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Comments Otter Creek posting EBR reference 013-1043

The comments provided below are for the Otter Creek wind power project, EBR 013-1043.

Wind Concerns Ontario is a coalition of 30 community groups, and hundreds of individuals and families, concerned about the impact of industrial-scale wind power development on the natural environment, human health, and the economy.

Our comments relate to both aspects of Section 145.2.1 on the Environmental Protection Act (EPA), in specific whether a Renewable Energy Approval for the [formal name] project will cause

a) Serious harm to human health

b) Serious and irreversible harm to plant life, animal life, or the natural environment

Our comments also reflect the wider responsibilities of the Ministry under Section 14 of the EPA with respect to preventing the release of contaminants. The narrow focus of 145.2.1 does not prevent future enforcement action under Section 14 when the turbine project generates containments other than those considered in the narrow REA guidelines. Protecting residents against these wider affects should also be addressed in the submission from proponent rather than dealt with after the investment has been made constructing the project.

We also consider the direction provided by the Environmental Review Tribunal decisions that need to guide the process going forward.

In the Environmental Review Tribunal decision on the Ostrander Point project (013-003), in which the Renewable Energy Approval was rescinded, the panel determined that there must be balance between the government's perceived need for sources of renewable power and the need to protect the environment. Specific paragraphs from the legal decision are provided, below. (Emphasis is ours.)

> [47] … Neither the purpose provisions of the *EPA*, nor the definitions of "natural environment" and "environment", specifically refer to renewable energy projects, **nor do they indicate that the promotion of renewable energy should be given primacy** over other environmental concerns.
>
> [48] … the policy goals of promoting and streamlining renewable energy projects lose their primacy and become one of many factors to consider within the broader legislative framework and the public interest in energy generation that **mitigates harm to the environment**.
>
> [49] … the Tribunal has found in a number of decisions that the policy of promoting renewable energy **does not automatically trump protecting against other environmental harm**.

Also, the ERT decision on the Ostrander Point power project accepted the idea of the application of the "Precautionary Principle" as necessary and appropriate, as regards renewable energy projects. In other words, the approval must achieve balance.

This decision from the ERT suggests that there is a requirement for wind power projects to demonstrate meeting a need *vis á vis* Ontario's electricity requirements. The submission from the proponent does not address this issue and while Ontario's situation of surplus electrical power suggests that it is not required, the following comments relate strictly to health/environmental concerns and the REA evaluation.

A. HUMAN HEALTH

Almost every wind power project in Ontario has been opposed in one way or another, whether as an appeal before the Environmental Review Tribunal, or in private actions in Ontario courts. Many of these appeals were filed based on concerns about the risk to human health.

In *Erickson*, for example (ERT ref), the panel concluded that (quote) harm to human health could result if wind turbines were placed too close to homes.

In *Bovaird* (ERT 13-070 to 13-075) the panel ruled that while evidence presented in that appeal was "inconclusive" as to wind turbine noise over 40dBA being a source of serious harm to human health, the state of research was such that, the panel ruled, was "closer to the hypothesis generating phase of scientific research". "The legal test, which requires proof of harm, has not been satisfied when the applicable scientific evidence is in such an early stage of development." (*Bovaird vs. MOE*, Para. 838)

That was in 2013.

And the question could be asked, if the panel determined there is no confirmation either way on the effect of wind turbine noise on human health, why was the approval for the project in the Bovaird appeal upheld?

In the intervening years, much new evidence has been developed and presented on the subject of wind turbine noise emissions. In fact, it is now recognized that there is a full range of noise emissions from wind power generating equipment, and it has been demonstrated that many earlier assumptions were incorrect.

Health Canada released the results of its community noise and wind turbine study in the fall of 2014. The $2.1-million taxpayer-funded project, which was not designed to determine cause and effect between wind turbine noise and health impacts, had two conclusions: one, that there are no health effects from wind turbine noise and two, that there are. In fact, study results not publicly available but provided to Wind Concerns Ontario in a private stakeholder meeting, Health Canada revealed that subjects experienced "annoyance" (in the medical sense of that term which denotes distress; annoyance is acknowledged by the World Health Organization as an adverse health effect). The study showed that at 1 km or less, 16.5 percent of the subjects experienced distress; that number jumped to 25 percent at 550 metres, the distance which Ontario has determined to be a "safe" setback distance from a wind turbine. The data showed that this distress occurred when respondents were exposed to 35 dB(A), which is a significantly lower threshold than the 40 dB(A) threshold assumed in the Ontario regulations.

