 dBA proposed by the 12/15/03 draft. He also indicated that the current process of variances from noise standards is workable, both for DEQ and for local governments.

Neither acoustical engineer supports the proposal to let landowners waive noise standards. They believe that waiver could have adverse impacts on neighboring persons. They also do not support any of the provisions in the 12/15/03 draft establishing special measuring requirements and procedures for measuring wind noise. They believe that all industrial commercial facilities have nuances of their operations that need to be taken into account in measuring noise levels. They believe that the current Commission rules provide for those nuances and wind facilities are no different than other facilities and should not be given special treatment compared to other industrial noise sources.

An architect involved in energy efficiency design and other energy projects also opposes any changes to the current noise rules. He believes that adverse environmental and health impacts may have been caused by wind projects. He claimed there have been numerous complaints about noise from people living near wind energy facilities. He also questions whether wind can be a reliable energy technology, and encourages greater reliance on energy efficiency to avoid the need for wind energy facilities. Because of the adverse impacts of wind and the lack of reliability of wind, he does not support any of the proposed changes to the noise standards for wind energy.

Other persons provided similar written comments opposing any changes in the current noise standards. They believe that there is no justification for treating wind energy facilities different from other industrial noise sources. They also believe that adverse health and environmental impacts could occur from changing the noise standards for wind energy facilities.

## **VI. HEARING OFFICER'S RECOMMENDATIONS: RESPONSE TO COMMENTS**

The revised rules proposed in this Hearing Officer's report would do the following:

- 1) Maintain the Commission's Table 8 limits on all wind energy facilities.
- 2) Provide that the background baseline is 26 dBA for ambient wind energy facility noise.
- 3) Provide that any willing landowner may waive the ambient noise degradation standard for his or her own property. Such waiver must be recorded with the county to accompany the legal title to the property.
- 4) Create a standard protocol based on IEC 61400 for modeling and measuring noise impacts from wind energy facilities to ensure compliance with the Commission's standards.
- 5) Add a provision clarifying the Commission's suspension of DEQ's administration of the noise program.

Each of these issues is discussed below.

### *1) Maintain the Commission's Table 8 limits on all wind energy facilities.*

Virtually everyone who testified urged continued applicability of the Table 8 standard for wind energy facilities. No one urged that Table 8 not continue to apply to wind. In particular, the L50 level of 50 dBA was supported by everyone, including those who wished to have the ability to waive the ambient standards, those who supported the 12/15/03 draft, and those who opposed any changes in the Commission's current noise rules. There is no reason, based on the hearing record, to change the applicability of Table 8 to wind or to modify the provisions in Table 8 for wind energy facilities.

### *2) Provide that the background baseline is 26 dBA for ambient wind energy facility noise.*

This was proposed in the 12/15/03 rules. Establishing a base line of 26dBA provides a uniform approach in determining impacts of wind energy facilities. It also addresses the problem of measuring a background where windspeed may be less than the speed necessary to start a wind energy facility (cut-in speed). This provision also eliminates technical difficulties of incurring wind noise at very low levels. Only one person of the more than 60 persons who testified opposed establishing a baseline of 26 dBA as a minimum ambient sound level. All of the other witnesses who addressed this issue either expressly supported 26 dBA or had no objection to it. While one acoustical engineer said that it was possible to measure at a lower level, he believed that 26 dBA is a reasonable level to assume as the minimum ambient sound level.

The level of 26 dBA is less than a soft whisper from 5 feet away (source: Beranek 1998). Requiring actual levels of measurement below this level is unnecessary, given the unlikely

benefit and the degree of difficulty in measuring accurately at those low levels. I believe that 26 dBA is a reasonable assumption for baseline of background levels. Where there is evidence that the actual background is higher, the proposed rules would provide an applicant the opportunity to demonstrate the actual minimum level.

- 3) *Provide that any willing landowner may waive the ambient noise degradation standard for his or her property. Such waiver must be recorded with the county to accompany the legal title to the property.*

The draft of 12/15/03 provided that a waiver by the landowner where the wind turbines would be located could waive the ambient degradation rule up to a 15 dBA increase over background. This would effectively allow a qualifying landowner to raise the noise level up to 41 dBA. Other landowners who also wished to allow noise from wind machines to affect their property could agree to a similar increase, but only upon approval of an exception by EFSC or DEQ. The 12/15/03 draft suggested that a 15 dBA increase was effectively a tripling of noise levels, and a 10 dBA increase a doubling of noise levels.

However, most people who commented, including landowners, renewable resource advocates and wind developers, believe the waiver should be afforded to any landowner, as long as the limits of Table 8 are maintained. I agree and recommend this position to the Commission.

Since the waiver by the landowner is voluntary, the ambient noise degradation requirements would continue to apply unless a landowner agreed to a waiver. I see no reason to distinguish between a landowner who owns the land where the turbines would be located and any other landowner impacted by the noise standards. If all affected landowners have the option to enter into a consent agreement with the wind developer, this provides certainty and a simpler process than the 12/15/03 draft proposal. The landowner who is unwilling to enter into such agreement still has the full protection of the ambient noise degradation standard, regardless of what his/her neighbor has done. It would make no difference to the level of protection of the ambient noise degradation standard whether the neighboring landowners who do waive the standard own the land where the wind turbines are located or not.

There is also a question whether the proposal to allow landowners to seek an exemption from DEQ is practical. As the new provision 340-035-0110 indicates, neither the Commission nor DEQ will process any requests for exemptions or other administrative actions related to the noise standard. While EFSC may be able to grant exemptions for large wind facilities, smaller facilities would be approved by local governments. Not all local jurisdiction have adopted the Commission's noise standards. Even for those which have, it is not clear whether they may grant an exemption from the Commission rules.

I also agree that all affected landowners willing to waive the noise ambient standard should be able to do so as long as the Table 8 limits are maintained. The 12/15/03 draft allows only an increase in ambient noise of 15 dBA through the consent agreement waiver. While

an increase of 15 dBA may be a tripling of heard noise, the 41 dBA provided in the draft 12/15/03 still constitutes a very low level of noise, the average of a living room library (Beranek 1998). The Table 8 level of 50 dBA is well below any impact on health. 50 dBA is about the level of light traffic 100 feet away, rainfall or noise in a private business office. If landowners want to agree to this level of noise for compensation, I see no reason to deny them this ability to do so.

I also believe that requiring a written waiver to be filed with the county office which records deeds is sufficient notice of the waiver. Such a waiver “runs with the land” and becomes a legally binding easement on future landowners of the affected property. I do not see merit in the extra requirement (in the 12/15/03 proposed rules) of a memorandum which describes the environmental conditions of increased noise due to the wind energy facility. The language in question is vague and confusing. A waiver that indicates the decibel level agreed to should be sufficient to put potential future landowners on notice of the noise easements and covenants in force.

