Ministry of the Environment
Guelph District Office

1 Stone Road West
4th Floor
Guelph, Ontario N1G 4Y2
Tel.: 519 826-4255
Fax: 519 826-4286

Ministère de l'Environnement

1, chemin Stone ouest
4e étage
Guelph (Ontario) N1G 4Y2
Tél.: 519 826-4255
Téléc.: 519 826-4286

Ontario

April 9, 2010

MEMORANDUM

TO: Jane Glassco, District Manager, Guelph District Office and Dave Bray, Supervisor, Guelph District Office

FROM: Cameron Hall, Senior Environmental Officer, Guelph District Office

Re: Comments - March 1, 2010 draft document, "Renewable Energy Approvals Technical Bulletin Six Required Setbacks for Wind Turbines"

I have reviewed the subject document per your request and offer the following comments.

The Technical Bulletin is essentially an interpretation of the requirements already spelled out in the Renewable Energy Approvals Regulation, Ontario Regulation 359/09. As such, any comments about the Technical Bulletin must ultimately be comments about the Renewable Energy Approvals Regulation, Ontario Regulation 359/09.

The setbacks were reportedly determined in accordance with the Ministry of Environment's 2009 Publication "Development of Noise Setbacks for Wind Farms" ("2009 Ministry Setback Development Publication"). The setbacks were determined using a computer model which reportedly has an output error of +/- 3 dB. The computer model uses sound level emissions data provided by the manufacturer of the wind turbines generators (WTGs). In the case of the Melancthon Ecopower Centre General Electric WTGs the sound level emissions are reported to have an error of +/- 2 dB. So in fact, the Ministry is using a computer program with an output error of +/- 3 dB, where the data input into the computer program may have a +/- 2 dB error. It is not clear if these errors are added, subtracting, multiplied or divided by each other. If the errors are simply added, then the potential error in the predicted sound level limit at the receptor is +/- 5 dB. In the Melancthon Ecopower Centre case, an approval was issued where the predicted sound levels at most of the receptors was 40 dBA (rounded-off). If a 5 dB error is applied, then the predicted sound level at the receptor could actually be as low as 35 dBA or as high as 45 dBA. Given the errors involved in the computer modelling it appears reasonable to suggest that a conservative approach might be to only establish setbacks and approve locating WTGs where the predicted sound levels at the receptors are 35 to 37 dBA.

The setback distances were determined on the assumption that the sound discharged from WTGs does not have a special quality of sound. In other words it is assumed the sound contamination

discharged into the natural environment from WTGs does not have a tonal quality or a cyclic variation quality. The assumption that the sound contamination discharged from WTGs does not have a tonal characteristic or a cyclic variation characteristic is not supported by our field observations. Furthermore, the assumption that the sound contamination discharged from WTGs does not have a cyclic variation characteristic is not supported in the report, Acoustic Consulting Report prepared for the Ministry of the Environment Wind Turbine Facilities Noise Issues, by Ramani Ramakrishnan, December 28, 2007 (the "Ministry 2007 Acoustic Consulting Report").

The Ministry's Publication Noise Pollution Control 104 states, "(1) Tonality If a sound has a pronounced audible tonal quality such as a whine, screech, buzz or hum then the observed value shall be increased by 5"; "If a sound has an audible cyclic variation in sound level such as beating or other amplitude modulation then the observed value shall be increased by 5"; and, "(4) One Adjustment Only An adjustment may be made under one only of subsections (1), (2) and (3), provided that, if subsection (3) applies, it shall be used in preference to subsection (1) or (2)."

Our field observations at the Melancthon Ecopower Centre and those reported by HGC on behalf of Canadian Hydro Developers, Inc. conclude some of the WTGs at the Melancthon Ecopower Centre have an audible tonal characteristic. This tonal characteristic does not appear to be properly identified as a result of the manufacturer's testing done in accordance with the testing procedures deemed acceptable in the 2008 NPC Guidelines Interpretation and consequently the Technical Bulletin. It appears reasonable to suggest that a 5 dB penalty for tonal quality of the sound discharged into the natural environment from the WTGs may be required. I also noted tonal characteristics when making observations of the sound contamination discharged into the natural environment from the Vesta manufactured WTGs at Clear Creek.

Most of the complainants who have contacted the Ministry about sound contamination from the Melancthon Ecopower Centre WTGs identify the characteristic "blade swoosh" or "swishing" sound contamination discharged into the natural environment from the WTGs as a quality of the WTG sound contamination which they find offensive. Provincial Officers have confirmed the "blade swoosh" quality of the sound contamination discharged into the natural environment from the WTGs throughout the Melancthon Ecopower Centre wind plant.

The Ministry 2007 Acoustic Consulting Report discusses the sound contamination characteristics of WTGs and includes discussing "the swishing (thumping) sound normally termed as the amplitude modulation phenomenon". The Ministry 2007 Acoustic Consulting Report includes the following:

> "Due to the nature of the amplitude modulation phenomenon, the swishing or thumping exists all the time.";
>
> "Reference 30 has addressed the issues connected with modulation. One of its principle findings is and we quote, "the common cause of complaint was not associated with low-frequency noise, but the occasional audible modulation of aerodynamic noise, especially at night."; and,