The methodology of Health Canada study has been criticized since 2014, but nevertheless, wind power corporations and Ontario government agencies find it advantageous to use it to show that wind turbines do not cause adverse health effects, even through the actual results show that the Ontario regulations are insufficient to protect human health.

Acoustics professionals have noted that in fact, most of the studies or reviews on wind turbine noise relied upon by government are "Typically sanctioned by state or provincial government agencies that have missions to support the development of wind energy, and which, in turn, appoint expert panels whose members hold views that regularly favor the wind industry and, therefore, may have conflicting interests." (J. Punch and R. James, "Wind turbine noise and human health: a four-decade history of evidence that wind turbines pose risks," 2016, page 3)

In Poland, the National Institute of Public Health released a summary of their review of peer-reviewed literature on the impact of wind turbines: http://www.ft.dk/samling/20151/almdel/mof/bilag/343/1610792.pdf

This paper documents the separations between occupied residences and wind turbines to protect against a range of risks created by this equipment. This assessment replaced the analysis based on single risk factor — audible noise — that is used in many jurisdictions, including Ontario. They found that most requirements fell within the 1 to 5 kilometre range and recommended **minimum setbacks of 2 km** until a structured process to review all of the identified risk factors could be established. In July 2016, the Poland enacted legislation that establishes the setback at 10 times the turbine height (including blade length). As the turbines proposed for Otter Creek have a hub-height of 129 metres and a blade length of 66.7 metres, the Polish regulations would suggest a setback of 1957 metres should be required. The Polish study and resultant regulations confirms that Ontario needs to move beyond regulations based on audible noise and undertake a broad review of the full impact of wind turbines. As was proposed in Poland, a substantial increase in the setbacks is required as a precaution.

In Australia, a special Select Committee on wind Turbines was struck in 2014 to review current science in light of the number of reports of excessive noise and other effects from that country's wind turbines. In its 2015 report, the Committee made several recommendations, among them the requirement to develop a single standard for audible noise from turbines, and to develop and recommend a national acoustic standard on "infrasound, low frequency sound and vibration from industrial [wind power] projects. (Recommendation 2) The Committee commented that "it is concerning that the [wind power] industry continues to face **persistent and widespread complaint** and criticism. As this inquiry amply demonstrates, there is a continuing lack of disquiet about the lack of transparency and consultation in the planning processes, and the lack of rigorous, independent research into the possible health impacts of turbines." (Section 1.5)

In Ontario, "persistent and widespread complaint" is also the case, and now, there is clear evidence of problems that are unresolved. Wind Concerns Ontario filed a request under the Freedom of Information and Privacy Act for actual noise reports filed with the Ontario Ministry of the Environment, now the Ministry of the Environment and Climate Change or MOECC. The time period for the requests was 2006 to end 2014 (the request was made in 2015, and took two years for the Ministry to fulfill).

From the evidence provided (it is certainly not complete) Wind Concerns Ontario learned that there had been more than 3,100 reports of noise exceedance and other effects of wind turbines such as "pressure" and vibration. There were so many reports filed by some individuals and families that their reports were

gathered together in “Master Incident” files, which contained multiple formal reports, as many as 90. Again, that is certainly not complete, as individuals reported that they were calling at the end of several days, even weeks, to file the report based on many incidents of experiencing excessive noise.

Of the 100 Master Incident files provided, 59 percent contained notations by Provincial Officers and other MOECC staff that there were indications of adverse health effects.

Symptoms reported included sleep disturbance (often so severe that people reported not having slept for days on end), headache, feelings of anxiety due to the effect of the noise, “annoyance” (which is itself an adverse health effect recognized by the World Health Organization), feelings of “pressure” in the head and chest, and ringing sensations in the ears. If these were solitary events, they could be dismissed, but sleep disturbance and deprivation over time is well documented as a source of other, serious health problems such as cardiovascular symptoms (high blood pressure), debilitating headache and more.

It is critical to note here that the MOECC **did not provide effective response** to the noise reports filed; in fact, more than 50 percent were met with no response at all, 31% were noted as “deferred” response---in all, only one percent merited a “priority” response.

