THE STATE OF NEW HAMPSHIRE
BEFORE THE
NEW HAMPSHIRE
SITE EVALUATION COMMITTEE

DOCKET NO. 2010-01

APPLICATION OF GROTON WIND, LLC
FOR A CERTIFICATE OF SITE AND FACILITY

SUPPLEMENTAL PREFILED TESTIMONY OF ADAM J. GRAVEL ON BEHALF OF GROTON WIND, LLC

October 12, 2010

Qualifications

Q. Please state your name and business address.

A. My name is Adam J. Gravel. My business address is 30 Park Drive, Topsham, Maine, 04086.

Q. Who is your current employer and what position do you hold?

A. I am employed by Stantec Consulting ("Stantec") as a Project Manager. I am responsible for coordinating and conducting wildlife use and impact assessment surveys, with a specific focus on large-scale avian and bat studies associated with wind power projects. My qualifications have not changed since the time my prefiled direct testimony was submitted in this docket.

Purpose of Testimony

Q. What is the purpose of your supplemental prefiled testimony?

A. The purpose of this testimony is to summarize activities that I and others at Stantec have been involved with on behalf of the Groton Wind Project since the time my prefiled direct testimony was submitted. In addition, this testimony rebuts assertions made by James Buttolph on behalf of intervenor group Buttolph/Lewis/Spring, and Counsel for the Public's witness, Mr. Lloyd-Evans.

Q. Please summarize the activities with which you or others at Stantec have been involved on behalf of the Project since the time the Application and your prefiled direct testimony were filed in March 2010.

A. Since the filing of my prefiled direct testimony in March 2010, I attended the public hearing in Plymouth, NH and provided responses to questions raised by the public there. I also provided responses to two rounds of data requests propounded by intervenor groups and Counsel for the Public, attended technical sessions and provided responses to questions from intervenor groups and Counsel for the Public, and reviewed prefiled direct testimonies of intervenor groups and Counsel for the Public's witness. I have also reviewed intervenor groups' and/or the Counsel for the Public's witnesses' responses to data requests propounded by the Applicant.

In addition, Stantec has conducted spring and summer 2010 acoustic bat surveys at the Project to supplement fall 2006 and fall 2009 surveys conducted on site. The reports for the initial surveys were submitted in Groton Wind's original Application as Appendices 29 and 32. The data collected in 2010, combined with the data collected in fall 2006 and fall 2009, provides information on bat activity and species or species groups present within the Project area during each period within a year when bats are

known to be active (i.e., spring, summer, and fall). The survey methods and design used during the fall 2009 surveys were replicated for the spring and summer 2010 surveys to ensure consistency among all three seasons of survey. A report of these surveys is submitted with the Supplemental Application in Appendix 48. It supplements the six avian and bat reports that were included as Appendices 28 through 33 to Groton Wind's Application.

Q. Please summarize the results of the 2010 acoustic bat surveys conducted at the Project site.

A. Stantec conducted an acoustic bat survey at the Project in spring and summer 2010. *See* Appendix 48. The objectives of the acoustic survey were to document bat activity patterns and general species composition from April through August across the Project area, and to document bat activity patterns in relation to weather factors such as wind speed and temperature. Consistent with fall 2009 surveys, surveys during the spring and summer 2010 consisted of 8 Anabat SD1 detectors (Titley Electronics Pty Ltd.) deployed at the same locations and heights within the Project area. Surveys occurred from April 9 to August 18 and operated from 7:00 pm to 7:00 am each night of survey for a total of 986 detector nights.

Between April 9 and August 18, a total of 6,356 call files were recorded by the 8 detectors, resulting in an overall detection rate of 6.4 calls per detector-night. Call sequences belonging to all five guilds known to occur in New Hampshire were identified during the acoustic survey. Migratory species of the hoary bat guild composed the greatest percentage of all calls recorded during the 2010 survey period (25.6%). The

Tenney Middle Met Low tower detector (22 m) recorded the most calls (29.8%, n=1,898) during the survey. Approximately 53 percent of all calls were recorded during the month of June, when detection rates peaked for all detectors. Species composition varied across acoustic detector height. There was no correlation between wind speed, temperature, or detection rates.

Q. Do the results of the 2010 spring and summer acoustic bat surveys change your assessment of potential risk to bats as a result of the proposed Project?

