

Saddleback Ridge Wind, LLC // Natural Resource Protection Act (NRPA) and Site Location of Development Act applications

- *Exhibit 5: Comments on Reposted Draft Noise Rule by Petitioners and Friends of Maine's Mountains*

STATE OF MAINE
BOARD OF ENVIRONMENTAL PROTECTION

In Re:

PROPOSAL TO AMEND DEPARTMENT OF ENVIRONMENTAL PROTECTION RULE 375.10 ON CITIZEN PETITION PURSUANT TO 5 M.R.S.A. §8055.3)	COMMENTS ON REPOSTED RULE BY PETITIONERS AND FRIENDS OF MAINE'S MOUNTAINS
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Petitioners and Friends of Maine's Mountains ("FMM") have the following comments on the reposted draft Noise Rule.

INTRODUCTION

The proposal brought to the Board on August 8, 2011, by the Director of the Division of Land Resource Regulation of the Maine Department of Environmental by Protection (the "DEP") , James Cassida, and recommended as Option C had the appearance of responding to the Citizen Petition, but in substance represented no change at all in the existing Noise Rule. This is disturbing because the DEP is charged with the responsibility of protecting the citizens on Maine from environmental hazards, not as an agent for promoting wind projects. Option C would lower the Sound Level Limits of the existing Noise Rule from 45 dBA at night to 42 dBA. However, the recommended Option would also remove the 3 dBA addition to the maximum rated output of the wind turbine to account for uncertainties in modeling. Thus for modeling purposes, the net change from the practice under the existing Noise Rule would be 0 under Option C. The proposal also fails to account for low frequency noise in any way, simply ignoring this feature of wind turbine noise. Nor does it account for the substantial increase in noise levels from wind turbine projects over the existing quiet, rural communities. Nor does the proposal address SDRS in a meaningful way because the new definition, while adding a 5 dBA penalty to the whole measurement period, as opposed to only the SDRS event, at the same time sets such a high

threshold for the existence of SDRS (peak to valley of 5 dB) that the penalty will rarely come into play. In addition, the DEP proposal completely avoids the key issue of complaint procedures in the compliance section, a key omission given the DEP's recent history with Vinalhaven on compliance issues. In summary, all the essential reasons for bringing the proposed amendments to the Noise Rule for wind development projects were not addressed by the DEP proposal.

At the August 8, 2011 work session, Board members pushed back on Option C in the direction of making the proposed amendments, as reposted, more protective. Petitioners and FMM urge the Board to go further, for the reasons set forth below. We start by raising concerns about the DEP proposal because we have seen the regulatory process for wind energy development politicized in a manner rarely seen before. The extent of the problem is illustrated by the way politics infiltrated compliance for Fox Islands Wind on Vinalhaven, leading to a lawsuit a copy of which is attached hereto. Morale at the DEP is at an all-time low, with several key employees of the DEP, including James Cassida, leaving government service. There is an urgent need to change the Noise Rule to be more protective in terms of wind energy development. We urge the Board to be firm about this and to make real, substantive changes to prevent the kind of suffering citizens have suffered at the hands of wind developers at Mars Hill, Freedom and Vinalhaven.

I. The Sound Level Limits in the Reposted Noise Rule are Too High.

Petitioners and FMM urge the Board to set Sound Level Limits in the amendments to the Noise Rule at 35 dBA for nighttime noise not 42 dBA as provided in the reposted rule. The basis for our proposal that the Board lower the sound limits to 35 dBA is health based with a cushion to reflect the "precautionary principle." As explained in our Post-Hearing Comments at 8-9, the precautionary principle is an approach to risk management that has been developed in

circumstances of scientific uncertainty, reflecting the need to take prudent action in the face of potentially serious risk without having to await the completion of further scientific research. We will address the relationship between the sound level limits and the safety factors in modeling and the penalty for SDRS below. However, on a standalone basis, 35 dBA should be the limit.

The wind industry opposes a limit of 35 dBA on the grounds that it is unnecessary for health reasons and that it would unreasonably limit the siting of new projects. However, the real agenda for opposition is about money. What actually happens when sound limits restrict the placement of turbines in a proposed project, and what has happened in almost every project built in Maine, is that the wind developer either obtains a noise easement for or purchases the property from residents whose homes are causing siting issues. The DEP knows this. In most, if not all, of projects built in Maine near residences, the permit issued by the DEP references the fact that the applicant has either purchased some properties or has been granted easements. We know of no project where a developer has been unable to spend their way out of a situation where the presence of a protected location has prevented a proposed project from being licensed because of the Noise Rule sound level limits. On the other side of the equation, the reality for neighbors who are suffering from wind projects because of their proximity to the turbines and who have not been compensated because the sound level limits are too high is that they are trapped because of the negative effect of the project on their property values. The net effect is to require homeowners to subsidize wind energy development, which is patently unfair and could be seen as an illegal taking of their property. The Board heard about this from citizens of Vinalhaven, especially the Lindgrens. Who would pay full market value for a residence where the current owner is forced out by excessive noise? It is simply wrong to allow wind energy developers to force property owners out of their homes because of the effects of excessive noise, causing them

to leave behind what may be their most valuable asset.

