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May 11, 2017

Judith C. Whitney
Clerk of the Board
Vermont Public Service Board
112 State Street
Montpelier, VT 05620-2701

Re: VCE's Written comments on Rule 5.700 Wind Generation Facility Sound Rulemaking

Dear Ms. Whitney:

Vermonters for a Clean Environment, Inc. (VCE), on behalf of our members and Vermonters with particularized interests in this issue, appreciates the opportunity to respond to the Board's rule for Sound from Wind Generation Facilities.

VCE attended the May 1 Bennington public hearing and reviewed the video testimony of the public hearings on May 2 in Lowell and May 4 in Montpelier. We participated in the Board's workshop on May 4. Our written comments are responsive to the input the Board heard at the public hearings and workshop. We also have some specific comments to offer on the rule as submitted to the Secretary of State and ICAR.

Industrial Wind and Changing Circumstances

When VCE began our work on wind in April 2009, most industrial wind turbines (IWT) were 1.5, 2, and 2.5 MW between 350 and 420 feet tall. Now, IWT proposals are for 2.5 to 3.3 MW up to 500 feet tall. We are aware of one wind turbine proposal in the Northeast, by the current Ranger Solar developers who were once wind developers, for 600 foot tall wind turbines in a heavily populated area of Maryland near a school and residences.

There appears to be no limit to the wind industry's efforts to maximize the wind resources at the highest elevations, thereby also maximizing profits. While those profits are shared with the host town, landowners with leases, and the state's education fund, with a few "good neighbor" agreements (that come with gag orders) and small payments to neighboring towns in some cases, in the last eight years there has not been any movement on the part of the wind industry in terms of sharing the profits or creating circumstances where neighbors and communities are partners.

We had hoped to see some movement on the part of the wind industry through this rule-making, and are disappointed to see no acknowledgment that there are problems to be addressed or better ways to do business.

Community Engagement

VCE's efforts to ask wind developers to "do it differently" began in April, 2009, when we asked the developer, at a public meeting with the Vermont Community Wind Farm (Ira Wind), to work with the communities to do joint fact finding and mutual gains negotiations, which are part of well-defined community-based stakeholder processes. Our request was joined by the public relations person from Omya, Inc., with whom we had engaged in a similar process with beneficial outcomes for the company and the community.

Eight years later, we have seen no progress despite our continuing efforts to ask wind developers to engage in a process that provides meaningful input for communities and neighbors. Here is a list of our attempts to date:

- April, 2009 - Vermont Community Wind Farm, Per White-Hansen
- Nov., 2009 - Green Mountain Power (3 1/3 hour meeting on the topic), KCW, Robert Dostis, Charlie Pughe, Martha Staskus
- April, 2011 - Reunion Power, Grandpa's Knob Wind, Steve Eisenberg
- Sept. 2011 and March, 2012 - Encore Redevelopment, Derby Line Wind, Chad Farrell
- Oct., 2012 - Eolian Wind, Seneca Mountain Wind, Jon Soinenen, Jack Kenworthy

Others' efforts to educate and engage wind developers in how to work with communities

- March 2011, Department of Energy sponsored a three-day workshop for 100 participants including 30 from the wind industry, "Facilitating wind energy siting" in New England at Harvard Law School which focused on teaching wind developers to use the community-based stakeholder process.¹
- In 2016, residents of Irasburg who have experience with community-based stakeholder processes over energy project development² asked David Blittersdorf and his project manager, Martha Staskus of VERA, to engage in a community-based stakeholder process.

The presentations at the May 4, 2017 workshop by Vermont Public Interest Research Group (VPIRG) and Renewable Energy Vermont (REV), and the wind industry's expert in Vermont, Resource Systems Group (RSG) all align with the idea that the exterior standard of 45 dBA that is currently in place is the right standard. These groups all agree that there is no need for standards related to distance from residences, and that low frequency noise and infrasound

¹ <https://vermontersforacleanenvironment.wordpress.com/2011/04/19/the-problem-with-wind-siting-policy-technology-impacts-or-negotiation/>

² <http://iss.fnal.gov/archive/misc/fermilab-misc-2008-01.pdf>

are not subjects in need of regulation. Their position is that there are no health effects for people and animals living near wind turbines, and there is no need to change the standard the Board has used on a case by case basis for the last four IWT projects that have received CPGs, except to eliminate the interior sound standard of 30 dBA L_{eq} .

