

**STATE OF VERMONT
PUBLIC SERVICE BOARD**

Temporary Wind Generation Facility Sound)
Standard Rulemaking)

June 27, 2016

**PROPOSED RULE AND COMMENTS OF THE
VERMONT DEPARTMENT OF PUBLIC SERVICE**

I. INTRODUCTION

The Vermont Department of Public Service (“Department”) hereby submits the following Proposed Rule and Comments in response to the Vermont Public Service Board’s (“Board”) request for proposals and comments, dated June 14, 2016. On June, 13, 2016, Act 174 of the Vermont legislature was made effective upon signing by Governor Shumlin. Included in Act 174 was a directive that “[o]n or before 45 days after the effective date of this section, the Board shall adopt temporary rules on sound levels from wind generation facilities.” Act 174, § 12(b).

Since late 2011, the Department has engaged in a comprehensive and continuing study of sound emissions from wind turbines in the state, with a particular focus on emissions at three multi-turbine wind facilities in northern Vermont: the Sheffield Wind facility (“Sheffield”), the Kingdom Community Wind facility in Lowell (“KCW”), and the Georgia Mountain Community Wind facility (“GMCW”). It has also examined other, smaller wind facilities, most notably a 100 kW single-turbine facility in Vergennes. Study of sound emissions has often been driven by a response to one or more complaints by individuals living near a facility, but an interdisciplinary team of state agency staff have also invested significant time and effort to better understand the unique science and policy concerns surrounding wind turbine sound propagation and monitoring.

In 2014, Health Canada began releasing the results of its study examining potential health impacts of long-term exposure to sound emission from wind turbines. The comprehensive field-based study examined more 1,200 residents living near wind turbines in Canada. Health Canada has published eight scientific journal articles on their findings in relation to sound modeling, monitoring and health. The Department's understanding is that the study found no link between direct or indirect health impacts in people exposed to sound levels of less than 46 dBA at the exterior of their home.

Health Canada also measured and studied the impact of exposure to low frequency noise and infrasound on health. The Department understands that Health Canada determined that the health impacts of exposure to low frequency noise levels correlated well with exposure to audible sound, and the health findings and conclusions related to audible sound below 46 dBA and health apply to the low frequency range as well. Additionally, the Department understands that a growing number of wind infrasound studies have been published in recent years by international researchers. The study results indicate that audible sound standards and guidelines are adequate surrogate to ensure that infrasound levels at people's homes are below international infrasound guidelines or standards. Although the Department's understanding is that infrasound and low frequency noise are components of wind turbine sound, and its understanding of these two components continues to evolve, at this time the Department concludes the levels are not significant enough to conclude that they pose a risk to public health and safety.

The Department's experience has yielded a deep appreciation for the substantial and complex interplay between hard science and policy choices when seeking to establish sound limits and monitoring and data analysis protocols that are based on current science and measurable criteria, protective of public health and safety, enforceable, and clear to all. Finding that balance

or “correct” answers to these concerns has not been easy. In short, the Board is now faced with a difficult undertaking under a significant time constraint.

The Department proposes the following temporary rule based on its experience and understanding to date. It stresses that the proposed rule represents the outer limit of what the legislature and/or Department has determined to be protective of public health and safety and enforceable. The proposed rule is intended to allow for all aspects of the sound limit and monitoring methodologies to be examined in a relevant Board proceeding held under 30 V.S.A. § 248, and for departures from the limits and methodologies stated in the rule based on examination of case-specific factors present in a proposal for construction and operation of a wind facility. The Department is authorized to represent that that Vermont Department of Health supports the proposed temporary rule.

Likewise, the proposed temporary rule is not complete at the time of this filing. As discussed below, the Department is unable to make specific recommendations with respect to a few critical components of an effective rule at this time. Specific determinations with respect to certain monitoring assumptions and/or methodologies will have significant impact on the effectiveness and enforceability of any sound limit. Those assumptions and methodologies will be more thoroughly examined and appropriately decided in the permanent rulemaking process also directed by the legislature in Act 174, but the Department hopes to further elucidate more detail with respect to some of these issues in reply comments to be filed on July 7, 2016. The Department therefore recommends that these issues be examined and decided on a case-by-case basis, if and when they arise in relevant 30 V.S.A. § 248 proceedings, while the temporary rule is operative.