The DEP rationale for picking 42 dBA as a new sound level limit at the August 9 work session of the Board was explained by James Cassida as follows: 42 dBA is the point where most people are affected, that at 42 dBA people will still be affected but not substantially so. These claims are contradicted by the expert testimony and, furthermore, James Cassida is not qualified to make such claims.

In the peer reviewed article by H. Moeller & C. Pedersen, *Low Frequency Noise From Large Wind Turbines*, 129 J. Acoust. Soc. Am. 3727 (June 2011), the author's state at 3734-35:

Pedersen & Wade have shown that around [35 dB] the percentage of highly annoyed persons increases above 5%, and the percentage of annoyed persons increases above 10% [citing a 2009 publication of Pedersen relied upon by Dr. McCunney in his testimony]. Pedersen and Nielsen recommended a minimum distance to neighbors so that wind turbine noise would be below 33-38 dB. A limit of 35 dB is used for wind turbines, e.g., in Sweden for quiet areas. *Thus 35 dB seems as a very reasonable limit for wind turbine noise.* It is also the limit that applies in Denmark in open residential areas (night) and recreational areas (evening, night and weekend for industrial noise (but not for wind turbine noise). [Emphasis added].

After making these comments, the authors provide tables showing the siting distances for a single turbine needed to achieve these limits, ranging from 600 meters (1200 feet) for quieter turbines to 1200 meters (3600 feet) for louder turbines. *Id.* at 3735 and Table I. Many countries with long term experience with wind turbines use the 35 dB limit. *See* testimony of Rick James Public Hearing Transcript ("PH Tr.") 72 (addressing Denmark and Germany.) We are not aware of any claims that in these jurisdictions that the 35 dB limit has prevented reasonable wind energy developments. Denmark and Germany are countries with high density populations. If they can work with these limits, Maine can as well.

The Board will recall that Dr. Robert McCunney, the wind industry's sole medical expert,

never claimed that noise levels above 40 dB were harmless. All his hearing testimony was directed at noise levels *below 40 dB*. See PH Tr. 145 (“there is not sufficient evidence that the biological effects observed at the level below 40 decibels are harmful to health.”) At the hearing, he never challenged his earlier testimony submitted by Petitioners and FMM, Exhibit E, PH Tr. 13-14, that if it were his home, he would want the levels between 35 dB and 40 dB. He also agreed whole heartedly with Dr. Nissenbaum’s testimony that noise can cause sleep deprivation and that persistent sleep deprivation creates adverse health conditions. McCunney testified:

I agree with the presenters, noise can certainly affect sleep, and certainly if sleep is affected, that can lead to health effects. In fact in my view there can be a cascade. Annoyance, if protracted, can clearly lead to stress; stress, if protracted, can lead to sleep disturbance; sleep disturbance, if protracted can clearly lead to health problems. There is no question about that

PH Tr. 150. *See also*, McCunney testimony at PH Tr. 163-4 and PH Tr. 166. Dr. McCunney did not point to any “scientifically and properly constructed, peer reviewed research showing that nighttime wind turbine noise ... above 40 dB is safe.” Nissenbaum Post-Hearing Testimony at 2. Quite to the contrary, Dr. McCunney agreed that a regulatory limit *under 40 dB* would be protective of potential health effects:

Most of the studies look at some transition somewhere between at the 40 and 45 level. I don’t see serious problems below 40 I think once you start hitting around 40, just as what the WHO pointed out, that’s where some people may be affected and there’s a lot of individual variability in how people respond.

MR. GOODALE: So as a protective measure coming in under 40 from a regulatory standpoint is protective of potential health effects.

[D]R. MCCUNNEY: Well, I would agree with that.

PH Tr. 178.

At the public hearing, and in post-hearing work sessions the claim was made that the

existing Noise Rule meets the 2009 *WHO Guidelines* recommendation of 40 dB based on how WHO measures noise, using a yearly average at the façade. This is a false interpretation. The *WHO Guidelines* do not address wind turbine noise and the unique ways, such as the presence of amplitude modulation, in which it is more annoying and therefore potentially more threatening to health than traffic and aircraft noise, which is the focus of the WHO research and findings. See Nissenbaum Post-Hearing Testimony at 2. The WHO annualized measurement is further noted by the *WHO Guidelines* themselves to be inadequate for sleep disturbance. The annualized measurement is mandated by EU requirements, not by WHO. *WHO 2009 Night Noise Guidelines for Europe*, Executive Summary at X and Chapter 1 at 1. In contrast, WHO explains that the “most frequently used noise descriptor in sleep research is L_{Amax} or SEL near the sleeper. This means that a considerable amount of conversion work needs to be done if relations are to be expressed in L_{night}.” *Id.* at 8. The *WHO Guidelines* state that noise is potentially hazardous at levels between 30 and 40 dB. See *WHO Guidelines*, Executive Summary at XVII and 108. It is also important to understand the difficult political environment that WHO operates in as acknowledged by the *WHO Guidelines* themselves because it was addressing existing noise levels in the EU at higher levels than was being considered to be safe and unlikely to be achieved in the first instance. So interim recommendations had to be made. See *WHO Guidelines*, Executive Summary at VI. No attempt was made to exercise the precautionary principle appropriately followed for *prospective* regulatory limits. If 40 dB is the point where noise creates hazards to health, then any regulatory body adopting prospective rules clearly should be set a limit below that point. No responsible prospective regulation will set limits at exactly the point of harm. That makes no sense.

