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May 12, 2014
File: 160950269

Attention: Ms. Sheryl Lusk
Environmental Protection Operations Division- Ontario
Environment Canada
4905 Dufferin Street
Toronto Ontario M3H 5T4

Dear Ms. Lusk,

Reference: Environment Canada Correspondence- Re: Proposed Niagara Region Wind Farm

Thank you for your letter of November 1, 2013 and the subsequent follow up discussions with the NWRC and Stantec teams (December 3, 2013) and between Stantec and Environment Canada (EC) (February 28 and March 3 2014).

As you know, Niagara Region Wind Corporation (NRWC) is proposing to develop, construct, and operate the 230 Megawatt (MW) Niagara Region Wind Farm (the Project) within the Townships of West Lincoln and Wainfleet and the Town of Lincoln within the Niagara Region and within Haldimand County in Southern Ontario, in response to the Government of Ontario's initiative to promote the development of renewable electricity in the province.

The basic components of the Project include 77 wind turbine generators (80 potential locations identified) each with a rated capacity ranging from approximately 2.3 MW to 3.0 MW for a maximum installed nameplate capacity of 230 MW. Two turbine models have been assessed as part of the approvals process, which includes hub heights of either 124 or 135 m.

In your November 2013 letter you note that "Environment Canada is uncertain whether the height of these proposed turbines will adversely impact migrating birds as there is little to no data on the impact of turbines of this height on migrating birds". Further, you note that there is a possibility that carcasses may fall outside the 50m search radius that is required by provincial guidance (MNR, 2012) and that an appropriate correction factor that considers this information is necessary.

Niagara Region Wind Corporation (NRWC) has developed the following study program designed to further the knowledge around the impacts of increased turbine height on migrating birds.

The monitoring program outlined in this report is project specific and will provide data on the pattern of carcass distribution that is accurate for this particular facility, specifically in relation to migratory landbirds. Huso and Dalthorp (2014) found that having site-specific information regarding the pattern of carcass density in relation to turbine location can be useful in producing improved fatality estimates.



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Given the Project's location along the northern shoreline of Lake Erie, this work plan also expands the timing window of the mortality monitoring searches to capture an extended period of spring migration activity.

MONITORING PROGRAM

This monitoring program is supplementary to the monitoring program outlined in the EEMP. It will be conducted concurrently to the EEMP program and does not negate or supersede monitoring commitments made within that monitoring program.

The monitoring methods proposed here are those recommended by Environment Canada (personal communication, December 3, 2013).

The supplementary monitoring program will consist of the following components:

- mid April- May 1: twice weekly search of 23 turbines (1/3 of all turbines as consistent with the EEMP; Stantec, 2013) within a 50m radius from turbine base; and
- mid-April- end of October: twice weekly search of 10 of the 23 wind turbines within an 85m radius from turbine base.

This program will be conducted for the first year of the mortality monitoring program.

SELECTION OF MONITORING LOCATIONS

The 23 turbines to be included within the mortality monitoring subset will be selected in consultation with MNR to cover representative areas throughout the project location and including consideration of commitments in the EEMP to monitor certain turbines in proximity to significant wildlife habitats. The 23 turbines selected will be those that will also comprise the regular twice weekly mortality monitoring program from May 1- October 31 that is detailed in the EEMP.

The subset of 10 turbines to be searched to 85m will be chosen using a stratified sample focused on the northern and southern extents of the Study Area to attempt to capture the spring and fall migration fronts. Selection of the subset of the 10 turbines will also take into consideration turbine locations where all, or a large portion, of the 85 m surrounding the turbine base can be searched (with consideration of property access and surrounding habitat).

A map showing each subset of turbines to be monitored will be provided to EC prior to initiating post-construction mortality monitoring.