II. PROPOSED RULE

X.X00 SOUND LEVELS FROM WIND GENERATION FACILITIES

X.X01 Definitions

For the purposes of this rule, the following definitions apply:

X.X02 General Rule

Until a final rule establishing sound standards related to the operation of wind generation facilities is adopted, no wind facility approved for operation pursuant to 30 V.S.A. § 248 shall emit sound levels when operating in excess of the lowest maximum decibel levels authorized in any certificate of public good issued prior to the adoption of this rule.

(A) Facilities with a Plant Capacity of 500 kilowatts or less. Operation of facilities with a plant capacity as defined in 30 V.S.A. § 8002 of 500 kilowatts (“kW”) or less shall not result in sound levels in excess of 10 dBA above L90 ambient level at the exterior of any residence.

(B) Facilities with a Plant Capacity of Greater than 500kW. Operation of facilities with a plant capacity as defined in 30 V.S.A. § 8002 of greater than 500kW shall not result in sound levels in excess of 45 dBA at the exterior of any residence.

X.X03 Pre-Construction Sound Modeling

All petitions to construct and operate a wind generation facility shall include a sound model developed for the proposed facility that reports the expected maximum sound levels from the operation of a facility experienced within a specified radius from the nearest turbine.

(A) Turbine Specifications as the Basis of Sound Model. The sound model shall be based on the technical specifications of the turbines proposed for use at the facility.

(B) Other Inputs to Sound Model. The sound model shall include information identifying the inputs and/or assumptions related to:

- (1) Uncertainty of Sound Power from the Facility;
- (2) Ground Absorption of Sound; and

(3) Topographic and Geographic Features Unique to the Facility.

- (C) Obligation to Update and Supplement Sound Model. A petitioner shall update, supplement, and/or amend the sound model due to any and all changes to the proposed facility prior to operation. Opportunity to review and comment on any change to the sound model shall be given to all parties to the 30 V.S.A. § 248 proceeding, and the Board shall approve any changes to the sound model prior to the initial operation of the facility.

X.X04 **Post-Construction Sound Monitoring**.

For a wind generation facility with a plant capacity of greater than 500kW, sound monitoring shall take place at no fewer than a specified number of residences within a specified radius from the nearest facility turbine upon facility operation for a specified time. The monitoring is intended to verify the accuracy of the pre-construction modeling and facility compliance with certificate of public good conditions and requirements.

- (A) Monitoring by the State. Post-construction sound monitoring shall be conducted under the direct supervision and control of a State of Vermont agency or agencies designated by the Board.
- (B) Monitoring Methodology. Post-construction sound monitoring shall conform to the methodologies, protocols, and practices contained in Rule X.X05.
- (C) Modification of Pre-construction Sound Model. The holder of a facility CPG is required to identify the appropriate inputs and/or assumptions, and modify the pre-construction sound model if the post-construction sound monitoring indicates that there is a reasonable likelihood that the expected maximum sound levels at any of the monitoring locations are equal to or greater than a specified dBA sound level above those modeled. All parties to the 30 V.S.A. § 248 proceeding shall be given an opportunity to review and comment on any change to the sound model.
- (D) Alternatives to Residential Monitoring Locations. Petitioner may seek a waiver from the minimum residence monitoring locations requirement if sufficient residential locations cannot be secured to conduct sound monitoring. A request for waiver shall include a description of why the petitioner is unable to meet the minimum residence requirement, and the efforts it has taken to meet the requirement. The request for waiver shall also include a description of the proposed alternative monitoring location(s).

X.X05 **Sound Monitoring Methodology.**

Sound monitoring equipment and procedures shall conform to all applicable relevant industry standards and specifications.

(A) Monitoring Equipment Specifications. Sound level meter or alternative sound level measurement system used shall meet all appropriate industry standards and specifications. Each monitoring site shall include:

- (1) Installation of anemometer and other equipment or sensors capable of gathering and recording sound level meter-level wind speed, wind direction, temperature, and precipitation; and
- (2) Installation of enhanced wind screens capable of significantly reducing or eliminating wind-induced noise contamination over the sound level meter.