Michael Nissenbaum recommended 35 dBA at the façade of a residence or the property

line, whichever is more protective in his testimony. He based his testimony on a structured epidemiological study of health effects from residents living near the Mars Hill and Vinalhaven wind projects and basic medical principles that annoyance is itself an adverse health effect and is one of the root causes of sleep disturbance and secondary adverse health effects, PH Tr. 26-35, effects not questioned by Dr. McCunney. The wind industry objected to the Nissenbaum study but has been aware of it for months and has offered no evidence to contradict its conclusions. Noise levels above 35 dB will bring about vigorous community reactions and calls for action to lower limits according to the testimony of Rob Rand, applying an EPA matrix used for almost 40 years as a guideline for community noise standards and now incorporated into an ANSI Standard (S12.9, Part 4) for assessing land-use compatibility. PH Tr. 93-102. *See also*, the testimony of Rick James at PH Tr.60 (“[W]hen you plan a wind project and you design it for 45 [dBA], you’re raising the nighttime sound levels by over 20 decibels. There is general consensus in acoustics that if you raise sound levels by more than 10 decibels, you’ll have objections and litigation...”). *See also*, PH Tr. 67-9 (explaining ANSI S12.9, Part 4).

It should be recalled from the wind turbine noise tutorial given by Warren Brown on July 21 that a reduction in the sound limits by 3 dBA to 42 dBA, as recommended by the DEP, would be just “barely perceptible” by neighbors to wind projects. Those residents who actually live near projects gave heartfelt testimony about the suffering they have endured from the three wind projects that have been built close to existing homes in Maine and their testimony cannot be dismissed as coming from failed projects where noise exceed the existing noise limits. Borne from necessity, these residents have bought meters and they have measured noise at or above existing limits. “The citizens of Maine who live near wind turbine facilities are telling their government in different ways, that they are suffering. The Board should accept their testimony as

evidence of a compelling need to avoid such suffering from future wind projects by lowering the sound limits permitted at nighttime,” Post-Hearing Testimony of Dr. Nissenbaum at 1, not by just a token 3 dBA that for all intents and purposes would be meaningless, but to 35 dB which by all accounts would actually make a significant difference. As further explained by Dr.

Nissenbaum at the Public Hearing:

We have to accept that industrial wind turbine noise, when the turbines are placed too close to people, leads to sleep disturbance, you have to understand that chronic sleep disturbance does lead to illness and really, you have to believe people when they say they are suffering. Why not believe them? Real world results must take precedence over hypothetical calculations, and I can tell you that any model or regulation that allows 1.5 megawatt or larger turbine to be placed with 4500 feet of homes will assure adverse health effects for many of those living within that distance, and we know what the sound levels are at both Mars Hill and Vinalhaven.

PH Tr. 34-5.

We ask the Board to heed the testimony of citizens living near wind turbines such as Cheryl Lindgren, who testified that “life next to industrial wind operation has meant days, weeks and months of compromised sleep, awakening with my jaw clenched or my heart pounding.” PH Tr. 242. And she said “I want you to understand that a lot of my experiences and complexities occurred when the decibel levels have been under 45.” *Id.* See also the testimony of Art Lindgren. PH Tr. 251 (“Turbine noise is annoying and disturbing at levels under 45 decibels. SDRS plays a major part of making it so.”) The health of Art Lindgren has been severely compromised by the wind turbine noise and so they are moving off Vinalhaven because of it. PH Tr. 244. “We cannot anticipate another three months, another six months, another year of waiting for some semblance of compassion over the situation....” PH Tr. 244-45. Wendy Todd from Mars Hill testified that “[o]ur quality of life has been altered in ways that seem criminal to me.”

She pleaded with the Board, “[p]lease don’t let the voices of Mars Hill, Freedom and Vinalhaven go unheard or our warnings go unheeded.” PH Tr. 264. See also the testimony of Carrie Bennett from Freedom at 322 (“[T]ake a recording of yourself for five minutes saying your name over and over and over and over and over. When you lay down in bed, you put that right by your head and you hit play, 30 to 35 decibels, are you going to sleep well? Do you want me to come sit in a chair next to your bed and say hello, hello, hello all night long?”).