Moreover, a number of speakers indicated that most states, including neighboring states, do not have ambient noise levels at all for wind energy. Instead, those states require a total noise level similar to current Table 8. People who supported waiving the ambient degradation standard testified that these states recognize the difficulty of measuring ambient levels for wind energy facilities, and they provide greater encouragement for wind by not requiring an ambient noise standard.

The rules proposed with this Hearings Officer report do not go as far as these other states, since Oregon would still maintain the noise degradation standard of 10 dBA for a landowner not willing to waive this standard. However, the proposed rules would allow a willing landowner to waive those rules with the Table 8 limits in effect. I believe that this is a reasonable compromise since it provides some flexibility for wind for willing landowners, while maintaining the noise degradation standard for those unwilling to waive this standard.

Finally, a number of commenters suggested that European and South Australian standards for noise are more stringent than the Commission’s current or proposed noise rules. Based on the information available to ODOE, however, I believe that the proposed changes are well within the range of these countries’ noise standards.

The noise standards for wind energy facilities vary considerably by country in Europe but ambient noise standards from wind facilities in Sweden, Denmark, Germany, The Netherlands and Great Britain range from 35 to 45 dBA. Ambient noise standards in New Zealand and Australia vary between 35 and 40 dBA. These noise levels are L90 levels which are less conservative than the L50 values used by the Commission’s rules. The proposed rules would allow the ambient noise level not to increase above 36 dBA (26 dBA background plus an ambient increase of 10 dBA) unless the landowner agreed to a waiver of the ambient rule. Some of these countries also allow landowner agreements to waive the ambient noise standards, including the Netherlands and South Australia.

*4) Create a standard protocol using IEC 61400-11 for modeling and measuring noise impacts from wind energy facilities to ensure compliance with the Commission's noise standards.*

I recommend the use of IEC 61400-11, to establish a standard protocol to determine compliance with the Commission's noise standards. This will simplify the methodology and assure more uniformity in evaluating the noise impact of wind energy facilities.

IEC stands for the International Electrotechnical Commission, which is the recognized international body for standards development activities. IEC 61400-11, "Wind turbine generator systems –Part 11: Acoustic noise measurement techniques" establishes the noise levels by rating the individual turbine from cut-in wind speed up to 95% of its electrical rated power level. The current version of IEC 61400-11 was published in December of 2002 and is referred to as version 2002-12.

The 12/15/03 draft rules proposed the following standard protocol for modeling and measuring noise impacts, to ensure compliance with the Commission's standards: (a) the use of a hub-height wind speed of 16 meters/second; (b) variable speed turbines and cut-in wind speeds; (c) waiver of L10; and (d) non-turbine related noise and indirect noise. Based on public comment discussed below, I believe that the IEC 61400-11 protocol (version 2002-12) is preferable and should be adopted by the Commission.

*4a) the use of a hub-height wind speed of 16 meters/second.*

The 12/15/03 draft rules provide that for purposes of predicting compliance with the Table 8 noise levels from proposed wind facilities, the appropriate measurements must assume the facility's turbines are operating at a hub-height of 16 meters/second (about 35 mph). To determine actual compliance with Table 8 noise levels, operating wind facility noise levels must also be measured based on the turbine operating at 16 m/sec.

ODOE staff believed that 16 m/sec represents a reasonable basis for determining the sound when the wind turbines are operating at full power generation. Speeds above 16 m/sec would likely create substantial noise from the wind itself, making it difficult to measure the actual noise created by the wind energy turbines. By establishing the measurement at hub-height, ODOE staff also believed that an accurate reading would be made regardless of the size and height of the turbine.

Some commenters suggested that 16 m/sec was not the right basis for determining noise. One acoustical engineer said that there was no reason to make a change to the current Commission rules to explicitly measure wind speed in this way (or to include other parameters different from other industrial facilities for measuring wind turbines). He believed that wind engineers could accurately make assumptions and take into account differences as they do for other industrial facilities.

Another witness expressed concern that wind speeds could be much higher, as high as 100 mph. He also objected to the use of hub-height since the noise level at a tower could be very different from noise levels at ground level. Instead, he encouraged numerous measurements at different locations and at different heights to determine noise level compliance.

One acoustical consultant suggested that the measurement protocol should specify a height level and require that the measurement occur when the wind speed does not exceed 16 m/sec. Another one suggested that there should be a range of measurements in the range of 14-16 m/sec to determine compliance.

A group of wind developers objected to the use of hub-height wind speeds. Instead, they suggested that the IEC 61400 ratings, assuming 8 m/sec at 10 meter height, be used, since turbine sound power levels that have been determined in accordance with IEC 61400 are readily available from all major manufacturers. One sound engineer objected to testing turbines at 8 m/sec at 10 meter height, since the turbines vary substantially in height and are much higher than 10 meters.

I recommend that the rule use the established maximum sound power level as determined by IEC 61400-11 (version 2002-12). Currently IEC is the only organization providing such ratings.

The maximum sound power level rating established by the IEC 61400-11 protocol does not mean that measurement is made at 8 m/sec and 10 meter height which was ascribed to that protocol by some commenters. The IEC rates each individual turbine at hub-height to determine maximum sound power levels. The 10 meter height is part of the IEC's calculation to standardize the results for comparison of different turbines.

Use of the IEC maximum sound power level provides the following:

- The power curve relates the turbine's electrical output power to the wind speed averaged over the rotor swept area. The wind speed can be determined from the measured electric power output. This is IEC's preferred method over wind speed measurements using anemometers.
- Sound measurements as a function of wind speeds are taken by recording the electrical power produced by the turbine and then calculating what the average wind speed over the rotor swept area must have been by using the electric power output curve.
- Correlation between measured sound power level and wind speed based on the measured electric power is very high, up to the point of maximum power.
- Because most turbines reach the maximum electrical power output around 12 to 15 m/s at hub height, sound power levels are not measured beyond that wind speed range (such as the 16 m/s as proposed in the 12/15/03 rules). Thus, turbine manufacturers are unable to provide noise data for wind speeds at 16 m/sec as a matter of course.
- Measurements show that the sound power levels generally do not increase beyond the 95% maximum power level. This can be explained because the noise emitted by a

wind turbine generator system is predominantly determined by the aerodynamic noise of the rotor blades, which is directly dependent on the blade tip speed. These blade noises grow with increasing wind speed until the maximum rotor speed (and thus power level) is reached. The wind speed still increases beyond that point but the rotational speed of the rotor, and thus the noise does not increase. However, some turbines with variable speed operation are sometimes being controlled in such a way as to limit noise generation. Therefore the use of the established maximum sound power level makes the most sense.