A. No. Results from 2010 are similar to 2009 results, and therefore our weight of evidence risk assessment (Appendix 28) of potential impacts to bats, which takes into account the results of on-site data, publicly available literature, and post construction survey results, remains at a moderate level. Like other similar studies conducted at proposed wind energy projects in the northeast, bat activity was variable among detector heights and locations during the 2010 survey. During both 2009 and 2010 surveys, detectors placed at or below tree canopy height documented the majority of calls, as opposed to detectors placed within the on-site met towers at heights above tree canopy and near the lower end of the rotor zone of the proposed turbines. This trend has been observed with other publicly available pre-construction acoustic bat surveys conducted at proposed wind energy projects (see Appendix 32, page 98 and Appendix B, Table 1 of Appendix 48). Typically, the majority of bat calls recorded during these surveys occur at detectors at or below tree canopy height. This trend was also observed at the nearby Lempster Wind Project during pre-construction acoustic bat surveys

conducted in 2006. At this site, the majority of bat calls were recorded from detectors at or below tree canopy height, rather than those in the on-site met tower.

Overall detection rates in the two years of studies at the Groton Project are similar: 4.5 calls per detector night in fall 2009, and 6.4 calls per detector night in spring and summer 2010. Since acoustic detectors are not able to distinguish between individual bats, detection rate is not related to the number of bats in an area. Comparisons between detection rates is an exercise in comparing the number of files recorded, or index of activity, and should not be considered a direct correlation to the number of bats in an area. Detection rates between 2009 and 2010, although not exactly the same numerically, may nonetheless be considered similar given the numerous sources of variation due to weather conditions, insect availability, and other random events, and the fact that acoustic surveys cannot determine the number of individual bats creating acoustic files. Thus, there is no significant difference between detection rates in the two survey years.

When compared to other pre-construction acoustic bat surveys conducted at other proposed wind projects in the northeast, detection rates recorded at the Project were at the low to middle range of those rates found at other projects (see Appendix 32, page 98 and Appendix B, Table 1 of Appendix 48). In 2010, detection rates were driven by two large pulses in activity relative to the total number of calls recorded during the survey, and was observed at the Tenney Middle Met (Low and 2M) detectors on the nights of May 29 and June 1. The Tenney Middle Met 2M detector recorded a total of 347 calls on May 29 and 551 calls on June 1 representing approximately 14% of calls recorded during the survey.

A total of 632 calls were recorded on May 29, and 846 calls were recorded on June 1, from the Tenney Middle Met Low detector, representing 23% of calls recorded during the survey. These two detectors combined on these two nights comprised 37% of all calls recorded at the Project in 2010. The majority of calls recorded on these two nights were from the Low Frequency Unknown ("LFUN") and Hoary Bat ("HB") guilds. Because this level of activity occurred during the spring migration period, did not persist into the summer resident period, and was limited to a single met tower, it is likely that this activity can be attributed to foraging activity by transient individuals stopping in the area for a short period of time during migration, and can therefore be considered outliers. When these two nights are removed from the dataset, the overall detection rate for 2010 drops from 6.4 calls to 5.0 calls per detector night. However, overall detection rate remains low in 2010 whether the outlying nights are included or removed from the dataset.

Species composition was very similar between 2009 and 2010. High and Low Met tower detectors recorded primarily low frequency echolocation calls from the Big Brown- Silver-haired Bat ("BBSH") and HB guilds, which include two long-distance migratory species (hoary bat and silver-haired bat) and the big brown bat. High frequency echolocators (bats in the genus Myotis along with tri-colored bats and red bats) were recorded most often at the tree detectors. This trend has been observed in several similar studies conducted at other proposed wind energy Projects in the northeast. *See* Appendix 32, page 98 and Appendix B, Table 1 of Appendix 48. Detectors at higher altitudes may often record lower detection rates because bats do not remain in those areas

for long periods of time. Detectors in and around canopy height often detect foraging individuals passing by the detector multiple times, often resulting in a higher detection rate. Long-distance migratory species are more likely to be recorded at detectors deployed above canopy height.

The 2009 and 2010 surveys were similar, recording similar rates of calls and similar species. Therefore, the risk assessment remains the same. The assessment relies upon the results of on-site surveys as well as known patterns of pre-construction survey results in the Northeast and known patterns of bat mortality at operating facilities. Acoustic activity rates in both years were low, but known patterns of bat mortality at existing wind facilities indicate that mortality will likely occur, particularly to long-distance migratory species. Therefore, the risk assessment (which uses the Weight of Evidence Model) concludes that there is a moderate risk to bats at Groton. *See* Appendix 28. However, as noted above, when comparing pre-construction surveys of the Groton site to a number of publicly available pre-construction acoustic bat surveys at other proposed wind projects in the northeast, bat activity at Groton falls within the low to middle range.