The wind industry's failure to acknowledge that there have been any problems, or to admit that circumstances are changing with taller towers and longer blades and more power output resulting in more audible noise, low frequency noise and infrasound, is the primary reason that current proposals for IWTs in Vermont are met with strong community opposition. Indeed, three projects in the works in Swanton, Holland and Irasburg have registered overwhelming opposition from the host communities.

If the wind industry will not agree to make any changes, then it is imperative that the changes made by the Public Service Board through this rule-making are sufficient to assure that neighbors and surrounding communities are not held responsible for compliance and enforcement. The standards set in this proceeding must be sufficient to require the wind industry to comply with protective noise levels and setback distances. Compliance mechanisms must not put neighbors in the role of enforcers.

The proposed rule with 35 dBA and 10x total height will not ban wind energy in Vermont

At the May 4, 2017 workshop and in a written filing on April 27, 2017 VPIRG argues that the proposed 35 dBA nighttime standard and the 10x total height in the draft rule is a functional ban on wind energy in Vermont. VPIRG did not provide the data used to make those claims. The expert they relied on, Eddie Duncan of RSG, was present at the workshop and should have been able to answer the question but did not. Instead, he said he would send the Board the information later, thereby depriving those of us with an interest in understanding the parameters used in making the evaluation from offering substantive comments on their presentation.

Nevertheless, Les Blomberg made an assessment that shows that VPIRG's assessment allows for wind energy development in 19 square miles of Vermont. VCE supports Mr. Blomberg's assessment.

VPIRG and REV have been raising that alarm statewide in recent weeks. It is likely that their efforts will flood the Board with emails and letters from people with no experience or education about the issue. VCE reminds the Board that this rule-making is not a popularity contest or a numbers game. We appreciate that the Board is listening and learning about appropriate standards for quiet rural areas where wind turbines are being sited, and has proposed a rule with standards that are supported by science and has been in effect in other areas with wind turbine development.

35 dBA limit at night is not a functional ban on wind

Germany has a 35 dBA nighttime noise limit. Germany is one of the countries with the most wind turbine development globally.

See this video <https://youtu.be/XHMcJT3Sg68> at 6:20 in which a German doctor discusses the noise standard. He says that there are several locations in Germany where wind turbines are turned off at night in order to meet the standard. The 35 dBA standard has not stopped wind energy in Germany.

The 35 dBA (or lower) standard for wind turbines is not unprecedented, as VPIRG claims. It has been adopted by the following municipalities that have become educated about wind turbine noise where local control exists, and also in countries with many IWTs:

- Middletown, RI
- Lyme, NY
- Frankfort, ME
- Orange, NH
- Glenmore, WI
- Holland, WI
- Morrison, WI
- Sumner, Maine
- Woodstock, ME
- Carteret County, NC
- Newport, NC
- Sand Beach, MI
- Oregon (10 dBA above background which is identified as 26 dBA)
- Quiet regions of New Zealand
- New South Wales, Australia
- South Australia
- Western Australia
- France
- Ireland (where background is less than 30 dBA)
- Sweden (low background areas)

10x total height setback is not a functional ban on wind

Several areas have adopted the 10x total height setback standard, including Poland³ and, most importantly, Bavaria, Germany. The setback was challenged in court, and the Bavarian

³ <http://www.epaw.org/echoes.php?lang=de&article=n515> and <https://renewablesnow.com/news/polands-sejm-passes-new-wind-turbine-distance-rules-525908/>

Constitutional Court upheld the standard in 2016.⁴ In its decision, the Court acknowledges that the minimum distance reduces, but does not eliminate, the potential for wind turbine installations.

A rough translation of the Court's decision says "It is not, however, necessary to set aside the best possible exploitation of the technical possibilities." The decision says that lower turbines cannot be ignored, "even though these may be less profitable today."

The Bavarian Constitutional Court's decision is an important one for Vermont regulators and policy makers to take into consideration. The wind industry, through its advocates at VPIRG, REV, and RSG, appear to want no limits on the ability to construct increasingly-large industrial machines in remote, rural areas of Vermont.

With the PSB's rule's option for wind developers to get signed agreements from non-participating landowners, the Board is creating the opportunity and obligation for community engagement, which is most welcome and necessary after so many years of attempting to force inappropriately large machines into communities, without any willingness or effort to cooperate with neighbors and community members.⁵

Recently, a list of setbacks⁶ was compiled and submitted in a South Dakota regulatory proceeding. It shows that many areas that have examined the issue have established setbacks that are greater than the Board's proposed 10x total height rule, and that 1500 m (or 4921 feet) is a common setback distance.