Using the IEC 61400-11 protocol would allow wind developers to provide sound power level information that is readily available for each model turbine using the IEC rating. At the same time, because IEC evaluates each turbine model individually, the impacts of different of hub-heights are also taken into account in determining maximum sound power level up to 95% power levels.

I also believe that the assumptions for wind measuring should not be left to the discretion of sound engineers, as was suggested by one commenter. Uniform guidance should be provided so the wind industry and affected citizens have certainty as to what the noise requirements are and how they are interpreted.

I also see no benefit to requiring a range of wind speeds as two other witnesses suggested to the extent that it differs from the IEC protocol. This approach lacks the certainty that is provided by the use of a standard independent rating based on actual power level.

#### *4b) Variable Speed Turbines and Cut-in Wind Speeds*

A related issue was whether noise levels for wind turbines with variable wind speeds can be accurately measured under the protocols established by the 12/15/03 proposed rules, which required measurement of wind turbine noise levels at cut-in speed. The sound level of variable turbines increases rapidly with only slight changes in wind speed from the cut-in wind speed, compared to wind turbines with constant speed.

The concern was raised that predicting or measuring the noise levels of variable speed turbines with the measurement requirements of the 12/15/03 proposed rules might significantly underestimate the noise level with slightly higher than cut-in wind speeds. I agree with that concern and have included a change to the 12/15/03 proposed rules. The use of the IEC 61400 maximum sound power level, as explained above, will address this issue.

One commenter suggested that adoption of rules be delayed so that the working group could evaluate this issue. However, I believe such a delay is not necessary. The IEC protocol does evaluate noise levels of variable windspeed turbines as well as those with constant speeds. The IEC process takes into account the quick rise in noise levels and

accurately rates the maximum sound power levels of variable turbines. The IEC protocol will result in a conservative method for both constant and variable speed turbines.

*4c) waiver of L10*

Wind developers also expressed concern about the pre-project L10 noise level and suggested that the L10 portion of the ambient degradation rule for wind projects be eliminated. They believe that the continuous noise created by wind justifies waiver of the L10 standard for wind facilities, as well as the fact that historical analysis of the L10 requirement indicates that if the L50 requirement is met, the L10 requirement is also satisfied. While this may be true in most cases, I do not recommend the elimination of the L10 requirement for ambient noise levels.

As noted previously, L10 refers to a noise level that is exceeded 10% of the time, and L50 is a noise level exceeded 50% of the time. With the adoption of 26 dBA as the assumed background, the concern raised in those comments is addressed in part, i.e., use by a wind developer of 26 dBA as background will reduce the need for pre-project monitoring for background noise.

These commenters clarified in response to the draft Hearings Officer Report that they were not suggesting a waiver of the L10 portion of the Table 8 standard, eliminating one concern I had with their request. However, if a developer seeks to show background is higher than 26 dBA, then the L10 and L50 measurements may both be important. This is particularly true where a landowner is not willing to waive ambient noise standards. A landowner not willing to waive the ambient degradation rule should continue to have the protection of the 10 dBA ambient degradation limit measured for both L10 and L50 (i.e. at noise levels exceeded 10% of the time and 50% of the time).

*4d) non-turbine related noise and indirect noise*

The 12/15/03 proposed rules referred to indirect noise from wind facilities. Concern was raised that the noise standards for wind energy facilities do not clearly state that the noise limits are noise levels attributed only to the wind machines; that noise from wind which is greater than the cut-in speed of the turbine not be incorrectly attributed to the noise created by the turbine rather than to the wind itself. Concern was also raised that the phrase “noise generated or indirectly caused by the wind energy facility” creates confusion and could lead to attribution to wind turbines noise not caused by them. I agree. The words “indirectly caused” have been dropped from the proposed rules and other language is included to clarify that the Table 8 application to wind energy facilities means the noise caused only by the wind energy facilities.

*5) Add a provision clarifying the Commission's suspension of DEQ's administration of the noise program.*

This provision was added at the request of DEQ to reflect the inability of the Commission and DEQ due to lack of funding to actively administer the noise program. There was no adverse comment by anyone on including this provision in the Commission's rules, although some expressed concern that DEQ was unable to actively administer the noise program. This rule provides useful clarification of the active administration of the noise rules and I recommend its adoption.

A number of people also suggested that the rules should provide for a role for local governments in making noise determinations for wind facilities. I do not recommend provisions to explicitly address the role of local governments, because existing state law already provides that determination. For large energy facilities, EFSC would determine compliance with the Commission's noise standards as it does for all applicable standards of other state agencies.

For wind energy facilities which are smaller than 35 megawatts and which are not subject to EFSC's jurisdiction, EFSC does not administer or enforce the noise control regulations for these smaller wind power projects. Instead, local land use approval is required before construction. Local governments may address noise impacts from wind power projects under their land use ordinances. Depending on the jurisdiction, local ordinances might or might not incorporate the state noise rules.

Amendment of the rules as proposed by this draft Hearings Officer report would not change local land use approval procedures. Local governments would continue to apply local ordinances in making land use decisions on small wind power projects. Not all local governments have adopted the state noise rules. In any county that has adopted the state noise regulations by reference in their local ordinances, the amended rules may apply. In those counties where the state noise regulations apply, the amended rules would simplify the noise impact analysis. The amended rules would not affect local government land use decisions in those jurisdictions that have not adopted the state noise rules in their land use ordinances.

## **VII. ISSUES RAISED AT THE COMMISSION MEETING OF APRIL 9, 2004**

Legal Counsel for the Commission raised two issues on the Draft Hearings Officer Report. The first issue was that incorporation of a separate protocol into state agency rules, such as IEC 61400, must either specify a particular version of that protocol, or include in the rules themselves a detailed narrative of the substance of the protocol. As originally written in the Draft Hearings Officer Report, the proposed rules could have provided an improper delegation of authority to the IEC and to other potential standard-setting organizations. To avoid this problem the rules proposed in this Final Report reference specifically the current version of IEC 61400-11, (version 2002-12) which was made effective in December of 2002

The second issue raised by the Commission's Counsel was the proper instrument for waiving the ambient noise rule so that future landowners would be bound by the agreement. The Commission's Counsel has indicated that the rules should provide the option to use either a covenant or an easement in order for a waiver of the ambient noise standard by a willing landowner to be effective on future landowners. Changes have been made in the rules on the landowner waiver provision to reflect Counsel's advice.

As a result of other discussion at the Commission hearing, language has been added clarifying that the proposed rules would apply to wind turbines of any size. Another clarification was made in response to comments which found the word "existing" to be confusing. The revised rules replace the phrase "existing wind energy facility" with the phrase "operating wind energy facility" to make it clear that the operational noise rules apply to any operating wind energy facility.