We ask the Board to give heed to the thoughtful testimony of Daniel Boulter, former Executive Director of LURC. PH Tr. 335 -46. He argued that the existing Noise Rule is not sufficiently protective of public health, “the more appropriate level in my belief is around 35 decibels.” Tr. 338. His view, which we adopt, is that “until you get down below 40, you will probably not have a significant diminishment of the noise” that citizens living near exiting projects are suffering from. *Id.* Mr. Boulter’s most compelling testimony came from his observations about the need to apply the precautionary principle. He testified at Tr. 342-43:

You’ve also heard from the windpower developers and their consultants about technical standards In the evolution of their projection protocols, that evolution really means failures and failures they have learned from, and I give them credit and there are some very credible people that have spoken to you representing the wind industry but those represent learning from their mistakes, and I submit to you that this is not a science.
 **** *So I think it is entirely appropriate to set a conservative standard so that the people that are nearby these areas are not paying the penalties for those learning mistakes.* [Emphasis added.]

A reduction of the nighttime noise limits to only 42 dB is an insult to the citizens living near existing wind projects who testified and others like them. A 40 dB limit is not enough to make a meaningful difference. The limit should reflect the precautionary principle and be set at 35 dB. In the future, if it can be demonstrated that this limit is over-protective, the issue could be revisited by the Board. If there is a risk of error in the limit the Board sets for wind energy

developments, the error should be on the side of protecting nearby residents, their health, their peace of mind and their property values.

On the same day the record closed following the public hearing, July 18, 2011, following the close of the record on July 18, 2011, the Ontario Environmental Review Tribunal decided the case of *Erikson v. Director*, Case No. 10-121/10-122 (the "Decision"). In this case opponents to a wind project approved under Ontario's Ministry of the Environment Noise Guidelines (the "MOE Noise Guidelines") sought review under Section 145.2.1 of the Environmental Protection Act, which prohibits a project where it is established that the project "will cause serious harm to human health." In the decision, the Tribunal noted that the "Director admits that there is a need for significant setbacks in order for sound levels to decrease in magnitude with distance from the source." Decision at 196. It further commented that the "implication of this is that it is recognized that turbines can cause serious harm if one lives too close to [the] source of the sound." *Id.* In this connection, the Tribunal further found that "[t]his case has successfully shown that the debate should not be simplified to one about whether wind turbines can cause harm to humans. The evidence presented to the Tribunal demonstrates that they can, if facilities are placed too close to residents." Decision at 207. Ultimately, the Tribunal found that the opponents had not carried burden of proof that serious harm would result from wind turbine noise *at or below 40 dB*. The MOE Noise Guidelines prohibits wind turbine noise levels in excess of 40 dB. The Tribunal stated that the "40 dB limit is a real limit that [the developer] must abide by regardless of its modeling exercise." Decision at 196. The opponents were also hampered by the terms of their statutory appeal which did not allow for the exercise of the precautionary principle:

In light of the clear wording of section 145.2, the precautionary principle does not allow the Tribunal to exercise discretion if an

appellant only establishes that there is a threat of serious damage (using the wording of the principle). The statutory test has a higher burden, that is, 'will cause serious harm'.

Decision at 121. [Emphasis original.] Thus while the *Erikson* decision is disappointing to the Petitioners and FMM for its determination that it found the evidence of health risks inconclusive at and below the 40 dB limit, it did stress the importance of the 40 dB limit as a not to exceed limit and, if it were allowed by the Canadian statute to take into account the precautionary principle, the Tribunal would in all probability come to the same conclusions that Petitioners and FMM urge on the Board in these proceedings.

II. The Reposted Rule Needs to Regulate Low Frequency Sound Omissions.

The proposed Noise Rule submitted by Petitioners included a sound limit for low frequency noise to accompany the 35 dBA limit. The limit proposal was 55 dBC. Based on the power spectrum of wind turbines currently being installed in Maine, according to Rick James, the 55 dBC limit would result in a setback equivalent to a 35 dBA limit. *See also*, testimony of Dr. Nissenbaum at PH Tr. 50. Rick James' concern was that it was likely that larger turbines would soon come into Maine, producing higher levels of low frequency noise. (Petitioners and FMM do not call for limits on infrasound at this point, just low frequency noise.) The peer reviewed article of Moller and Pedersen, *Low Frequency Noise, supra*, confirms Rick James' concern. The article concludes that "[t]he results [of the study described] confirm the hypothesis that the spectrum of wind turbine noise moves down in frequency with increasing turbine size. The relative amount of emitted low frequency noise is higher for large turbines (2.3-3.6 MW) than for small turbines (≤ 2 MW). The difference is statistically significant for one-third octave bands in the [audible] frequency range 63-250 Hz." *Id.* at 3742. *See*, testimony of Rick James at PH Tr. 64 ("So we need a dBC limit to guard against future designs of wind turbines.") In the