Q. The prefiled testimony of Trevor Lloyd-Evans asserts that, absent the 2010 survey results, it is not possible to draw a final conclusion of the quality of on-site field surveys. Do you agree with this statement?

A. I don't agree with this statement as it relates to birds. At the time of Mr. Lloyd-Evans' review of the Project's Application, Stantec had completed all surveys

pertaining to birds and those surveys provide the necessary information to draw a final conclusion of the quality of field surveys addressing birds. However, Stantec had not completed its report on the 2010 acoustic bat surveys prior to Mr. Lloyd-Evans' prefiled testimony. The 2010 acoustic bat surveys were completed by August 18, 2010, and following data analysis a report was submitted in October 2010. This report is attached to the Project's supplemental application as Appendix 48.

Q. Do you have any comments on the prefiled testimony of Trevor Lloyd-Evans regarding his assertions that on-site raptor survey results did not appear to be a factor in the conclusion of minimal impact to raptor species?

A. Yes. Mr. Lloyd-Evans asserts that on-site raptor survey results did not appear to be a factor in the conclusion of minimal impact to raptor species. This statement is inaccurate. As described on page 13, table 3-1 of the Bird and Bat Risk Assessment (Appendix 28), two assessment endpoints were evaluated: potential collision mortality of resident and migratory raptors and potential habitat loss or displacement of raptors. For the assessment endpoint of potential habitat loss or displacement of raptors from the Project, a literature review and general habitat characterization were used. Based on a combination of the information sources described above, a low magnitude of impact to raptors as a result of the construction and operation of the Project was predicted. *See* Appendix 28. Additionally, in 32 post- construction studies conducted at operating wind projects in the eastern United States, forty-six raptor fatalities have been documented, with the majority of these being red-tailed hawks and turkey vultures, some of the most common species in the region. Of these fatalities, only three raptors were

reported in four studies in New England with no raptor fatalities reported at the nearby Lempster Wind Project during two years of monitoring. Migrating raptors have not been demonstrated to be at significant risk of colliding with wind turbines. Even at raptor migration sites where there are a great abundance of raptors, fatality rates have been low, suggesting abundance or raptor passage rates of migrants are not precise predictors of a project's post-construction mortality risk.

Q. Do you believe that post-construction avian and bat mortality and mitigation for those events have been adequately addressed?

A. Yes. Groton Wind has committed to one full year of post-construction monitoring similar to that conducted at the nearby Lempster Wind Project. This will provide the opportunity to identify actual impacts to birds and bats as a result of the Project and confirm the accuracy or reliability of the on-site field surveys and pre-construction Bird and Bat Risk Assessment conducted for the Project. If the first year results show higher mortality than the range of observed rates at other operational projects on forested ridgelines in the northeast then Groton Wind will conduct a second year of post-construction monitoring with specific focus on the factors that may have influenced such results. However, if after that first year of post-construction surveys, the Project's bird or bat mortality rates are within or lower than known ranges of mortality at other projects in the northeast, then Groton Wind will implement its yearly monitoring using onsite operations personnel for the life of the Project, as described in Iberdrola's corporate Avian and Bat Protection Plan. This is a reasonable plan given that there are no state guidelines for mortality thresholds at wind projects and because the state has

little information about bird and bat population numbers that either reside or migrate through New Hampshire, or on bird and bat mortality caused by sources other than wind projects (e.g., vehicle collisions, other tall structures, house cats, etc.) Thus, because mortality rates are studied at other operational wind energy projects in the region, data from those projects provide the most reasonable standard to follow at this Project.

Q. Do you have any comments on the prefiled testimony of James Buttolph on behalf of intervenor group Buttolph/Lewis/Spring regarding his assertions that HMANA protocols for raptor migration studies were not followed?