Finally, concern was raised at the Commission meeting that concerned citizens who think that the noise standards may be exceeded should have the ability to bring an action and have access to the information necessary to successfully bring that action. In the case of large wind energy facilities subject to the jurisdiction of the Energy Facility Siting Council, compliance with the Commission's noise standards would be one of the requirements of compliance with the site certificate issued by the Siting Council. Citizens have the right to bring complaints regarding compliance for large wind facilities to the Siting Council and the Council has ample authority to require the wind energy facility owner to demonstrate compliance. The Siting Council can require whatever information is needed from the facility owner to make that determination.

However, for smaller wind facilities not subject to the Siting Council's jurisdiction, the ability to bring a compliance action is more difficult since the Commission does not have an active enforcement program for its noise regulations, as noted previously. Where the local governments have adopted and are enforcing noise standards that meet or exceed the Commission's rules, the local governments presumably would have enforcement authority and the same ability as the Siting Council to acquire from the wind energy owner whatever information is needed to make that determination.

However, where no local governments have adopted such ordinances, enforcement of the wind noise standards, as well as the Commission's other noise standards is more difficult and the access to the necessary information to make a compliance determination is more problematic. While this rulemaking cannot address the broader issue of enforcement of the Commission's noise standards generally, resolution of complaints by citizens of noise from wind energy facilities should be no more difficult than for other noise generated by other industrial noise sources.

The rules have been revised to reference the IEC protocol in a manner that does not restrict the existing ability of a person to bring an action to assure compliance with the Commission's noise rules. Under the revised rules the IEC protocol is used to determine whether a proposed wind facility would meet the Commission's ambient and Table 8 noise

standards. The revised rules provide that determination of compliance with the Commission's noise standards must be based on actual measurement of noise levels created by the wind energy facilities.

(Note: the March 18 Information Memo to the Commission for the April 8 meeting contained a technical error. On page 3, the memo states:

"The measurement point is 25 feet from the most distant identified noise sensitive property (property used for sleep and schools, churches, hospitals and public libraries)."

OAR 340-035-0035 3) b) of the rule actually reads:

b) Unless otherwise specified, the appropriate measurement point shall be that point on the noise sensitive property, described below, which is further from the noise source:

A) 25 feet (7.6 meters) toward the noise source from that point on the noise sensitive building nearest the noise source;

B) That point on the noise sensitive property line nearest the noise source.

While the proposed rules make no changes in this provision, the Commission's Counsel recommended correcting this error for the record.)

**Rule Changes Proposed by the Hearing Officer for Final Action by the Commission**

**DEPARTMENT OF ENVIRONMENTAL QUALITY**

**DIVISION 35**

**NOISE CONTROL REGULATIONS**

**Proposed Amendments**

*(Affected rules only: additions are underlined; no proposed deletions.)*

**340-035-0035**

**Noise Control Regulations for Industry and Commerce**

(1) Standards and Regulations:

(a) Existing Noise Sources. No person owning or controlling an existing industrial or commercial noise source shall cause or permit the operation of that noise source if the statistical noise levels generated by that source and measured at an appropriate measurement point, specified in subsection (3)(b) of this rule, exceed the levels specified in Table 7, except as otherwise provided in these rules.

(b) New Noise Sources:

(A) New Sources Located on Previously Used Sites. No person owning or controlling a new industrial or commercial noise source located on a previously used industrial or commercial site shall cause or permit the operation of that noise source if the statistical noise levels generated by that new source and measured at an appropriate measurement point, specified in subsection (3)(b) of this rule, exceed the levels specified in Table 8, except as otherwise provided in these rules. **For noise levels generated by a wind energy facility including wind turbines of any size and any associated equipment or machinery, subparagraph(1)(b)(B)(iii) applies.**

(B) New Sources Located on Previously Unused Site:

(i) No person owning or controlling a new industrial or commercial noise source located on a previously unused industrial or commercial site shall cause or permit

the operation of that noise source if the noise levels generated or indirectly caused by that noise source increase the ambient statistical noise levels, L<sub>10</sub> or L<sub>50</sub>, by more than 10 dBA in any one hour, or exceed the levels specified in Table 8, as measured at an appropriate measurement point, as specified in subsection (3)(b) of this rule, **except as specified in subparagraph (1)(b)(B)(iii).**

(ii) The ambient statistical noise level of a new industrial or commercial noise source on a previously unused industrial or commercial site shall include all noises generated or indirectly caused by or attributable to that source including all of its related activities. Sources exempted from the requirements of section (1) of this rule, which are identified in subsections (5)(b) - (f), (j), and (k) of this rule, shall not be excluded from this ambient measurement.

**(iii) For noise levels generated or caused by a wind energy facility:**

**(I) The increase in ambient statistical noise levels is based on an assumed background L50 ambient noise level of 26 dBA or the actual ambient background level. The person owning the wind energy facility may conduct measurements to determine the actual ambient L10 and L50 background level .**

**(II) The “actual ambient background level” is the measured noise level at the appropriate measurement point as specified in subsection (3)(b) of this rule using generally accepted noise engineering measurement practices. Background noise measurements shall be obtained at the appropriate measurement point, synchronized with windspeed measurements of hub height conditions at the nearest wind turbine location. “Actual ambient background level” does not include noise generated or caused by the wind energy facility.**

**(III) The noise levels from a wind energy facility may increase the ambient statistical noise levels L10 and L<sub>50</sub> by more than 10 dBA (but not above the limits specified in Table 8), if the person who owns the noise sensitive property**

executes a legally effective easement or real covenant that benefits the property on which the wind energy facility is located. The easement or covenant must authorize the wind energy facility to increase the ambient statistical noise levels, L<sub>10</sub> or L<sub>50</sub> on the sensitive property by more than 10 dBA at the appropriate measurement point.

(IV) For purposes of determining whether a proposed wind energy facility would satisfy the ambient noise standard where a landowner has not waived the standard, noise levels at the appropriate measurement point are predicted assuming that all of the proposed wind facility's turbines are operating between cut-in speed and the wind speed corresponding to the maximum sound power level established by IEC 61400-11 (version 2002-12). These predictions must be compared to the highest of either the assumed ambient noise level of 26 dBA or to the actual ambient background L<sub>10</sub> and L<sub>50</sub> noise level, if measured. The facility complies with the noise ambient background standard if this comparison shows that the increase in noise is not more than 10 dBA over this entire range of wind speeds.

(V) For purposes of determining whether an operating wind energy facility complies with the ambient noise standard where a landowner has not waived the standard, noise levels at the appropriate measurement point are measured when the facility's nearest wind turbine is operating over the entire range of wind speeds between cut-in speed and the windspeed corresponding to the maximum sound power level and no turbine that could contribute to the noise level is disabled. The facility complies with the noise ambient background standard if the increase in noise over either the assumed ambient noise level of 26 dBA or to the actual ambient background L<sub>10</sub> and L<sub>50</sub> noise level, if measured, is not more than 10 dBA over this entire range of wind speeds.