The result is that there has been almost NO resolution of the noise complaints filed with the Ontario government over an eight-year period. In contrast, the staff reports provide documented evidence that the Ontario regulations were insufficient to protect nearby residents and included recommendations as early as 2010 that changes to the assessment procedures were required, and the setbacks needed to be increased to provide proper protection. There was no evidence that these recommendations were acted upon; in fact, the program seems to be continuing without any modifications based on the learnings from the initial projects.

Following the release of this information, Global News did a four-month investigation including over 40 interviews, and aired a two-part investigative report in June, 2017. Then Minister, the Honourable Glen Murray said that if there were problems (he claimed that the reports referenced had not been sent up to his office) he would ensure swift and effective resolution.

That has not been the case.

Wind Concerns Ontario now has a request for copies of noise reports filed with the Ministry for 2015 and 2016, and have been informed that there will be nearly 1,000 pages of such reports released.

Given that it is public knowledge that the Ministry has information that indicates that the existing regulations are inadequate, a failure to consider this existing information in evaluation of Renewable Energy proposals in all future REA submissions would appear to constitute “willful blindness” and could expose the MOECC to legal liability.

We now question, with this knowledge at hand, why the Ontario government would consider approving a Renewable Energy project such as Otter Creek, which will be employing new and untested equipment, while there has been no resolution to existing, serious problems that do represent serious harm to human health.

As was discovered in the information released under FOI, the MOECC relies almost entirely on information supplied by the wind turbine manufacturers. In short, citizens may file reports, and may experience health effects noted by trained MOECC Provincial Officers, but if the wind power developer

(the MOECC's named "client") and the turbine manufacturer states there cannot be a problem with a specific turbine, then no action is taken despite noise testing results, even conducted by the MOECC, show that issues exist.

Noise Impact Assessment

There are several serious shortcomings in the Noise Impact Assessment in the REA documentation submitted by the Otter Creek proponents.

Comment: Statement of Qualification and Limitations – A critical review of the Statement of Qualifications and Limitations included by AECOM as part of their Noise Impact Assessment suggests that the report should not be considered a valid, independent, expert assessment of the impact of the project on nearby residents. Our reasons for this comment:

- The report is only to be relied on by the project team and government agencies reviewing the proposal. Even though this document has been publicly posted as part of a public consultation process, the limitation stated by AECOM would seem to exclude members of the public from relying on the contents to assess the impact of the project on their living conditions and, for example, the potential for impact of project noise emissions on property values. This limitation would indicate that this report may not meet the government's requirements for transparency.

- The qualification statement also indicates that the analysis in this report has been undertaken within the constraints of an unpublished agreement with the proponent. One would expect that before accepting the professional assessment of AECOM, a copy of this agreement would be included as an appendix to the published report.

- It also states the analysis is based on information provided by the proponent that has **not been independently verified**. In business practice, when conducting an accounting audit of a company, for example, the auditing firm conducts an array of random tests that verify the correctness of the information submitted by the company being audited. One would expect that at least some verification of the inputs by AECOM would be required to generate an assessment acceptable to the MOECC.

- The purpose in having qualified acoustic engineers prepare a noise assessment is to utilize their unique and specialized understanding of acoustic issues related to wind turbine noise and their professional judgement of the situation. There is a lively debate among acousticians about the proper methods to complete this analysis with many reports critical of the MOECC techniques published, even by acousticians associated with the wind industry. Again, the qualifying statement in the document that is part of the Otter Creek application — that they are following industry standards in preparing qualifications of the study — suggests that AECOM is plugging numbers into a formula, rather than providing any specific critical assessment of the noise estimates that result. Given that the MOECC acknowledges that the inputs need to be tightened, one would expect that the proper professional review would provide a comparison of outputs using the old and new input parameters. Rather, they have just presented the analysis of the situation requested by the proponent in place of any assessment of alternative approaches.

The qualifications and limitations stated for the noise assessment should be sufficient grounds to request a new assessment that fully reflects the unqualified professional judgment of the acousticians.

Both the MOECC and the local residents need Noise Impact Studies that accurately fully document all noise emissions that will be generated by the wind project. If there is any uncertainty about these estimates, a range of potential noise output levels should be provided and the project approval be based, **as per the regulations**, on the "worst case" scenario. The MOECC and residents need the ability to take legal action against the acoustic engineers that endorse noise projects if actual noise levels deviate substantially from these predictions are experiences.