(B) Determination of Background/Ambient Sound Levels. Activities conducted to determine background/ambient sound levels shall conform to the following methodologies:

- (1) Petitioner shall conduct no less than a specified number of turbine shutdowns lasting no less than a specified number of minutes each month during the post-construction continuous sound monitoring program. No fewer than specified number required turbine shutdowns shall occur during specified nighttime hours.
- (2) Where feasible, both a primary and secondary sound level meters or alternative sound level measurement systems at the sound monitoring location, consistent with appropriate industry standards and specifications.

X.X06 **Analysis of Sound Monitoring Data**

X.X07 **Response to Complaints**

Complaints raised by residents near the wind facility shall be responded to pursuant to and consistent with the complaint response procedure(s) issued by the Department of Public Service.

III. COMMENTS

The rule proposed above provides increased clarity regarding the minimum obligations of petitioners and certificate of public good (“CPG”) holders related to petition requirements and post-construction monitoring when compared to the conditions placed on CPGs for existing facilities. For instance, it provides for protection of public health by ensuring the accuracy of a petitioner or GPG holder’s sound model after facility construction, providing the Board, state agencies, and the public a comprehensive understanding of the anticipated maximum sound levels associated with facility operation.

The proposed rule does not, however, address all parameters of an effective sound limit and monitoring protocol. Generally, two major measurement metrics used at some existing facilities – an indoor sound limit, and use of a 1-hour Leq measurement interval – are not included in this proposed rule. Additionally, a proposal for the assumptions to be used when analyzing monitoring data is not included here.

A. Continued Use of an Indoor Sound Level

At KCW, and GMCW, the Board imposed facility sound limits of 45 dBA at the outside of nearby residences *and* a 30 dBA sound limit inside residences. The Board also imposed a 30 dBA indoor sound limit for the Sheffield facility *without* a companion outdoor limit. The Department’s experience with enforcement of an indoor limit raises questions as to the limit’s effectiveness and overall enforceability. As a result, the Department has not included an indoor sound limit as part of this this proposed temporary rule.

To be clear, the Department continues to examine whether an indoor sound limit should appropriately be a part of this temporary rule or the later permanent rule. It is, however, not able

to make a recommendation on this question at this time. The Department will make a recommendation by the July 7 comment deadline if it is able to do so; if not, it recommends that this issue be decided on a case-by-case basis as part of a relevant § 248 proceeding while this temporary rule is operative.

B. Establishment of Sound Measurement Interval Time and Metric

The proposed temporary rule does not contain a recommendation for the sound measurement interval time and metric. For example, the Sheffield, KCW, and GMCW facilities establish a one-hour measurement interval and the use of an Leq metric for determining CPG sound limit compliance. The Department is exploring whether the continued use of a one-hour Leq measurement metric is enforceable and appropriate. However, it is not in a position to offer an alternative interval and metric at this time. Much like the question of the continued use of an indoor standard, the Department is closely examining this issue now, and will make an appropriate recommendation by the July 7 comment deadline if possible. Alternatively, the appropriate interval time and metric should be established on a case-by-case as part of a § 248 proceeding if the temporary rule makes no determination on this issue.

C. Development of Sound Level Data Analysis Protocols

Protocols guiding the method by which data gathered during post-construction will be analyzed to determine CPG compliance should be developed and approved by the Board prior to the issuance of a CPG for wind facility with a capacity greater than 500 kW. To date, no wind facility in the state has been subject to specific requirements related to the analysis of recorded sound level data. Like the establishment of a sound monitoring time interval and metric, proper

analysis protocols are critical to effectively isolate facility-only sound levels from background levels; and like the time interval and metric question, the Department is not able to propose specific analysis protocols at this time. It has been exploring this issue and intends to provide proposed analysis protocols during the permanent rulemaking. However, the specific analysis protocols should be developed and approved on a case-by-case basis as part of a § 248 proceeding while the temporary rule is operative.

Dated at Montpelier, Vermont, this twenty-seventh day of June, 2016.

Respectfully submitted,

VERMONT DEPARTMENT OF PUBLIC SERVICE

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