(VI) For purposes of determining whether a proposed wind energy facility would satisfy the Table 8 standards, noise levels at the appropriate measurement point are predicted by using the turbine's maximum sound power level

following procedures established by IEC 61400-11 (version 2002-12), and assuming that all of the proposed wind facility's turbines are operating at the maximum sound power level.

(VII) For purposes of determining whether an operating wind energy facility satisfies the Table 8 standards, noise generated by the energy facility is measured at the appropriate measurement point when the facility's nearest wind turbine is operating at the windspeed corresponding to the maximum sound power level and no turbine that could contribute to the noise level is disabled.

(c) Quiet Areas ... (no changes)

#### 340-035-0110

##### Suspension of Commission and Department Responsibilities

In 1991, the Legislative Assembly withdrew all funding for implementing and administering ORS Chapter 467 and the Department's noise program. Accordingly, the Commission and the Department have suspended administration of the noise program, including but not limited to processing requests for exceptions and variances, reviewing plans, issuing certifications, forming advisory committees, and responding to complaints. Similarly, the public's obligations to submit plans or certifications to the Department are suspended.

## **VIII. ATTACHMENT: DETAILS OF COMMENTS**

### Portland Hearing, February 9, 2004

The hearing ran about two hours; about 20 people attended the hearing and 14 testified. They are listed below and the major points of their comments are briefly summarized.

Ann English Gravatt, representing Renewable Northwest Project (RNP): supports general effort to establish separate noise standards for wind energy facilities; supports right of landowners to waive ambient degradation rule up to Table 8 limit of 50 decibels (dBA) – such a waiver would be recorded as an easement that applies to the property for as long as specified in the easement agreement; supports the provision of the 12/15/03 draft rules that the assumption for noise evaluation purposes that pre-project ambient noise level is assumed to be 26 dBA. (See written testimony summary below for more issues covered).

Jerry Wilson: supports the 12/15/03 draft rules with a few changes including a definition of wind energy facilities covered by the rule and specifying requirements for operational oversight; does not support the right of a landowner to waive ambient degradation rule; believes that DEQ noise standards are important and should be made known to the public and local governments—i.e. 340-035-0110 should not be the basis for ignoring noise standards even if DEQ lacks the budget authority to actively enforce them. (See also written comments below.)

Andy Linehan, with CH2MHill: believes the 12/15/03 draft is an improvement but does not go far enough to make wind facilities competitive in Oregon with other states; supports right of landowners to waive ambient noise standards up to Table 8 limit of 50 dBA;

Rhett Lawrence, OSPIRG: supports right of landowners to waive ambient noise standards up to Table 8 limit; believes that benefits of wind energy outweigh any increased noise impact.

Peter Mostow: supports right of landowners to waive ambient noise standards up to Table 8 limit; believes that the use of easement restrictions is appropriate for wind noise like other issues including nuisances which property owners address through easements.

Roby Roberts, PPM Energy: supports right of landowners to waive ambient noise standards up to Table 8 limit; believes that this approach is comparable to what is allowed in other states.

Virinder Singh, Pacificorp: development of renewables is important to Pacificorp, which is relying heavily on renewables in meeting its energy needs in the next ten years; supports maximum flexibility in developing renewable resources, including landowners rights to waive ambient noise level.

Russell Altermatt, of Altermatt Associates: indicates that Oregon's current noise standards are very good and sees no need to make changes in Oregon's noise standards; believes there is no justification to treat wind facilities different from other industrial facilities which create noise. – see also written comments below.

Scott Kringon, Vestas Wind Systems: supports right of landowners to waive ambient noise standards up to Table 8 limit; notes that wind facilities can't use noise mitigation measures, so there must be flexibility if wind facilities will be developed.

Mark Bastasch: with CH2Mhill and a noise consultant on wind energy projects, supports right of landowners to waive ambient noise standards up to Table 8 limit; believes that Massachusetts is only other state with ambient noise standards for wind, and has caused adverse impacts on wind development.

John DeMoss: represents a number of farmers and ranchers who want the flexibility to waive ambient noise standards; believes that noise levels above 50 dBA could be acceptable.

Brett Gray: supports right of landowners to waive ambient noise standards up to Table 8 limit;

Kerry Standlee, acoustical engineer: supports the 12/15/03 draft with some changes; suggests that tests to determine compliance with the ambient standard be conducted at a range of 14-16 meters/second rather than just at 16 meters/second; also supports a local government option to grant an exception to the ambient noise standard under the same conditions as provided for DEQ in the 12/15/03 draft; believes the exemption should have a requirement explaining why the noise regulation cannot be met.

Mr. Standlee supports the requirement that DEQ must issue an exemption through an administrative process as the 12/15/03 draft provides, for a waiver of the ambient noise standard; believes that the administrative process through DEQ for exemptions provides added protection to the general public which would not be present in a private agreement between any landowner and a developer; believes that the limited waiver provided to the landowner where the turbine would be located as proposed in the 12/15/03 draft provides enough flexibility for wind and should not be expanded to all affected landowners.

Mr. Standlee also suggests that DEQ provide guidance as to how local governments can use the noise standards, given the suspension of Commission and DEQ responsibilities in OAR 340-035-0110; also suggests dropping the use of the word "existing" to describe wind energy facilities in OAR 3440-035-0035 as it is confusing; "existing" could be understood to refer to pre-1975 facilities when the current noise rules were adopted by the Commission.

Sean Harding: supports development of wind and believes noise issues can be addressed without overly restrictive noise standards; recently developed residential-scale windpower in Tillamook County.

The Dalles Hearing, February 9, 2004

The hearing went about ninety minutes, with 30 people in attendance. Twenty-two people testified; they are listed below.

Mike McArthur, Sherman County Judge and Gary Thompson, Sherman County Commissioner: wind energy is very important to Sherman County; they believe that landowners should have the right to waive ambient noise standards up to the 50 dBA limit of Table 8; also believes that local planning commissions should have greater latitude to deal with these issues.

Ann English Gravatt, referenced comments at Portland hearing and written comments.

Dan Erickson: Wasco County Judge: agrees with Judge McArthur on ambient noise standards and the need for greater ability of local jurisdictions to adjust noise standards.

Kent Thomas: supports right of landowners to waive ambient noise standards.

Barbara Gray: supports right of landowners to waive ambient noise standards.

John Fields: supports right of landowners to waive ambient noise standards.

David Beasley, Superintendent-elect of Sherman County schools: wind energy development is important to Sherman County economically; supports right of landowners to waive ambient noise standards.