work sessions following the public hearing, James Cassida confirmed that larger turbines are to be expected to come to Maine and Warren Brown in his tutorial explained that low frequency wind turbine noise attenuates at lesser rates, can penetrate dwellings and even amplify by resonance in a home. While he acknowledged in the July 28 work session the concerns of Petitioners and FMM, without disputing their legitimacy, inexplicitly he was not in favor of setting low frequency limits because other states do not. Most other states do not have as much experience with wind turbines as Maine, and those that do are experiencing similar complaints about wind turbine low frequency noise. Most of these other states do not have state level agencies with authority for state wide standards. The standards the Warren Brown is referring to are often set by local township planning boards who adopt criteria presented by the developer working in their community. European countries, however, do have or are in the process of implementing low frequency limits for the larger (1 MW and larger) wind turbines because of problems similar to what has been experienced in Maine. Maine should not wait for other jurisdictions to address this aspect of industrial grade wind turbine noise. We question the reasoning that leads to the decision of Warren Brown that because other states do not protect against low frequency sound that Maine should not be on the "cutting edge" to do so either. We ask why that should be a reason not to protect citizens against an identified health risk?

In the original Statement of Position of Petitioners and FMM, low frequency noise was identified as one of the characteristics that distinguish wind turbine noise from other sources of industrial noise. *See*, Statement of Position at 6-8. We noted that even Geoff Leventhall, an acoustician with recognized credentials in the field related to low frequency sounds and a wind industry advocate, acknowledges that annoyance from low frequency noise is greater than from the higher frequencies. *Id.* at 7. We also drew upon Moller and Pedersen's article for the

statement that “it is beyond any doubt that the low- frequency part of the [wind turbine] spectrum plays an important role in the noise at the neighbors and that *low- frequency sound must be treated seriously in the assessment of noise from large turbines. Id* at 3735. [Emphasis added.]

We urge the Board to restore the 55 dBC limit for low-frequency sound to the reposted rule to protect citizens in Maine in the future against annoyance/health risks associated with larger wind turbines.

III. The Reposted Rule Needs a More Protective Definition of SDRS.

There is consensus at this point that short durational repetitive sound (“SDRS”), known in the literature as “amplitude modulation,” is a feature of wind turbine noise that distinguishes it from other sources of industrial noise and is one of the most important features of wind turbine noise that makes it particularly annoying and a cause of sleep disturbance. *See, e.g.*, the testimony of Rick James explaining that amplitude modulation noise is more likely to awaken a person more than other noise, similar to a mother’s response to a crying baby. PH Tr. 61. *See also*, testimony of Dr. McCunney, PH Tr. 164; 179-80 (amplitude modulation is “the aspect of wind turbine noise that people tend to find annoying.”) Also see the testimony of Wendy Todd from Mars Hill. PH Tr. 262 (“The repetitive pulsing, even if it does not wake you up, which it does, keeps you from falling back to sleep until you do something to escape it.”) This was acknowledged by Warren Brown in the work sessions, it is well established in the literature, including peer reviewed literature, *see* Petitioners and FMM’s Statement of Position at 9-12, and this is confirmed by the testimony of citizens who testified at the public hearing who have suffered from wind turbine noise. Warren Brown also acknowledged that the provisions for SDRS in the existing Noise Rule does not work for wind turbine noise (1) because the existing rule requires peak to valley modulation of 6 or more dB and (2) because in the existing Noise

Rule the 5 dBA penalty is added only to the milliseconds of the modulation and then gets averaged into an hour of noise.

The reposted rule addresses the second point by breaking down compliance measurements into 10 minute segments and then adding a penalty of 5 dB to the entire 10 minute average when it is found to exist. However, the reposted rule again deprives citizens of the benefit of the penalty by setting the threshold of peak to valley modulation too high, at 5 dB. According to Warren Brown, both in his tutorial and later when commenting on Stetson II in the July 28 work session, amplitude modulation is common with 2-4 dB peak to valley modulations but rare for modulations of 5 dB or more. This point is confirmed by Table I of the testimony of Scott Bodwell at page 16 reviewed by Warren Brown with the Board in the July 28 work session. Citizens who have suffered from wind turbine noise have emphasized that amplitude modulation is common and is particularly annoying. Sleep is disturbed by short duration sounds that rise only 3 dB above the background. Once a person has been awakened sleep has been disturbed and it is difficult, at best, to return to sleep as described by Wendy Todd. At the August 8 work session, Warren Brown stated that the use of a 5 dB threshold for SDRS was "basically arbitrary." What possible rationale can justify taking on the issue of amplitude modulation and then defining it in such a way as to make it irrelevant to the most common cause of sleep disturbance? The only logical rationale is a motivation to promote wind energy development at the expense of the health of non-participating neighbors.

As we explained in our Statement of Position at 11, the best available science on the level of modulation that triggers annoyance and adverse health effects is a peak to valley modulation of 3 dB. See the decision in *Hulme and Secretary of State for Communities and RES Developments*, 2011 EWCA Civ. 638, decided May 26, 2011 by the England and Wales Court of

Appeals (Civil Division), the highest court in the English legal system short of the Supreme Court of the UK. After years of litigation it was accepted in that case that a 3 dBA peak to valley modulation would be regarded as “excessive” and that it was reasonable and necessary to regulate such excessive modulation to avoid health problems mediated through loss of sleep. The *Hulme* decision is part of the record in these proceedings.

