

ONTARIO ENERGY BOARD

IN THE MATTER OF the *Ontario Energy Board Act, 1998, S.O. 1998, c. 15, Sch. B, as amended* (the “**OEB Act**”);

AND IN THE MATTER of an application by Summerhaven Wind LP (the “Applicant”) for an order under section 92 and subsection 96(2) of the OEB Act granting leave to construct an electricity transmission line and related facilities.

APPLICANT’S INTERROGATORIES TO HALDIMAND COUNTY HYDRO INC.

Interrogatory #1

Reference:

On page 4 of the Kinectrics Induction Study for Haldimand County Hydro Inc. (May 31, 2011), in regard to the statement:

Kinectrics performed induction calculations considering the geometry given in the 230-kV transmission line draft design provided by NextEra and the HCHI construction standard design for 27.6/16kV lines. This line will connect their new 125MW wind power generation farm to the Hydro One Networks Inc. grid.

Kinectrics studied the voltage unbalance on the distribution phases downstream of 2 km of exposure. The calculated values are very small, about 0.01 % of average line to line voltage for any of the configurations studied. This analysis neglects the effect of the neutral and the overhead ground wire, which should be negligible. The result is well below the 1% limit to voltage unbalance normally accepted by utilities.

Question:

- (a) Please confirm the current voltage on HCHI's existing line running along Concession Road 5.

Interrogatory #2

Reference:

On page 4 of the Kinetrics Induction Study for Haldimand County Hydro Inc. (May 31, 2011), in regard to the statement:

Calculations of the induced voltage into distribution phases during a transmission line fault were also performed. The maximum calculated longitudinal voltage induced in the distribution phases was 46 kV when a 63 kA fault on the lowest transmission line phase was considered. To limit these fault induced overvoltages, the protection of distribution equipment may require the installation of surge arresters properly rated for the expected duty on distribution phases at each end of the parallel exposure.

Preamble:

Please refer to Summerhaven Wind, LP.'s Leave to Construct Application submitted on January 26, 2011. Please refer to Exhibit B, Tab 8, Schedule 2, the System Impact Assessment (SIA), dated November 4, 2010, and Schedule 3, the Customer Impact Assessment (CIA), dated November 9, 2010. In the SIA, at page 24, grid calculated post-Summerhaven symmetrical line-to-ground fault current at the closest transmission interconnected facilities includes the Nanticoke bus at 42.4 kA and the Middleport bus at 44.2 kA. In the CIA, on the final page, the post-Summerhaven symmetrical line-to-ground fault current at the Imperial Oil facility is shown to be 25.012 kA.

Questions:

- (a) Given that system fault levels identified in the SIA range from 44.2 kA at Middleport to 42.4 kA at Nanticoke, and given that the fault level at the Imperial Oil facility is identified in the CIA to be 25.012 kA, please explain the decision to use 63 kA as the fault level in your analysis.
- (b) Please describe how the conclusions in 4.2 would change if a 44.2 kA fault (the highest anticipated at closest buses) was used instead of 63 kA.
- (c) Please confirm that if the effects of a 63kA fault on the lowest transmission phase can be mitigated by the installation of surge arresters, a similar mitigation would suffice, if needed, with a lower fault level.
- (d) Please confirm that fault contribution decreases as you go further away from the source.

Interrogatory #3

Reference:

On Page 5 of the Kinetrics Induction Study for Haldimand County Hydro Inc. (May 31, 2011), in regard to the statement:

Due to its proximity, the transmission line will provide lightning protection against direct lightning strikes. It is recommended to maintain a minimum distance of 10 m or more between the transmission and distribution poles to limit the GPR (Ground Potential Rise) transfer during lightning strikes to the transmission line and 60 Hz faults.

Questions:

- (a) Please confirm that the distance between the proposed transmission line and the HCHI distribution line is less than 10m for only approximately 550 meters where HCHI's line runs on the south side of Concession Road 5, west of Cheapside Road.
- (b) Please identify the calculation for the recommendation of the 10m minimum separation distance.
- (c) Please provide a definition of "GPR (Ground Potential Rise) transfer".
- (d) Please identify HCHI's current design specifications for mitigation of transient overvoltage on its distribution line.

Interrogatory #4

Reference:

On Page 5 of the Kinetrics Induction Study for Haldimand County Hydro Inc. (May 31, 2011), in regard to the statement:

Kinetrics modelled the neutral to earth voltages considering 2 km length of parallel exposure. Calculations were performed for two ground rod resistances (transformer and customer service ground), 37 ohm and 75 ohm, on the neutral at 100 m spacing. The calculated neutral potential to remote earth remained below 7 V in both cases. The Ontario Electrical Safety Code limits the neutral potential to 10 V, which could be still exceeded depending upon the existing potentials that may be present. In addition, utilities must maintain their contribution to animal contact potentials at customer premises under 0.5 V which could be exacerbated by the new line.

Questions:

- (a) NextEra's practice is typically to achieve less than 25 ohm resistances. In light of that, please identify the reason for the selection of the 37 and 75 ohm resistances.
- (b) Please provide calculations of the voltages using 10 to 15 ohm resistances.
- (c) Please provide a spreadsheet of HCHI's current contributions to animal contact potentials at customer premises in the vicinity of HCHI's distribution line.
- (d) Regarding the calculated induced neutral to ground potential stated as 7V, please describe how that relates to animal contact potentials at customer premises.
- (e) Please identify whether HCHI has ever had a complaint where HCHI's contribution to animal contact potentials at customer premises was over 0.5.
- (f) Please describe mitigation HCHI has conducted for all complaints HCHI received where HCHI's contributions to animal contact potentials at customer premises were over 0.5.
- (g) For all mitigation described in question 4.f., please provide the cost of mitigation.
- (h) Please provide a list of all dairy farms along Concession Road 5.

- (i) Please provide the evidence supporting the statement that the 10V limit could be exceeded.

Interrogatory #5

Reference:

On page 5 of the Kinetrics Induction Study for Haldimand County Hydro Inc. (May 31, 2011), in regard to the statement:

The latest 230-kV draft design provided by NextEra shows the offset between the transmission line structures and the HCHI distribution line as 3.4 m (see Figure 4).

Questions:

- (a) Figure 4 in HCHI's submission indicates that HCHI's infrastructure is 9.3 m from the county road center line, and that Summerhaven's proposed infrastructure is 14m from the county road center line. Please confirm that the resulting difference is 4.7m between HCHI's infrastructure and Summerhaven's proposed transmission line.