Paul Woodin; current rules are too restrictive and have adversely affected wind projects in Oregon; supports right of landowners to waive ambient noise standards.

Darrel Hart: supports right of landowners to waive ambient noise standards.

Allan Peterson: supports right of landowners to waive ambient noise standards.

Carole McKinster: supports right of landowners to waive ambient noise standards.

Melva Thomas: supports right of landowners to waive ambient noise standards.

Nancy Fields: supports right of landowners to waive ambient noise standards.

Sharon Spencer: supports right of landowners to waive ambient noise standards.

Don Hildebrand: supports right of landowners to waive ambient noise standards.

Mark Jackson: supports right of landowners to waive ambient noise standards.

Brett Gray: supports right of landowners to waive ambient noise standards.

Sandy McNabb: supports right of landowners to waive ambient noise standards.

Mark Bastasch, CH2MHill: supports right of landowners to waive ambient noise standards; also believes Oregon's current standard is too strict for wind development compared to Washington and other states.

Roby Roberts, PPM Energy: believes that wind developers need certainty, supports right of landowners to waive ambient noise standards up to 50 dBA limit in Table 8.

John DeMoss: supports right of landowners to waive ambient noise standards up to at least 50 dBA limit in Table 8.

#### Tillamook Hearing, February 23, 2004

The hearing ran about 45 minutes. Twelve people attended, and 9 persons spoke. They are listed below.

Mary Ann Sweet supports the development of wind energy, and supports using Table 8 limits without a separate ambient noise standard as the basis for wind energy facilities in Oregon. She also provided a written statement.

Larry Stein: believes that global warming from fossil fuels presents real risks and dangers; believes that wind energy has environmental benefits and should be encouraged through modifying the Commission's noise standards. He also provided a written statement.

Barry White: represents the United Brotherhood of Carpenters. He supports the effort to amend the noise standards for wind energy resources.

Tom Bender, an energy architect from Manzanita: expressed a number of concerns about wind energy facilities and their noise impacts; believes that the proposed noise standards do not take into account the interaction of wind noise with other noise; expressed concern about deterioration of wind energy equipment in Hawaii and elsewhere.

Mr. Bender supports renewable energy but believes that wind energy must be sited carefully to avoid adverse impacts; believes that energy efficiency should be a much higher priority and would reduce the need for new wind and other electricity resources; and also believes that more emphasis on clean energy needs to be placed on cars and other mobile sources of pollution, not power plants.

Shirley Kalkhoven: who is on the Nehalem City Council, requested clarification of the legal significance and who would enforce new noise standards for wind energy facilities, given the fact that DEQ and the Commission are not actively administering or implementing the noise standards.

Ann Gravatt, Renewables Northwest Project (RNP), gave a brief summary of RNP's position provided at previous hearings: i.e. she supports the ability of any landowner to waive ambient limits up to the Table 8 limits for wind energy facilities; is proposing no change to Table 8 for wind energy facilities.

Sean Harding: believes that wind energy can be an important factor in bringing new jobs to Tillamook County; believes that the benefits of wind energy outweighs any adverse noise impacts; supports the use of the Table 8 limits as the noise limits for wind energy resources. He also provided a written statement and a report by the National Renewable Energy Lab on the noise impacts of wind energy facilities.

Mark Bastasch, works for CH2Mhill: supports right of landowners to waive ambient noise standards up to Table 8 limit; .believes that newer wind turbines are quieter than older models; believes that the Table 8 limits are adequate to protect health impacts and take into account the cumulative impacts of noise.

John DeMoss: believes landowners should be able to waive the ambient standard, Oregon's maximum Table 8 noise level is restrictive enough, as Washington allows up to 70 dBA, which is 20 dBA higher than Table 8. He has a farm under some existing windfarms and has no problems with the noise levels there.

#### Pendleton Hearing, March 9, 2004

The hearing ran about an hour and 20 minutes. Nine persons spoke at the hearing. They are listed below.

Matt Wood: lives at the current Stateline Windfarm, about 1,00 feet away from the nearest turbine; has no problems with noise from the wind turbines and has seen minimal effect on wildlife, including birds and coyotes, from the turbines.

Jim Williams: lives in Helix and farms near the first wind project in the area; has seen no impact from noise and has seen benefits from wind through tax payments used to help the fire district.

Monty Hixson: has been a construction contractor on a number of wind facilities, supports wind development and believes noise is not an issue from wind machines; hears more noise from passing cars than from wind turbines.

Cliff Bracher: a landowner inside the Stateline Windfarm, leases farmland to Matt Wood; also supports wind energy development.

Dave Campbell: owns property at Stateline and has reseeded the land while wind turbines are operating; has had no problems with noise; one residence on his property has also not complained about noise.

Anne Walsh, FPL Energy: developed the Vansycle Ridge wind energy project; supports wind energy development, believes that willing landowners should be able to waive the ambient rule while maintaining Table 8 limits; also supports use of 26 dBA as background level; supports other changes in wind energy rules advocated by RNP to make wind energy easier to site in Oregon.

Mike McKay: has done electrical work on wind projects; believes that wind is much quieter than other power plants and supports wind development.

Kerrie Standlee: previously supported the 12/15/03 draft rules, but now believes they do not adequately take into account the noise levels from variable wind speed turbines; believes that witnesses who say noise levels of existing turbines is not a problem demonstrate that the existing noise levels are workable and will not prevent wind development; urges delay in adoption of the rules to further examine the impacts of variable windspeed turbines; see also written testimony provided at this hearing summarized below.

John DeMoss: disagrees with Mr. Standlee and supports the landowners' right to waive ambient noise standards; opposes a delay in adoption of new wind rules.

#### Written Comments Received Before Issuance of the Draft Hearings Officer Report

David Stewart-Smith, Oregon Department of Energy: 2/6/04, memo explaining the ODOE staff proposed amendments. Most of the points covered in the memo are incorporated in the prior sections of this Hearing Officer report entitled "Introduction", "Energy Facilities and Commission Noise Standards", "Why ODOE Believes Wind Energy Facilities Need a Specific Noise Standard Provision", "Application of the Commission's Noise Standards to Wind Energy Facilities" and "Initial ODOE Draft Proposal of 12/15/03".

Tillamook County Commissioner Tim Josi: 2/24/04, supports this rulemaking to make noise standards suitable for wind energy; supports establishing a minimum background level of 26 dBA and the compliance wind speed of 16 m/sec as more reasonable than high wind conditions.

Russell N. Altermatt, P.E., Altermatt Associates: 2/9/04, comments indicate that Oregon's current noise standards are some of the best in the country; sees no need to make any changes in Oregon's noise standards; believes that current EQC exemption process adequately provides flexibility for increases of noise levels; believes there is no

justification to treat wind facilities different from other industrial facilities or other energy facilities which create noise.