Comment: Wind Speeds Used in Modelling – The Noise Assessment Report is based on the noise impact on receptors when ground wind speeds are at 7 metres/second. A review of complaints received by the MOECC and noise assessment completed by District Offices indicate that noise issues started at ground wind speeds as low as 2 m/s or less. Some complaints have been logged when the nominal ground wind speed is 0 m/s. This feedback to the Ministry should suggest that the noise modelling assumptions should be modified to reflect the reality that will be experienced by residents that will be living among these turbines. Additional lower wind speeds need to be modelled to provide an assessment of the range of wind speeds that we understand are now being assessed in the noise audit process.

Comment: The turbine specification report – The first draft of the Turbine Specification Report, submitted by the German manufacturer Enercon, and posted on the Otter Creek website, is dated October 2016, and was later revised and dated February, 2017. [1] http://ottercreekwindfarm.ca/wp-content/uploads/2013/06/CER_03a_Wind-Turbine-Specifications-Report-03.03.2017.pdf

The October 2016 draft of this document was submitted to the Chatham-Kent Council in October 2016, to fulfil a requirement of the REA process. From Enercon's own media releases, it is established that the turbine selected for the Otter Creek project, the E-141 EP4, had not entered production by that date. The Enercon media releases [2], [3], also indicate that the **first prototype** of the E-141 EP4 turbine was scheduled for commissioning sometime in December 2016.

[2] http://www.enercon.de/en/news/news-detail/cc_news/show/News/first-rotor-blade-set-for-enercons-low-wind-speed-wec-e-141-produced/

[3] http://www.enercon.de/en/news/news-detail/cc_news/show/News/enercon-announces-new-low-wind-speed-wecs/

Thus, the noise emission specifications for this turbine, with a precision of 0.1 dBA, were **estimates** and were not measured in accordance with the CAN/CSA C61400-11 2012 protocol as implied in the document. In a letter from Boralex's Asier Aria, dated May 17, 2017 and included in the current Otter Creek Noise Impact Assessment Report [4] dated May 2017, Mr. Aria stated that the actual noise emission test report would be forwarded to the MOECC "within three months" of the start of the technical review which started on July 7, 2017. This confirms that the required CAN/CSA C61400-11 2012 **testing had not been completed by May 17, 2017**, nor had it been completed by July 7, 2017, when the MOECC decided that the Otter Creek REA documents could be "deemed complete."

[4] http://ottercreekwindfarm.ca/wp-content/uploads/2013/06/B4_03a_DO-App-B.pdf

This report would be made available to the MOECC outside of the public comment period, and without any public discussion.

Comment: Applicability of transition rules – The Otter Creek developers opted to use the **optional** transitional rules in O.Reg. 359/09 for LRP 1 projects, as outlined in the MOECC document "Summary of

Changes to O.Reg. 359/09" [5], and have modelled the noise at the receptors using the older guidelines. The new guidelines require the inclusion of the uncertainty in the turbine noise emission specification, claimed to be 1.0 dBA by Enercon in the above-mentioned Turbine Specification Report [1]; and a change in the universal ground factor from 0.7 to 0.5. These two changes would result in modelled noise 2.0 dBA higher than the previous version of O.Reg. 359/09. Thus, **any receptor modelled above 38 dBA using the older guidelines would be above 40 dBA** with the new guidelines, requiring an adjustment to the turbine setback distances.

MOECC staff has already questioned the validity of computer-generated noise modelling used in previous project approvals and the reality of reports of excessive noise received from Ontario citizens; this confirms that the use of the transition rules should not be allowed for the Otter Creek project. The number of people affected if conservative noise assessments are accepted by the MOECC will be substantial.

The reason given by the MOECC for the transitional rules was to take into account projects "that are already significantly underway" because "LRP I bid proposals were submitted to the IESO shortly after the Ministry proposed amendments to the guideline on August 4, 2015", and some LRP I proponents claimed that "they did not have sufficient time to account for positive uncertainty or the change to global ground factor" [6]

[5] MOECC document "Summary of changes to O.Reg. 359/09"

https://www.ebr.gov.on.ca/ERS-WEB-External/displaynoticecontent.do?noticeId=MTI1MzYz&statusId=MTkxMjMw

[6] MOECC document "Updates and clarifications to the "Noise Guidelines for Wind Farms", EBR decision, EB 012-4493

https://www.ebr.gov.on.ca/ERS-WEB-External/displaynoticecontent.do?noticeId=MTI1NDY0&statusId=MTkxMTky&language=en

The Otter Creek developers' first draft of their Project Description Report, dated June 2016, has since been removed from the website; however, a copy can be provided on request.