We urge the Board to restore the language proposed by Petitioners in the draft rule to define SDRS in a way that captures modulation that actually and regularly affects residents using a threshold of a 3 dBA (not 5) modulation.

IV. The Reposted Rule should be Amended to Make the Safety Factors Mandatory.

When the Mars Hill project was recognized as a failed project, the DEP initiated an informal requirement that predictive modeling include an “uncertainty factor” adjustment to the maximum rated output of sound sources. This was accomplished by applying uncertainty factors of 2 dB and a 3 dB to account for tolerances in the measurement and modeling, respectively, of sound propagation for wind energy development. According to Scott Bodwell, the uncertainty factors were part of the “milestone changes in the prediction model” after Mars Hill, known as the “Rollins Protocol,” the thrust of which was “to make sure that the models were conservative enough to cover the very high end of all the test results from Mars Hill.” PH Tr. 222-23.

Petitioners and FMM urge the Board to modify the reposted rule to require *both* uncertainty factors to be mandatory. This was Scott Bodwell’s testimony as well. “So my suggestion would be for the Board to try to formalize and codify these established protocols.” PH Tr. 235.i

The reposted rule acknowledges the need for an uncertainty factor for power output, but leaves it to the manufacturer to determine what that is. For many manufacturers, this provision would be adequate, but there is a risk that some manufacturers will not do so or will not do so

accurately. As observed by Moller and Pedersen in their article, the adjustment is required by IEC 61400-14, which provides a formula. *Low Frequency Noise, supra*, at 3738. We urge the Board to change the language in the reposted rule to add the following after “manufacturer’s recommendations” – “*provided those recommendations comply with IEC 61400-14.*”

The reposted rule makes the application of the 3 dBA safety factor in modeling discretionary for the DEP. This would be a serious mistake and is not justified by the Stetson II study. The Stetson II study used the 5 dBA uncertainty factor, as clearly stated in the handout given to the Board in the July 28 work session titled “Stetson II-WHO 2009 Compliance Demonstration.” As explained in the handout and the underlying testimony of Scott Bodwell, the predictive modeling used the full 5 dB uncertainty factors and the testing on 2 days showed that actual sound was 40-42 dBA. This shows that the uncertainty factor worked, not that it is not needed. If the project was built based on a model that did not include the 5 dB adjustment, the Stetson compliance testing would have shown the model was in error.

As explained in the Warren Brown tutorial on wind turbine noise on July 21, predicting wind turbine noise is a complicated exercise and the actual sound emissions are subject to a number of different variables, including meteorological conditions, wind speed and direction, topography, etc. It is simply imprudent to conclude that a comparison of prediction modeling to post-construction operational measurements for one project on two days (Stetson II) can be generalized as justifying the removal of the measurement uncertainties. ISO 9613-2 in Section 9 at 13 mandates uncertainty calculations in the use of this predictive modeling tool, even when all the parameters of the measurement standards are adhered to. As the DEP knows, use of ISO 9613 for prediction of ridge mounted wind turbines involves measurements (both height and distance) beyond the criteria for ISO 9613-2. Yet, the DEP declared its position at the work

sessions that the 3 dBA safety factor is not needed, presumably in an effort to promote wind energy development, even though it has been used consistently after Mars Hill with the exception of Vinalhaven, which has routinely exceeds the modeled sound levels. Warren Brown stated in his tutorial that when asked if this factor could be eliminated, his response would always be “absolutely not.”

Petitioners and FMM urge the Board to make the 3 dBA safety factor mandatory.

V. The Relationship Between Sound Level Limits, the SDRS Penalty and the Uncertainty Factors.

The Board recognized in its deliberations that it is necessary to consider the relationship between the Sound Level Limits, the SDRS penalty and the safety or uncertainty factors. We agree. Petitioners and FMM urge the Board to set the Sound Level Limits for wind turbine noise at 35 dBA. If the Board agrees, we believe that it is not necessary to provide for an additional 5 dB penalty for SDRS, as explained in the testimony of Rick James. PH Tr. 71, 86. However, if the Board were to set the sound limits at 40 dB, we would urge the Board to retain the penalty and define it as being applicable for a threshold of 3 dB modulation so as to capture what citizens have experienced in terms of amplitude modulation in existing projects. The safety factor for predictive modeling is different, as Board Member Woodard explained to the Board in deliberative sessions, and necessary because predictive modeling is too variable to expect it to be able to pinpoint noise to a specific decibel number. It is easy, but in error, to conflate modeling assumptions with operational sound limits. During the hearings and the deliberative sessions, we heard people say that the 5 dB uncertainty factor would effectively bring the sound limits down to a point of being overprotective, for example by starting with 35 dB and then 5 dB lower because of SDRS and then another 5 dB lower as a safety factor, with a net limit of 25 dB as an “de facto” limit. *Also see*, comments of attorney Juliet Brown, PH Tr. 238 (“you already have a

