association to protect
AMHERST ISLAND

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Summary prepared by APAI

EBR 012-0774 – Response to the Final REA for the Amherst Island Windlectric Wind Energy Development

by Richard James INCE.

NOISE ASSESSMENT

Introduction:

We chose Richard James to be our external consultant to review the noise assessment report for the Windlectric wind energy generating system for several reasons:

- He is a professional acoustician and long-standing member of the Institute for Noise Control Engineers.
- He has worked with clients in over 60 communities.
- He has provided written and oral testimony in 30 of those cases.
- He was accepted as an expert witness by the Environmental Review Tribunal appeal of the approval of the Suncor Kent-Breeze Project (#10-12/10-122).
- With his broad background he has written a historical review of other noise sources with similar adverse health effects as wind turbine noise.

His critique is attached to this introduction to and summary of his report. His comments fall under a number of headings, as discussed below. This summary is intended as an introduction to his report and not as an alternative to reading it in its entirety.

Major Deficiencies of the Hatch Report

- The sound power level was not corrected for uncertainty as specified in IEC 61400-11, the basis for ISO 9613-02 and Cadna/A
- The uncertainty inherent in ISO 9613-2 was not included in the predicted sound pressure levels.
- Therefore the sound pressure level predictions do not correspond to the "predictable worst case".
- Infrasound and low-frequency sound has not been given the weight that it deserves.
- Together the above deficiencies, with day-to-day variability in atmospheric conditions and a more realistic ground parameter, the predicted sound pressure levels will be up to 8 dBA higher.
- The impact of low-frequency sound and infra-sound has been ignored.

Mr. James notes that the IEC protocol for measuring the sound power level does not seek the worst case; rather, it specifies daytime conditions with low wind shear (a neutral atmosphere). The intention is to provide a comparison of one wind turbine with another.

Low frequency Noise (LFN) and Infrasound

Mr. James is well qualified to discus low-frequency and infra-sound. For much of his career he has been involved with the noise from heating and ventilation systems as well as general industrial noise. In the conference presentation of Bray and James[1], "Dynamic Measurements of wind turbine acoustic signals, employing sound quality engineering methods considering the time and frequency sensitivities of human perception" the authors conclude that:
"We have shown that wind turbine signals are strongly and varyingly time-structured, perhaps unusually so at frequencies below 100 Hz which may affect the likelihood of audibility or other physiological responses from low-frequency and even infrasonic wind turbine noise …"

Mr. James was involved in the four separate company measurements at the Shirley Wind project in Wisconsin. The conclusion of the study was that:
"The four investigating firms are of the opinion that enough evidence and hypotheses have been given herein to classify LFN and infrasound as a serious issue, possibly affecting the future of the industry. It should be addressed beyond the present practice of showing that wind turbine (noise) levels are magnitudes below the threshold of hearing at low frequencies."

Mr. James has discussed this issue in some depth on pages 11 to 16 of his critique. The discussion is fully referenced.

He makes the important point that many complaints go beyond audibility to an impact on their sense of balance, and sensations like stuffiness in their ears, headaches and general malaise. Here he refers to the work of Dr. Alec Salt and colleagues that demonstrates that sub-audible LFN can disturb the vestibular organs.

Mr. James' Findings

1) The sound power level should be the "declared apparent sound power level" derived by adding 1.645 times the standard deviation of the apparent sound power level to the apparent sound power level. This was not done. Mr. Cameron Hall, a Senior MOE Field Officer with experience of wind turbines in the field, knows that this should have been done.

2) The noise assessment report should have included the linearly weighted octave sound power levels as well as the uncertainty in the noise immission at receptors.

[1] Wade Bray and Richard James: NOISE-CON 2011, July 2011.

Finding 3) has been dealt with in the final assessment report.

4) The confidence limit for the prediction of the sound pressure level should have included the ±3 dB inherent in the use of ISO 9613-2 and versions of it. Again, Mr. Cameron Hall was aware that this should have been done.

5) Studies have shown that all three ground parameters (G_s, G_m and G_r) need to be set to zero to achieve the most accurate predictions.

7) The sound prediction modelling in Ontario has been found to under-predict sound pressure levels by at least 5 dBA. Mr. James quotes studies by Aercoustics, HGC Engineering and Valcoustics Canada Ltd. showing under-prediction by as much as 3 to 5 dBA 18 to 50% of the time. Also, the statement by Mr. Gary Tomlinson, a Senior MOE Experimental Officer, that noise levels were measured between 44 and 45 dBA using the NPC protocol with wind speeds less than 6 m/s.

Mr. James discusses the amplitude modulation and "thumping" which is particularly prevalent in a large wind speed gradient. He recommends adding 5 dBA to the declared apparent sound power level.

Conclusions

- Turbine noise at almost all homes within the study area will be out of compliance with the MOE 2008 noise guidelines.
- There will be non-compliance for homes setback by 1 km and likely up to 2 km.
- There will be infrasound and low frequency sound beyond what is safe for people, particularly those with disturbed vestibular systems.
- There will be sleep disturbance for those exposed to 40 dBA and above outside the bedroom.
- There are no reasonable mitigation measures.

In his opinion, the Amherst Island project is not compatible with the host community and current land use.

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