Section 1.4 in the June 2016 version of the Otter Creek Project Description Report states:

> *"The project will use wind to generate energy through the use of commercial wind turbine technology. The project's nameplate capacity is up to 50 mw and the wind farm will consist of up to approximately 19 turbines, the locations of which are currently being assessed as part of the REA process. As a note, the proposed wind turbine technology for the project is currently under review. The total number of turbines is dependent on the type(s) of turbines that will be used, the individual MW generation capacity of each turbine, and potential changes to the overall nameplate capacity."*

The above statement indicates that by June 2016, one month after the new guidelines came into effect, and ten months after the new guidelines were proposed, the Otter Creek developers had not yet selected a turbine model, nor had they finalized the number and location of turbine sites.

The first draft of the Otter Creek Noise Impact Assessment Report dated November, 2016, has since been removed from the Otter Creek website, but a copy can be provided on request. That report would have been prepared sometime between June 2016 and November 2016.

The Otter Creek project was **not** "already significantly underway" on August 5, 2015 when the new guidelines were proposed. The Otter Creek project was **not** "already significantly underway" as recently as May 1, 2016, when the new O.Reg. 359/09 guidelines came into effect; nor was the project already significantly underway by June 2016, when the first draft of the Project Description Report was posted on the Otter Creek website. **The developers cannot claim that they did not have time to account for the turbine noise emission uncertainty** or the global ground factor because when they submitted their LRP I proposal; all they proposed was a 50 MW wind project, with turbine model and turbine sites to be "assessed as part of the REA process."

The MOECC guidelines indicate that the transitional rules are optional for LRP I proponents. This is a tacit assumption that developers would act responsibly and that the transitional rules would only be used for projects that did not have sufficient time to incorporate the new guidelines in their planning process.

Table 8.4, the Noise Impact Assessment Table, in the current Otter Creek Noise Impact Assessment Report, dated May 2017 [7], indicates that with the current configuration proposed by the developers, there are 21 non-participating receptors and 11 of the 12 turbine sites that would be out-of-compliance under the new guidelines. [7] http://ottercreekwindfarm.ca/wp-content/uploads/2013/06/B4_03a_DO-App-B.pdf

The Enercon turbine specification report has **noise specifications that were not derived by direct measurement with a working turbine as required by the CAN/CSA C61400-11 2012 protocol**.

The Otter Creek Noise Impact Assessment Report was based on turbine noise emission specifications submitted by the manufacturer for a turbine that had not been commissioned or tested. The Noise Impact Assessment Report, is in effect **an estimate based on another estimate**.

The MOECC has asked the public to comment on documents published on the Otter Creek website that they've "deemed complete", but two critical reports, the Turbine Specification Report and the Noise Impact Assessment Report, should be considered spurious and incomplete.

The Otter Creek developers are not justified in using the transitional rules and should be directed to resubmit both the noise emission report, with noise levels actually measured with an operational turbine, and the Noise Impact Assessment Report using the current guidelines in O.Reg. 359/09.

The developers are asking the MOECC to approve a project that would be considered completely unacceptable under the current noise guidelines. This project could and should be revised to reflect the current noise guidelines.

The public comment period and the technical review should both be cancelled and restarted after the Otter Creek developers submit complete and accurate documentation.

Comment: impact of noise estimate errors – The data provided in the Noise Impact Assessment indicate the number of residents that will be impacted if the noise estimates are not accurate. The points of reception count appears to show that the project will affect very few participates as there are only six

participant receptors within 1,500 metres of a turbine. However, the noise assessment reports that 446 non-participating receptors are located within the 1,500-metre boundary, with more than 1,000 more homes located within the 2-kilometre range now being considered the safe setback by some European countries. This number is very large as Figures C2-4 and C2-5 show that a sizeable portion of the community of Wallaceburg falls within the 1,500 to 2,000-metre distance from turbines. All of these homes fall within the minimum setbacks recommended by the Polish Health Institute.