Low Frequency Noise and Infrasound

The PSB's rule covers only one portion of the noise profile of IWTs. There is no question that wind turbines produce Low Frequency Noise (LFN) and infrasound. Denmark had an industrial interior standard for LFN, 20 dBA from 10 – 160 Hz, which was expanded to include IWTs in 2012. Vermonters living near IWTs have described the vibrations and "feeling" inside their homes. Infrasound is also a confirmed component of the IWT acoustic profile.

⁴ <http://www.bayern.verfassungsgerichtshof.de/14-VII-14U.a.-Pressemitt.-Entscheidung.htm>

⁵ VCE does not consider GMP's year-long vote-buying effort in Lowell to qualify as community collaboration.

We also note for the record that the vote in Sheffield was to continue to study the wind turbines, with a promise to vote on the project again later. That promised vote never happened. The vote on Deerfield Wind in Readsboro was for 300 foot tall turbines, not the 400+ foot tall turbines being erected. When Vermonters vote on wind energy projects, the record shows increasing opposition which VCE attributes primarily to the attitude of the wind industry which is one of no compromise and no willingness to take responsibility for problems:

<https://vermontersforacleanenvironment.wordpress.com/2016/11/08/vermonters-votes-and-surveys-on-wind/>

⁶ https://lincolncountysd.org/userfiles/file/Public%20Submissions/04_04_17_We_Care_Setback_List.pdf

The wind industry's practice of increasing tower height and blade length makes the LFN and infrasound worse. Small turbines with high RPM do not produce LFN or infrasound. It is the large, and increasingly large machines, that cause these problems.

When VCE began working on the wind issue in 2009, we learned that some countries were establishing setbacks of 1.25 km. That was at a time when the average size IWT was 1.5 MW. Over the years, as the turbines got larger and they became operational in Vermont, we stayed in close contact with neighbors to understand what they were experiencing. VCE has concluded that an appropriate setback for Vermont's mountainous terrain where the noise problems are magnified compared to turbines on flat land is one that adjusts to the size of the machine, or one mile per MW. A standard based on turbine output is more appropriate due to the complex acoustic profile of IWTs and would address LFN and Infrasound, as well as audible noise, in a more effective way. A setback based on power output would also take into account the ever-increasing size of IWTs.

Interior Monitoring

An interior standard, such as Denmark's for LFN, is only as good as the ability to enforce it. The Board has previously chosen not to include actual monitoring inside homes, and instead has substituted a test unrelated to the sound coming from the wind turbines to determine the attenuation of a home. This aspect of noise compliance is being eliminated in the Board's rule.

We have learned from Sheffield, Lowell and Georgia Mountain that not everyone is bothered by the noise, and those who are need relief. Residents who wish to have monitoring done in their homes should be offered that opportunity. To date, we do not have any good data on the dBA, dBC or infrasound levels that are occurring inside Vermonters' homes. The data gathered inside the former Nelson home in Lowell was unfortunately contaminated by furnace noise and a broken window with a window shade banging for months. Nevertheless, a noise expert was able to extract data showing infrasound occurring inside the home. VCE submitted the graph of the infrasound in our comments on the temporary rule.

The Board rule should allow for interior monitoring if requested by the homeowner, keep the 30 dBA interior standard for audible noise and add the Danish standard for LFN.

Wildlife

The Board's rule is silent on wildlife. The Agency of Natural Resources has not played a role in this proceeding. To date, the only wildlife study being conducted is the bear study as part of the Deerfield Wind project.

VCE has read studies about the impacts of wind turbines on wildlife. The findings are that since wildlife communicate by LFN and infrasound, and also audible sounds, wildlife that have used areas with IWTs tend to choose to nest further away, resulting in a general degradation of the useful habitat. Neighbors of operating IWTs in Vermont speak about their observations that wildlife have declined in numbers.

VCE supports the recommendation of Dhyan Nirmegh, "There should be multiple studies hired by the state and conducted by our colleges and universities, and our own Fish and Wildlife Department and Forest and Parks Department."

The Board rule should include a section that requires pre- and post-construction wildlife studies.

Small and Medium Wind

The workshop raised good issues about the appropriate standards for small and medium wind turbines. VCE has fielded noise complaints from neighbors of Bergy and AllEarth Turbines which we consider "small", and NPS 100 turbines which we consider "medium". VCE has also worked with citizens dealing with Starwind Turbine petitions for CPGs.

Proper siting seems to be the most important aspect of assuring there will be no complaints from smaller turbines. We are aware of many small turbines that are not generating noise complaints. Usually they are at an appropriate distance from neighbors. When they are too close, they can produce mechanical noises that disturb neighbors, especially at night, and that noise can travel. We have heard reports of small turbines sounding like a helicopter under certain weather conditions.