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MONITORING METHODS

Turbine searches will occur in accordance with the following parameters:

- Post-construction monitoring will begin April 1st of the year that the wind power project is fully operational.
- Searchers will aim for a consistent search time for all surveyed turbines and within each search radius subset.
- Within each radius subset (50m and 85m) the search area will be examined using transects 5.0-6.0m apart allowing for a visual search of 2.5-3.0m on each side.
- All mortality of birds will be recorded.
- Percent area searched will be recorded and calculated separately for each search radius interval.
- All carcasses found will be photographed and recorded/labeled with species, sex, date, time, location (UTM coordinate), carcass condition, searcher, injuries, ground cover, and distance and direction to nearest turbine.
- Weather conditions including wind speed and precipitation will be included as part of the data collection.

ANALYSIS OF RESULTS

The results from each monitoring distance (50m and 85m) will be analyzed to determine the distribution of carcasses with respect to distance from wind turbine base. This information will be used to develop a bell curve of carcass distance from turbine base in order to identify the proportion of carcasses that fall within a 50m and 85m radius of the turbine bases. A statistical analysis will be undertaken to determine significance.

The results of this analysis will be used to recommend an appropriate search interval for the remainder of the monitoring program and to provide data on the impacts of increased turbine heights. Results will be analyzed in consultation with Environment Canada.

REPORTING

An annual monitoring report will provide a summary of the analysis and results of this Monitoring Plan. The annual report will be submitted to EC by the end of February of the year following implementation of the Program. All data, collected in accordance with this monitoring program



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will be provided. The annual report will identify all activities as set out in this Plan and conducted onsite during the calendar year including methods, data and analysis of results.

The monitoring program will be reassessed by EC and NWRC at the end of each monitoring year. Modifications to the program methods, frequencies, and duration may be proposed by NRWC in consultation with EC.

SUMMARY

This monitoring program has been proposed to provide data that may help address the uncertainty that EC has identified with respect to the increased turbine height on migratory landbirds.

EC notes that "While avoidance is the best approach, appropriate preventative and mitigation measures to minimize the risk of incidental take of migratory birds and to help ensure sustainable populations of migratory birds should be developed particularly with respect to the uncertainties related to taller turbines" (EC, November, 2013).

The results of the analysis of the number of carcasses within each of the 50m and 85m will be used to provide information on the impact of increased turbine height with respect to migratory landbird mortality. An analysis of the results of this monitoring program will be used to determine next steps including:

- Identifying the need for additional scoped studies;
- Refinement of the monitoring program; and/or
- Implementation of mitigation measures in response to unanticipated adverse effects.

Mitigation measures may include subsequent scoped mortality and cause and effects monitoring, and/or operational mitigation techniques (periodic shut-down of select turbines and/or blade feathering at specific times of the year when mortality risks to migratory landbird species is particularly high). Emerging and new technologies will be considered that may reduce migratory landbird fatalities.

In order to develop an appropriate and effective mitigation strategy, it should be developed in response to the analysis of the specific circumstances of the mortality. To date, likely in part because they have not been required, mitigation measures at wind turbines specific to migratory landbird mortality remain largely unproven.

Given fatalities at wind turbines have been generally known to occur at relatively low levels and that the effect of operational mitigation on avian mortality is relatively unknown, an effective mitigation strategy to help ensure sustainable populations of migratory landbirds should also consider measures that target sources of mortality to birds that result in larger magnitudes of



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incidental take of avian mortality (i.e., as per Calvert et al., 2013) in order to more effectively offset mortality for wind turbine operation and benefit birdlife.

CONCLUSION

This monitoring program is intended to provide data to EC to help address the gap in knowledge surrounding the impact of increased turbine height on migratory landbirds. NWRC is committed to implementing this program and to working with EC to minimize the risk of incidental take to migratory landbird populations.

Regards,

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References:

- Calvert, A. M., C. A. Bishop, R. D. Elliot, E. A. Krebs, T. M. Kydd, C. S. Machtans, and G. J. Robertson. 2013. A synthesis of human-related avian mortality in Canada. *Avian Conservation and Ecology* 8(2): 11. <http://dx.doi.org/10.5751/ACE-00581-080211>
- Huso, M.P., and D. Dalthorp. 2014. Accounting for unsearched areas in estimating wind turbine-caused fatality. *Journal of Wildlife Management*. 78:347-358.