It is one thing to propose acceptance of noise modelling when approving a project, but providing a remedy to the situation when noise levels exceed the inaccurate modelling numbers afterward is very costly. If the approval is issued, the MOECC could be liable for evaluating and approving a project with incomplete data and withholding evidence that will contravene the requirements of the REA. Similarly, the professional acousticians who provided no indication of a risk that noise levels could exceed the noise limits in the guidelines may also face liability. Given the number of people potentially affected, it would be advisable to ensure that estimates of noise levels are based on learnings from existing projects rather than from theoretical modelling.

Comment: Gaps in the Operational Plan – REAs require that the proponent take responsibility for addressing residents' complaints. Each REA references the need to address cause of each incident and prevent a similar future occurrence. The 3,100+ reports released to Wind Concerns Ontario by the MOECC indicate that only a few complaints have been resolved. This means that the Operation Plan for future wind projects should include more robust commitments from the proponent to actually **resolve** complaints that they received. This plan should include commitments to:

- Investigate each complaint by visiting the resident's location during similar meteorological conditions as those that triggered the complaint within an appropriate timeline;
- Testing and analysis to understand the root cause of the complaint and removing these conditions from the operation.
- Resolution of complaints requires that the MOECC move beyond testing for compliance with the approved noise levels to a process focused on understanding the full impact of the turbine on residents and addressing more issues than non-compliance, i.e., EPA Section 14.
- Timelines for implementing changes and interim measures to address the concern so that delays in compliance audit testing and other MOECC initiatives do not leave residents exposed to adverse conditions for months or years while the Ministry and the proponent discuss alternatives.
- Any future REAs should incorporate meaningful penalties for proponents that do not fulfill their obligations to resolve all complaints.

B. THE NATURAL ENVIRONMENT AND HUMAN HEALTH

Impact on source water for area wells

Also of concern to human health, is the issue of water quality, which represents a risk to health. The Ministry is separately responsible for administering the government's program to protect water sources and this mandate needs to be considered when assessing the impact of this project on human health.

Non-disclosure clauses in wind turbine leases prevented landowners from revealing or discussing problems of long-standing with well water in the Dover Centre area of Chatham-Kent; Chatham-Kent is also the location of the Otter Creek project. It is now coming to light that well water has been affected in several locations, beginning with the vibrations occurring with construction of the wind turbines, and persisting with their operation. In the absence of real action by the MOECC, citizens undertook independent testing of well water with the result that the water was found to contain sediment with toxic heavy metals.

Specific descriptions of events in various locations relevant to the Otter Creek project follow.

Location: Dover Township wells – There are serious concerns in the local community around the Otter Creek project due to issues with well water in the nearby former Dover Township after the construction and operation of a wind turbine project in the area. This concern was raised as far back as August 8, 2012, when Lambton-Kent-Middlesex MPP Monte McNaughton wrote to then Energy Minister Chris Bentley on behalf of a constituent. [1] [1] http://montemcnaughtonmpp.ca/wp-content/uploads/2012/08/August-8-2012-McNaughton-to-Bentley-re-well-water-2.pdf

Other rural residents in Dover Township reported significant turbidity in their well water during construction of the wind project several years ago that have continued until the present. In addition to the highly visible turbidity, the well water has the unmistakeable odour of hydrocarbons and is unfit for human or animal consumption. Filters were purchased by some landowners who reported subsequently that they were ineffective in producing potable water. Other landowners reportedly received water filters from the developers but are now prevented from commenting on their efficacy because of the non-disclosure agreements they were asked to sign on accepting those filters.

Location: North Kent – On June 29, 2016, the North Kent I wind project was granted a Renewable Energy Approval (REA) by the MOECC. Due to concerns expressed by local residents, that REA contains several requirements for a seismic survey and well water testing, as well as a commitment for the developers to provide potable water in sufficient quantities for farming operations. The North Kent proponents have commissioned a literature review [2] of the seismic issues from wind turbines by Golder Associates, a member of CanWEA, the Canadian Wind Energy Association.

[2]http://northkentwind.com/files/8514/7672/1123/NKW1_Golder_Evaluation_of_GeoNorthKent1_2016_0923.pdf

This report claims the turbines will likely not affect the nearby water wells; however, all the studies and data presented were undertaken in areas other than Dover Township, North Kent or Otter Creek project areas.

Recent events at a well on Brook Line, north of Chatham [3] within the North Kent project zone, and reported in the media, have shown that the optimistic opinion expressed by Golder Associates was not warranted, and serious damage to at least one nearby water well has occurred during the pile-driving activity.