Distance may be the best approach for small turbines, combined with the standard in the temporary rule of no more than 10 dBA above background. VCE supports a setback distance from the neighboring property line rather than residence, but we are not sure what the right distance is.

The problem with a specific dBA standard for small wind is that it requires the expense of a hiring noise expert to do monitoring. If the turbine is sited properly in the first place, that expense can be avoided.

Medium turbines such as the NPS 100 can be appropriately sited, such as at a large farm or in a business industrial park with higher levels of background noise. However, as experienced in Vergennes, when located near residences, the noise can travel and be problematic. There appears to be something about the sound profile of the NPS 100 that is problematic. In the case of the Vergennes NPS 100, after neighbors complained, GMP hired RSG to conduct sound monitoring. The neighbors insist that RSG excluded the data for the periods of time

when the noise was the worst. This practice is consistent with what we have seen with RSG's work at IWT sites. Therefore, any compliance monitoring should be done by an independent party, and not by the company that owns the turbine and has an interest in assuring no problems are found. VCE supports the 10x total height as a setback for NPS 100 and medium wind turbines.

Starwind Turbines may have a quiet machine as claimed, but it is so far unproven. VCE looks forward to seeing the sound evaluations specific to Vermont's topography that have yet to be produced in the dockets we have seen at the PSB. At this time it is unclear if the company has a marketable product, though we did visit the one that had been set up at the East Dorset Industrial Park before it was taken down. We could not tell if it was generating electricity, and await further information that confirms the promised quiet sound profile of the machine.

Specific Comments on the Rule

5.702 Definitions

Add dBC and definition

(I) Residence: a structure upon which taxes are paid, regardless of length of time it is occupied.

Add L_{dn} and definition

(P) Participating landowner: Add language to eliminate the ability of Petitioners to require confidentiality agreements (a/k/a gag orders).

5.703 General Rule

(A) for wind turbines 150 kW or less, consider using 10 dBA above background, with the ten (10) times total height as an alternative.

(B) for wind turbines larger than 150 kW, 35 dBA for all times of day, not-to-exceed (no averaging), at the property line, plus the ten (10) times total height setback from the property line of non-participating landowners. Or a one mile per MW setback.

5.704 Compliance with the Sound Level Limits

Please refer to Stephen Ambrose's⁷ presentation regarding the needless complexity of this section. Attended measurements under conditions with maximum power output and noise levels is simpler and easier.

5.705 Pre-Construction Sound Modeling

Please see slide 24 of Stephen Ambrose's presentation which compares the accuracy of the proposed Rule's ISO 9613-2 Model with the more accurate Nord2000 Model. Please require the more accurate model.

⁷ <http://www.vce.org/FINAL%20BW%20-%20PSB%20Sound%20Measurement%20Workshop-2May17.pdf>

Sound models done by experts hired by the wind developer will inherently be biased to minimize the potential impacts. Modeling should be done by independent experts, billed back to the Petitioner. Compliance testing locations should also be chosen by independent experts, billed back to the Petitioner, and not experts hired to serve the Petitioner's interests.

5.706 Post-Construction Sound Monitoring

(A) is potentially an improvement, however if the governor is biased in favor of wind, the State of Vermont agency may work for the interests of the wind industry. A stakeholder process for choosing an expert that satisfies parties with standing on the issue of sound is a preferable approach.

5.707 Sound Monitoring Methodology

5.708 Compliance Data Collection, Measurement, and Retention Procedures

5.709 Reporting of Compliance Measurement Data

Due to the behavior of the wind industry to date, VCE supports real time full spectrum continuous sound monitoring for the life of the project as the only effective method to assure compliance and remove neighbors from the role of uncompensated enforcement officers. Real time full spectrum continuous monitoring equipment is affordable and technically feasible, enabling immediate response to exceedances. Turbine shut-down should be used, as shown on slide 28 of Stephen Ambrose's presentation.

Data Collection, etc. and Reporting of Compliance Measurement Data are simplified by the use of real time continuous monitoring, such that only the times when exceedances are triggered become necessary to report.

All monitoring data should be public, including noise readings from each monitoring station, weather conditions, and SCADA data for each turbine. The rules should require turbine operators to create an online dashboard that displays this information in real time.

5.710 Complaint Response Procedures

This section perpetuates the unsuccessful requirement that neighbors of wind turbines must report complaints in order to get relief. DPS' complaint procedure was discussed at the workshop by Les Blomberg and shown to be an unrealistic method to resolve complaints from people whose sleep is disrupted.