He does not support any of the changes in the 12/15/03 draft. He believes that current Commission exemption process adequately provides flexibility for increases of noise levels; believes there is no justification to treat wind facilities different from other industrial facilities or other energy facilities which create noise. He believes that noise levels for wind can be accurately monitored and the ambient levels determined. As such there would be no justification for assuming the background of 26 dBA proposed by the 12/15/03 draft.

Mr. Altermatt also believes that the current process of variances from noise standards is workable, both for DEQ and for local governments. He does not support the proposal to let landowners waive noise standards and believes that such power could have adverse impacts on neighboring persons; does not support any of the provisions in the 12/15/03 draft establishing special measuring requirements and procedures for measuring wind noise; believes that all industrial commercial facilities have nuances of their operations that need to be taken into account in measuring noise levels, the current Commission rules provide for those nuances; and wind facilities are no different than other facilities in this regard.

Ann English Gravatt, Renewable Northwest Project, (RNP): 2/9/04, supports some of the provisions of the draft proposed amendments, including the assumption for noise evaluation purposes that pre-project ambient noise level is assumed to be 26 decibels (dBA); believes that affected landowners should be able to waive the ambient degradation rule for their property; believes that there should be no restrictions on the landowner's right to waiver as long as the noise level complies with the limits of the existing. Table 8 rule (the most stringent limit of which is 50dBA).

Ms. Gravatt also believes that the rules should be amended to provide the following:

- 1) any owner of property impacted by noise may consent to waive the ambient degradation rule on their property. The increase in ambient can exceed 10 dBA up to any level so long as the levels in Table 8 continue to be met. Any affected landowner, whether or not the wind turbines would be located on that land, may exercise this waiver. The waiver would be recorded as an easement on the property and would not require a separate memorandum describing environmental conditions required by the 12/15/03 draft;
- 2) the existing ambient rule of a 10 dBA limit would apply to any landowner who did not wish to waive the ambient rule;
- 3) the Table 8 maximum limits would still apply to all wind energy projects.

Ms. Gravatt also supports deleting the L10 portion of the ambient degradation for wind project for two reasons: 1) the continuous nature of the noise source for wind facilities and; 2) that meeting the L50 limit also meets the L10 requirements. She also opposes the

12/15/03 draft proposal for an exemption process from the noise rules; she believes that the exemption is not helpful for providing certainty to wind developers because the exemption is discretionary, i.e. an exemption may not be granted even if the landowner is willing to agree. She believes that the proposal to allow any affected landowner to agree to waive the noise ambient standards up to the Table 8 limits is more workable and provides regulatory certainty for wind developers.

Ms. Gravatt is also concerned that the exemption process would not be available as a practical matter since the 12/15/03 rules also provide that DEQ has suspended all requests for exemptions (as well as other procedures) under the noise program because of the lack of funding; it is doubtful whether counties are delegated the authority to grant such exemptions in making local land use determinations.

Ms. Gravatt also believes that the 1/1/04 draft provision to determine compliance by establishing a wind speed of 16 meters per second (35 mph) at hub height is unnecessary, since the IEC 61400 wind speeds (8 m/sec at 10 meter height) are sufficient to determine compliance with Table 8. Turbine sound power levels determined in accordance with IEC 61400 are readily available from all manufacturers. She also suggests some clarification of compliance measurement conditions, so that noise generated by the wind alone (and not by the energy facility), does not constitute non-compliance; and she believes that references to “indirect noise” are vague and should be eliminated.

Proposed Rule Language for Oregon Noise Regulation of Wind Projects, received Feb. 24, 2004, by Ms. Gravatt of RNP, based on previous written testimony.

John V. Stahl, Pacific Wind Power LLC: February 9, 2004, support the RNP comments, especially the right of any landowner to waive ambient noise standards up to the Table 8 limit; supports the 26 dBA pre-project assumed noise level in the 12/15/03 draft rules, and supports making the regulation applicable to local jurisdictions.

Maureen Kirk, OSPIRG: supports wind development for economic benefits to consumers and for environmental reasons; supports the RNP proposals, including right of the landowners to waive ambient noise standards.

Mary Ann Sweet: supports the right of landowners to waive ambient noise standards and believes changes in the noise standards are necessary to encourage wind energy.

Larry Stein: supports the right of landowners to waive ambient noise standards and believes changes in the noise standards are necessary to encourage wind energy; believes that wind can help avoid reliance on fossil fuels and their adverse impacts on global warming.

Sean Harding: supports the right of landowners to waive ambient noise standards and use of Table 8 limits for wind energy facilities. Mr. Harding also provided a report prepared by the National Renewable Energy Lab (NREL): “Acoustic Tests of Small Wind

Turbines” by P. Migliuri, J. van Dam, and A. Hurley, NREL Report # AIAA 2004-1185. The report provides information on noise monitoring and evaluation of a number of small wind energy facilities capable of operating at very low wind speeds.

Tom Bender: raised a number of concerns about the noise impacts of wind energy facilities; including operational history in Hawaii and Wisconsin, adverse environmental and health impacts that may have been caused by wind projects, numerous complaints from people living near wind energy facilities. He also questions whether wind can be a reliable energy technology, and encourages greater reliance on energy efficiency to avoid the need for wind energy facilities. He does not support any of the proposed changes to the noise standards. He also objects to some of the current provisions in the existing noise rules which were not proposed for change in this rulemaking proceeding. These included definitions of “noise sensitive properties” and “quiet areas” and the peak response levels for impulse sounds among other issues.

John Hector: opposes changes to allow any landowner to waive ambient standards up to Table 8 limits, believes the 12/15/03 draft provides enough flexibility with some minor amendments, and believes that further loosening of noise standards for wind development is not justified.

Jerry Wilson: February 9, 2004, supports the 12/15/03 draft rules with a few changes including a definition of wind energy facilities covered by the rule and specifying requirements for operational oversight; also provides extensive background of the work done by the informal advisory committee before the 12/15/03 draft rules were issued; he believes that this draft with minor changes adequately takes into account the special features of wind energy facilities.

John Guynup, Currydale Farms: March 9, 2004, believes development of wind is very important for economic development, supports more flexible standards for noise to encourage wind energy development, including the ability to waive ambient noise levels and other provisions recommended by RNP.

Kerrie Standlee: March 8, 2004, recommends a delay in adoption of the rules so that the informal working group can be reconstituted to evaluate remaining technical issues; he is particularly concerned that the 12/15/03 draft rules which he previously supported do not adequately address the noise levels from newer variable speed wind turbines; both the provisions on ambient noise levels and Table 8 limits may be accurately determined for constant speed turbines in the 12/15/03 draft rules, but not the impact of variable speed turbines; he also disagrees with RNP’s analysis that the ambient degradation rule is not needed to protect public health; reliance solely on Table 8 limits could result in higher noise levels than USEPA’s recommended health and safety levels.