[3] http://www.chathamdailynews.ca/2017/08/02/sediment-so-thick-it-prevents-water-from-coming-through-taps-of-chatham-township-familys-home

In this case, the sediment was enough to plug the four sediment traps the well owners had installed and stop the flow of water. The well owners found they had to clean the traps every six hours, or the flow of water would again be blocked. The public response from the developers and their consultant, AECOM, to this incident was not helpful and less than rigorous. From a media statement [4] released by North Kent Project Development Manager, Jody Law: "The preliminary update from AECOM's field staff is that, with no remedial work required, they were able to run a faucet continuously with no issues. The sample was visually clear and colorless with no visible sediment. We have requested expedited analysis from the lab but, at this point, there is no empirical evidence of an issue," stated Jody Law, Senior Manager of Development, North Kent Wind Project."

[4] http://www.ckreview.ca/2017/08/north-kent-wind-issues-statement-regarding-recent-water-well-complaint/

This assessment was contradicted by the well owners [5] who commented that the water sample was obtained with difficulty. Furthermore, the well owners received a **preliminary report from the MOECC** stating that the turbidity of the sample the MOECC had collected had a turbidity of 86.4 NTUs. It could not be considered "visually clear and colorless".

[5] http://www.chathamdailynews.ca/2017/08/09/preliminary-results-indicate-turbidity-of-water-is-well-above-acceptable-level

Visually inspecting the tap water and declaring "there is no empirical evidence of an issues" has resulted in the public perception of bias on the part of the consultant and developers, and an attempt to deny or minimize the problem.

Location: Otter Creek – Given that the Otter Creek project will sit on top of the same Kettle Point bedrock formation with the same type of overburden, and on top of the same aquifer, nearby residents are understandably concerned.

The Otter Creek developers have also commissioned a study [6] by the engineering firm, GHD Group, to evaluate the Golder Report. [6] http://ottercreekwindfarm.ca/wp-content/uploads/2013/06/B5_06a_App-F.pdf

This report is another review of a literature review that is based on other studies in other areas, none of which are anywhere near the North Kent, Otter Creek, or Dover Township wind projects.

The conclusions in the GHD Group's study mirror the conclusions in the Golder Report. The Summary and Conclusions in the GHD report, and quoted in Otter Creek's media statement (reference [4] above) follow.

The main conclusions from GHD's review are:

1. "Based on the similarity of geologic conditions confirmed by GHD at the Otter Creek Site and those presented in the Golder Report, GHD believes that the Golder Report conclusions are applicable to the Otter Creek Site."

2. "The Report concludes, and GHD concurs, that given that the typical residential well pump operational vibration intensity threshold is in the range of 3 to 9 mm/s, it is highly unlikely (nearly impossible) that vibrations induced by pile driving can cause dislodgement of sediments that would not be otherwise dislodged by existing pump vibration."

3. "GHD is not aware of any report or study confirming a plausible mechanism for vibrations induced by wind turbine operations to cause sediment dislodgement at distances beyond the common turbine exclusion zones."

Based on these conclusions, Otter Creek does not anticipate that either the construction or operation of the facilities will have any negative impact on water wells.

The comment in the GHD report that "Otter Creek does not anticipate that either the construction or operation of the facilities will have any negative impact on water wells" has been shown to be unwarranted and premature by the contamination of the well on Brook Line.

If the Otter Creek developers and their GHD consultants believe that "the Golder Report conclusions are applicable to the Otter Creek Site", then they must also accept that the experience with the well on Brook Line in the North Kent project zone would also be likely with a well in the Otter Creek project zone.

Impact on bedrock – fractures in the bedrock

The West Dover, North Kent and Otter Creek project zones are all above the Kettle Point bedrock formation consisting of black shale.

The Golder Report (Reference [2] above) Section 7.4.2.1 Computer-Aided Hydrogeological Modelling) opines that bedrock fracture is limited to the possibility of fractures caused by pile driving for the turbine base supports in an area with a diameter of 24 metres, the same area contained in the perimeter of driven piles.

"For the purposes of modelling and as an extreme case, it was assumed that piles driven into the shale bedrock create a fully fractured zone about half a metre thick and 24 m in diameter (within the full perimeter of driven piles) ... "

Otter Creek's GHD report supports this opinion.