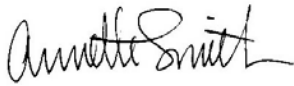
Neighbors need a phone number to call in the middle of the night so they can get immediate relief. Neighbors cannot and should not be the people who assure the wind turbines are operating in compliance with the standard. Many complaints were made after the three IWT projects began operating, and none were responded to in a meaningful way, and none have been addressed or resolved. There is every reason to believe that the IWTs in Vermont are frequently violating their CPGs on noise, because no enforcement is taking place. People stopped complaining because there is no point. Please do not pour the public down this black

hole again. The DPS process does not result in complaint resolution in a time frame that works for neighbors.

Real time full spectrum continuous sound monitoring to assure compliance appears to be the only method that will work, along with a phone number for neighbors to call so the turbine operations can immediately be evaluated and curtailed if conditions exceed the standards.

Neighbors of proposed IWTs have learned from the experience of neighbors of operating IWTs that they have no reason to trust the wind developer.

Sincerely,

A handwritten signature in black ink that reads "Annette Smith". The signature is written in a cursive style with a large initial "A".

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Enclosure: VCE's public comment at Bennington Public Hearing, May 1, 2017

Vermont's Comprehensive Energy Plan says, "Learn from existing in-state wind projects".

Here is some of what we have learned about wind turbine noise, wind company owner/operators, and the Public Service Board's attempt to regulate it:

We learned that wind turbines produce a unique source of noise because they are open air fans that cannot be mitigated by the usual noise control methods such as insulating the source or insulating the receptor.

We learned that wind turbines produce audible noise, low frequency noise, and high levels of infrasound.

We learned that the best place not to hear wind turbines is standing underneath them.

We learned that the health effects are cumulative, and can be headaches, tinnitus, nausea, sleep deprivation, cardiac issues and lead to the inability to work and doctors prescribing numerous drugs.

We learned that the wind company will dial back the turbine output if they know testing is going on.

We learned that post-construction, nobody cares, even when small children cannot sleep for three years.

We learned that a home attenuates only one to three decibels from inside to outside with windows open, not the fifteen decibels promised by wind company experts.

We watched with dismay as the PSB reduced protections for neighbors when adopting the temporary rule, in violation of the law that directed the PSB to not make the standard worse.

We learned that dozens of noise complaints go into a black hole with no response from regulators, and if there is a response, the PSB takes more time than it took for the project's CPG.

We learned that in more than five years, the PSB has not successfully resolved a wind turbine noise complaint but instead opened investigations that have the effect of putting the neighbors on trial.

We learned that wind turbine owners respond to neighbor complaints by ridiculing them, saying they are crazy and denying there are any noise issues.

We learned that bigger turbines with slower RPM, more power output and longer blades produce acoustical impacts that go out further than turbines with faster RPM, shorter blades and lower power output.

We watched people sell homes at a loss, abandon homes, and sell under duress out of fear for their health.

We learned that wind company experts put pre-construction sound monitors next to roads, snowmobile trails, and streams, maximizing the background noise levels.

We learned that wind company experts create models that underestimate noise levels by as much as 9 decibels.

We learned that during compliance monitoring, wind company experts put monitors in bushes and under trees so the data that is gathered is contaminated and useless.

We learned the wind company experts write the operating protocols to enable them to discard all the data that would find a violation.

We learned that wind turbine owners will not turn the turbines off when iced, even when the protocols they wrote require them to do so.

We learned from neighbors that “45 dBA is way too loud, and we can’t believe how loud 40 dBA is.”

We learned that wind projects are being built in some of the quietest places in Vermont, with very low background noise levels, 20 dBA or lower.

We learned that noise control experts know that an increase of 10 dBA above background will result in complaints.

We have learned what doesn’t work. It does not work to trust wind company’s experts or experts hired by government agencies directed by a governor who tells them to do nothing to stand in the way of wind energy.

It does not work to allow wind company experts to do pre- and post-construction monitoring, write the protocols, or be responsible for compliance.

We learned that 35 dBA is the right standard for Vermont -- at the property line for all taxpaying properties regardless of length of occupancy -- and that the only solution for infrasound is distance or smaller turbines.

We have learned that the only way to assure compliance is with independent continuous full spectrum sound monitoring that includes audible noise, low frequency noise and infrasound, for the life of the project.

Annette Smith, Executive Director, Vermonters for a Clean Environment, Inc.
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