Mark Bastasch: March 12, 2004, opposes delaying adoption of the rules and believes reconstituting the informal advisory group would not result in consensus; also disagrees with other portions of Mr. Standlee’s comments.

Tom Hare, US Bureau of Land Management, January 27, 2004, supports the proposed rulemaking changes to encourage wind energy development.

Tom McClara: February 15, 2004, has concerns about the noise created by a lumber mill in southern Oregon and seeks help to enforce noise standards.

Ann Gravatt, Renewable Northwest Project, March 12, 2004, opposes any delay in taking action on noise standards for wind energy facilities; believes that the rulemaking record has been sufficiently thorough for action to be taken;

A number of emails in correspondence, March 10, 2004 through March 12, 2004 between Mark Bastasch and Kerrie Standlee further explaining their most recent respective statements.

Carol Dillin, Portland General Electric: March 11, 2004, supports making changes in the noise standards to encourage wind energy development.

Katie Fast, March 12, 2004, supports wind energy development, supports allowing any landowner to waive the ambient noise degradation rules; believes the waiver in the 12/15/03 draft of the rules is too restrictive.

Ken Thompson, opposes changes in the noise rule to make it easier to site wind in rural areas, believes that there is too much industrialization occurring in exclusive farm use areas. Mr. Thompson provided three attachments to his written testimony: an East Oregonian 2004 calendar cover, showing many wind machines on farmland; an excerpt from the National Wind Coordinating Committee "Permitting of Wind Energy Facilities Handbook" and the Umatilla County Wind Utilization Process", October 2002, by Mr. Thompson.

Catharine Lawton: March 11, 2004, opposes changes in the current noise rules; opposes the 12/15/03 draft rules; believes noise from wind turbines should be limited to a maximum of 40 dBA, or no more than 5 dBA over background ambient noise levels which a number of European countries have done; believes wind turbines present health hazards from excessive noise, opposes allowing landowners to waive ambient noise degradation standards; opposes making special noise rules for wind energy facilities; suggests that South Australia's noise guidelines be considered for adoption.; also encourages international certification of wind turbines.

Ann Vileisis, Kalmiopsis Audubon Society: opposes changes to treat wind different from other industrial facilities.

Written Comments Received After Issuance of the Draft Hearings Officer Report

David Van't Hof, Sustainability Advisor to Governor Kulongoski: 4/8/04, supports the rule changes recommended in the Draft Hearings Officer Report of 3/22/04, especially the changes which allow willing landowners to waive the ambient noise standards.

Judge Mike McArthur, Commissioner Sherry Kaeberg and Commissioner Gary Thompson, Sherman County Court: 4/7/04, support the rule changes recommended in the Draft Hearings Officer Report of 3/22/04.

Ann Gravatt, Renewable Northwest Project: supports the rule changes recommended in the Draft Hearings Officer Report of 3/22/04 with two exceptions: 1) the L10 portion of the ambient degradation rule should be deleted for wind projects; 2) the ambient rule appears applicable to wind projects on previously used sites but not to other noise sources at such sites.

Shelley Tanquary: 4/5/04, opposes any changes to the noise standards because of concerns regarding potential environmental impacts.

Joanna and Roger Rieber: 4/8/04. oppose any changes to the noise standards because of potential adverse health impacts to humans and animals.

Pat Volz: 4/9/04, opposes any changes to the noise standards because of potential adverse health impacts.

Cathleen Moore: 4/9/04, opposes any changes to the noise standards because of potential adverse health impacts to humans and animals.

David Cornell, Curry County Coastal Alliance: 4/4/04, opposes any changes to the noise standards because of concerns regarding noise impacts from large wind energy facilities

John Hector: 4/9/04, opposes the changes recommended in the Draft Hearings Officer Report of 3/22/04, including the ability to waive ambient noise standards for wind energy facilities; objects to the fact that his prior comments were not adopted in the draft Hearings Officer Report.

Bruce and Pat Stannard: 3/30/04, oppose any changes to the noise standards because of concerns regarding noise impacts.

Sue Sweet Musser: expresses concern that any changes in noise rules not adversely affect quiet areas and the wildlife attracted by those quiet areas.

William L. Hanna: 3/26/04, opposes any changes to the noise standards because of concerns regarding noise impacts on health.

Melody Norass: opposes any changes to the noise standards because of concerns regarding potential environmental impacts.

Kerry Standlee: 4/8/04, opposes the changes recommended in the Draft Hearings Officer Report of 3/22/04; believes these changes go to far in modifying Oregon's noise regulatory program to assist wind development; opposes use of IEC 61400 as the basis for determining compliance with Commission noise rules, opposes the ability to waive the ambient noise standard, and believes the changes would be difficult to administer; recommends the Commission defer action until further changes in the proposed rules can be evaluated.

Gerald T. Wilson: 4/5/04, while supporting streamlining the permitting of wind energy facilities, he opposes the changes recommended in the Draft Hearings Officer Report of 3/22/04; believes these changes are inconsistent with longstanding Commission policy on noise regulation; recommends the Commission defer action until further changes in the proposed rules can be evaluated.

Janette K. Baxter: 4/5/04, opposes the changes recommended in the Draft Hearings Officer Report of 3/22/04; believes that the provisions establishing background at 26 dBA, allowing landowner waiver of ambient noise standards and other proposed changes will result in adverse impacts; believes that wind turbines should not be treated differently from other industrial noise sources; urges the Commission to adopt rule changes that will result in stricter noise standards and which will reduce the level of noise allowed from wind turbines.

Oral Comments Received at the Commission Meeting of April 9, 2004

Ann Gravatt of Renewable Northwest Project: supports the rule changes recommended in the Draft Hearings Officer Report of 3/22/04.

Paul Woodin: supports the rule changes recommended in the Draft Hearings Officer Report of 3/22/04.

Mark Bastasch: supports the rule changes recommended in the Draft Hearings Officer Report of 3/22/04.

Dave Campbell: supports the rule changes recommended in the Draft Hearings Officer Report of 3/22/04.

George Ward: supports the rule changes recommended in the Draft Hearings Officer Report of 3/22/04.

John DeMoss: supports the rule changes recommended in the Draft Hearings Officer Report of 3/22/04.

Kerrie Standlee: expressed concern about the ability of citizens to assure compliance with the Commission's noise standards for smaller wind energy facilities not subject to the Siting Council's jurisdiction under the changes proposed in the Draft Hearings Officer Report of 3/22/04.