'de facto' limit on these projects of 42"). This is wrong and misleading. We do not advocate stacking a 5 dB penalty for SDRS on top of a 35 dB limit, as just explained. Moreover, the 5 dB uncertainty factor is to be sure that the limit during actual operations (35 dB without the SDRS penalty or 40 dB with SDRS penalty) can be achieved. In the future, if it is demonstrated for a broad range of projects and in a broad range of conditions, that the 5 dB uncertainty factor results in consistent over-predicting, then that part of the formula can be adjusted, but we are not there yet.

VI. The Reposted Rule Requirement that Point Source Be Used in All Modeling is a Mistake.

The reposted rule provides that when wind projects are modeled for noise, "the sound propagation rate shall reflect a point source 6 dB decay rate for each turbine in the proposed arrangement of wind turbines." The draft Noise Rule proposed by Petitioners and FMM provided that the "sound propagation rate shall reflect a point or line source (6 dB vs. 3 dB decay rates) or combination thereof, as is most appropriate for the proposed arrangement of wind turbines." The difference in modeling using a decay rate of 6 dB or a 3 dB decay rate is substantial. The wording of the rule proposed by Petitioners and FMM is consistent with what Warren Brown has been telling the Board since the Rollins project was appealed and was repeated in the Record Hill appeal. Even in these proceedings in his wind turbine noise tutorial, Warren Brown stated that point source or line source decay rates are preferred "depending on the frequency of interest and depending on the wind turbine arrangement" and in the July 28 deliberative session Warren Brown stated that as you get greater distances from the turbines, "a 3 dB decay rate is more accurate." In addition, Moller & Pedersen in their article explain that usually one predicts using a 6 dB reduction of sound pressure level per doubling of distances, but that "during certain atmospheric conditions, e.g., with temperature inversion or low level jets,

there may be a sound reflecting layer in a certain height, and thus the propagation beyond a certain distance is more like cylindrical propagation, which only gives a 3 dB reduction per doubling of distance." Several citations are given. *Low Frequency Noise, supra*, at 3740. Under these circumstances, we are at a loss as to why the DEP came out with a draft rule requiring that the 6 dB decay rate should always be used. The DEP's recommendation on this point is a step backwards and will result in more people being exposed to unsafe sound levels.

VII. The Compliance Provision in the Reposted Rule Needs To be Made More Explicit.

The DEP's version of the amendments to the Noise Rule for wind turbines omitted some key sections proposed by the Petitioners and FMM. The DEP experience with compliance in the case of Fox Islands Wind in the Vinalhaven project has shown the complexities of the issue and how contentious the process can be. To address this situation, this past year the DEP staff, led by James Cassida, drafted detailed compliance assessment procedures and complaint response protocols for the Vinalhaven project. The details of the procedures and protocols proposed in the draft Noise Rule amendments were taken, word for word, from what Mr. Cassida drafted for FIW, with appropriate changes to generalize the provisions. Unfortunately for the residents of Vinalhaven living near the FIW project, the Acting Commissioner politically intervened under pressure from the Governor's office to scuttle these provisions, over the written protests of James Cassida. All of the nasty details of this unseemly process are detailed in the Petition for Review of the DEP's decision in the FIW submitted for the record, including the substitution of compliance procedures and complaint response protocols advocated for by FIW having the practical effect of immunizing FIW from any compliance scrutiny. We can only assume that the omission of some of the key provisions proposed by Petitioners based on James Cassida's work, were pulled again for political reasons. Given the recent history of political intervention on

compliance issues in the DEP, we urge the Board to be more explicit in the compliance sections.

Petitioners and FMM urge the Board to add to the reposted rule the follows general objectives for Compliance Assessment of wind projects:

(6) *Post-Construction Compliance:*

(a) *Compliance Assessment:*

i *The licensee shall affirmatively demonstrate that it is in compliance with the hourly sound level limits in Chapter 375 §10 under all routine operating conditions regardless of meteorological conditions or time of year and regardless of prior submissions by the licensee showing compliance or determinations by the Department.*

ii. *Non-compliance is defined as sound levels from the licensee exceeding the sound level limits in Chapter 375.10 for 6 contiguous 10 min. intervals (1 hr Leq) or (9) 10 min. intervals in a single 12 hour period (7AM to 7PM) or (7PM to 7AM).*

iii *The compliance testing period shall be specified in the license as representative of the time of year and meteorological conditions most likely to result in excessive noise. Such designation shall not mean that licensee is not under an obligation to be in compliance for other times of the year or meteorological conditions.*

These provisions are necessary to prevent a wind developer, such as FIW, from arguing that compliance is established and cannot be questioned if a wind project can be shown to be in compliance once under the circumstances specified in the license.