From Section 6. Review of Hydrogeological Numerical Modelling, Conceptual Model, page 7:

"Rather than the more possible localized fracture that would occur in each pile, it was assumed that the installation of turbine piles created a fully fractured zone of 0.5 m thick and 24 m in diameter. ... Such representation was a conservative approach as it was deliberately chosen to be biased toward the potential for more adverse fracture and flow condition in the shale bedrock."

However, neither the Golder report, nor the GHD report, present data to back up their assumption that fractures from pile driving would be limited to an area 24 meters in diameter.

Comment – presence of shale gas

The GHD report acknowledges that the Kettle Point black shale bedrock contains shale gas consisting mainly of methane gas:

From the GHD Group report Section 3. Review of North Kent Site Geologic and Hydrogeologic Conditions; Bedrock :

> *"The Devonian-age Kettle Point Formation is composed of black organic rich shale and siltstone. The Report indicates that the Kettle Point Formation is not considered to contain oil or water, although low pressure natural gas is found in Kent County and southwestern Lambton County. The Kettle Point Formation consists of up to 105 m of organic-rich shales (Otis, 2011). Otis (2011) documented the presence of shale gas within the Kettle Point Formation, composed primarily of methane, but did not indicate whether the shale gas may be economically viable."*

Summary – harm to natural environment, human health

The Kettle Point black shale bedrock formation is rich in organic compounds and shale gas, and extends from Kettle Point on the shores of Lake Huron to the project areas for both the North Kent and Otter Creek wind projects. It also extends under the Marsh Line wind project where several wells have been rendered useless after the nearby wind turbines were installed and operated.

The experience with the water well on Brook Line in the North Kent project zone indicates that the assumptions in the Golder and GHD reports are unfounded, and their conclusions of no damage, or "nearly impossible" damage, to nearby wells are incorrect.

Despite the seismic testing requirements for the North Kent project, there does not appear to be any protocol to respond to a well failure for the North Kent project developers, other than supplying bulk water to the residents. The continued construction activity in the North Kent project indicates the lack of any protocol requiring the project developers to address the root cause of any problems that may arise.

Neither the North Kent nor the Otter Creek REA documents include any fracture trace mapping to determine the existing bedrock fractures; nor do they comment on the potential impact of pile driving on the existing fractures.

Neither the Golder Report nor the GHD report comment on the weight of the turbines that will be coupled to the black shale bedrock; and neither comments on the actual force exerted on the bedrock by the vibrations from each turbine.

The manufacturer of the Enercon E-141 EP4 turbines proposed by the Otter Creek developers did not report the gross weight of the turbine and base; however, the Otter Creek construction report states that each base will use "up to 125 trucks" of cement. Assuming 7 cubic meters per truckload and a weight of 2,400 kg per cubic meter of concrete, each turbine base will contain 875 cubic meters of concrete with a weight of more that 2100 metric tons.

The potential for large scale fractures from 12 Enercon E-141 EP4 turbines that are seismically coupled to the Kettle Point black shale bedrock is unknown and has been ignored by the developers and their consultants.

The potential impact from the combination of large scale fractures and the presence of shale gas in the bedrock was not reviewed by either the Golder report or the GHD report.

To protect the non-participating residents, the project plan should include pre-project and post–project testing of all areas wells along with a viable mitigation plan to provide alternate sources of water to any affected residents. The construction plan should also document the steps that will be taken to ensure that any piles forming part of the turbine foundations cannot become a source of contamination reaching the aquifer either during construction process or later while the turbines are operational. This is also an important consideration for the decommissioning plan.

The Otter Creek wind power project should not receive Renewable Energy Approval on the basis that the water issue has not been properly investigated, and has not been resolved.

Interference of this nature with the aquifer represents serious and irreversible harm to the natural environment and cannot be allowed to proceed.

CONCLUSION

In our view, the documentation for this wind power project is not complete.

There is a strong possibility that there will be serious harm to human health owing to the lack of due diligence about the noise emissions from the wind turbines, and that there will be serious and irreversible harm to the natural environment and serious harm to human health due to interference with aquifers that supply water to residents.

In our view, the evaluation of these documents should not result in a Renewable Energy Approval. At a minimum, the documentation should be returned to the proponent with the request that information gaps be addressed.

Respectfully submitted,

Jane Wilson

President

WIND CONCERNS ONTARIO

president@windconcernsontario.ca