At the August 8 work session James Cassida stated that there is no need to put in protocols in the Noise Rule to address circumstances where a project is out of compliance (a compliance protocol) because the DEP's experience in these matters are that they can be resolved "quickly." His statement simply is not true. The DEP's most recent, and for all we know the only experience, with noncompliance for wind turbine projects was for FIW at Vinalhaven. That project was out of compliance from the outset beginning in November 2009. It took until September 2010 for the DEP to make a finding of noncompliance and then it was not

until June 2011 for the non-compliance matter to be (politically) “resolved” in a manner, over the objections of James Cassida, in an ineffective way. Throughout the DEP’s compliance protocol was hotly contested. With this background, at a minimum, the Noise Rule should contain the following language originally proposed by Petitioners and FMM to address compliance protocols:

x. If the Department determines that the licensed facility is out of compliance with the noise standards as outlined in Chapter 375.10, the Department shall issue a notice of violation (NOV) for the alleged non-compliance and shall grant licensee 30 days to submit a revised operation protocol to the Department in the form of an application to permanently amend the license or certification. Upon notification of non-compliance, the licensee shall take all reasonable and necessary actions to temporarily mitigate the issue(s) identified pending final approval of a revised operation protocol. If the licensee fails to take such measures, the Department reserves the right to order the licensee to immediately cease operation of the project under the specific conditions present during the period of non-compliance and other conditions similar to those present during non-compliance that the Department determines are likely to result in non-compliance provided that the Department makes findings as provided in 38 M.R.S.A. §347-A.3.

We also request the Board to add back the following specifics about the complaint response protocols:

(b) *Complaint Procedure:*

i. The intent of the sound complaint response and resolution protocol is to provide a transparent process for reporting sound complaints to the licensee, provide a consistent approach to documenting and resolving complaints and to inform subsequent compliance testing efforts, provide a process for informing the Department and interested persons of sound complaints, and when necessary, cease the operation of the facility so that a further revised operation protocol can be put in place.

ii. The licensee shall provide a contact 24 hour “hotline” telephone number, email address, or website to receive complaints regarding sound from the project. Contact information along with a copy of this protocol will be mailed to all abutters, consistent with the definition of abutters set forth in Chapter 2 of the Department regulations. In addition, a sign shall be posted at the main gate to the facility notifying the public of the presence of the Complaint Response and Resolution Protocol and directing the general public to the hotline, Email address, or website.

iii. The licensee shall ensure that a standardized set of information is

collected for each complaint in order to facilitate its analysis and review by the Department. The following information shall be required from the complainant, either by phone or by written form, in order to process the complaint:

- Name and address of complainant;
- Date, time and duration or periods of the sound event;
- A description of the sound event, for example, the complainant may provide relative amplitude, source of annoyance, steady or fluctuating, low/mid/high or mix of frequencies/pitch, noticeable vibration, indoor or outdoor, and specific location; and
- A description of other audible sounds from sources outside and, as applicable, inside the dwelling of the complainant.

iv. In addition, the licensee shall record, from the data collected at the facility's compliance testing locations the following information in relation to the complaint:

- The mean hub level wind speed/s in ms at during the complaint period;
- The 10 m surface wind speed/s in mph during the complaint period at approved compliance testing sites ;
- The wind direction during the complaint period by compass quadrants (S-W, W-N, N-E, E-S);
- A-weighted 10 min equivalent sound level/s unadjusted for extraneous sounds during the complaint period;
- 10 min 10/90% exceedance levels during the complaint period; and
- Hourly 1/3 octave band sound pressure levels (dB) for the complaint period.

vi. If the Department determines that there is a consistent pattern of complaints that suggests that sound levels from the project may be exceeding the applicable sound levels limits in Chapter 375.10, the licensee shall undertake a formal compliance assessment following the procedures outlined in Section a. above to determine if the facility is in compliance with Chapter 375.10, and, if necessary, develop and implement an appropriate modification to the operating protocol for ensuring that the project continues to meet applicable sound level limits. The licensee shall provide a copy of the formal compliance assessment to the Department for review and concurrence

prior to the implementation of any corrective action.

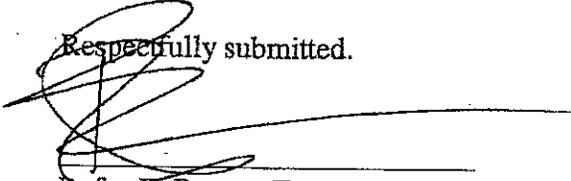
These are the provisions that James Cassida concluded were essential to deal with a recalcitrant FIW which refused again and again to give access to the DEP and the complainants about meteorological and sound data prevailing during a period when a complaint was made.

CONCLUSION

For the reasons set forth above and the hearing testimony and the Statement of Position and the Post-Hearing Comments of Petitioners and FMM previously filed with the Board, we urge the Board to approve the reposted Noise Rule with the changes outlined above.

Dated: August 29, 2011

Respectfully submitted.



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