A. Yes. Mr. Buttolph argues that HMANA protocols were not followed during each day of survey and consisted of surveying from 9 am to 4 pm. That is correct: However, HMANA survey protocols are not appropriate for project-specific raptor surveys because HMANA survey protocols do not record the information necessary to best quantify potential risk from development. Like the HMANA protocol, the survey protocol followed at Groton required a qualified observer to pan the sky with binoculars from prominent locations within the Project area and to document all raptor species observed. The methods used for the study were provided to the New Hampshire Fish and Game Department ("NHFGD") and United States Fish and Wildlife Service ("USFWS") in a work plan for comment. No comments were received regarding raptor migration studies; however, those agencies recommended that Groton Wind consult with NH Audubon due to Audubon's experience conducting nest surveys at the Bear and Rattlesnake Mountain nests over the past several years, and because NHFGD regards NH Audubon as the state's expert regarding this species. Groton Wind, Stantec, and NH

Audubon collaborated to develop and implement a study to address use of the Project area by local peregrine falcons. *See* Appendix 47.

The critical variation of the Project's study from typical HMANA protocols was that for each raptor observed, the surveyor documented the raptor's flight path and the estimate of its flight height. Because flight paths and heights provide insight into the potential for collision risks, these data provide useful information for determining potential risk to these species from the Project. If HMANA protocols were strictly followed, this useful information would not have been collected. In addition, unlike past surveys conducted at proposed wind energy projects in the state, two observers were used at the Groton Project, rather than one, to ensure adequate coverage of the Project area ridgelines.

Unlike the intent of HMANA surveys, the purpose of the migration period surveys was not to census the migrating population of raptors traveling through the area, but instead to sample appropriate periods within a migration season, focusing on time periods when the greatest numbers of migrants are expected to move through the area. For the purposes of the raptor migration studies conducted at the Project, publicly available HMANA data were reviewed prior to conducting field surveys and were used to help predict appropriate timing of surveys based on past HMANA data in the region. These data helped target appropriate time periods to survey for species known to migrate through New Hampshire. These data were also used to compare to on-site survey results to determine how similar migration traffic was at the Project relative to these established HMANA hawk watch sites. This methodology has been accepted by state and federal

regulatory agencies and has become standard practice when conducting raptor migration studies at wind projects.

Q. Do you have any comments on the prefiled testimony of James Buttolph on behalf of intervenor group Buttolph/Lewis/Spring regarding his assertions that, raptor migration studies did not occur over the course of the entire migration period?

A. Yes. I disagree with Mr. Buttolph's assertions that raptor migration surveys must be conducted throughout the migration season and over the course of several years. As explained in Appendix 32 of the Project's Application, the 2009 raptor migration studies were conducted to investigate use of the proposed Project area by migrating raptors. These surveys were conducted to document diurnal raptor migration activity at a central and prominent location within the Project area and from two locations in the Project area and were intended to: document species of raptors that occur in the vicinity of the Project and document other raptor flight behaviors (e.g., turkey vultures or other diurnally migrating bird species) within or in the vicinity of the Project. Spring surveys occurred on 11 days between March 26 and May 23, 2009 and fall surveys occurred on 10 days between August 24 and October 26, 2009. In addition, Peregrine falcon use surveys were conducted in accordance with a workplan developed in collaboration with New Hampshire Audubon, at the recommendation of NHFGD. *See* Appendix 47. These surveys were conducted in the Project area during the summer resident period for peregrines and other raptor species from June 23 to September 10, 2009. Sampling occurred at the Project during periods within the year that raptors are

known to be most active, including Peregrine falcons, consequently, most species of raptors known to migrate through New Hampshire were observed during the course of the surveys.

Q. Do you have any comments on the prefiled testimony of James Buttolph on behalf of intervenor group Buttolph/Lewis/Spring regarding his assertions that radar surveys were not conducted throughout an entire night each night of survey, and the Project is located within a key migration corridor?

A. Mr. Buttolph's assertion that radar surveys were not conducted during appropriate time periods within each night of survey and that the majority of surveys were focused at times around midnight when most migrants are flying high is inaccurate. The average number of hours surveyed were 9 hours in the spring and 11 hours in the fall. *See* Appendix A, Tables 1-4 of Appendices 30 and 31 to the Application (hours of survey and radar surveys results per hour.)

Additionally, Mr. Buttolph asserts that the Project area is within a key migration corridor based on the orientation of the ridgelines. Birds that migrate over the Project area migrate in a very broad swath known as the Atlantic flyway. This region extends from the offshore waters of the Atlantic Coast west to the Allegheny Mountains and northwest to northern West Virginia and northeastern Ohio, where it continues into Canada and Northwest Territories, into the arctic coast of Alaska. Although the Project is within the Atlantic flyway, the data collected on site does not support statements that the Project is within a key migration corridor; in fact the results of the on-site radar and

raptor migration surveys were comparable or lower than similar studies conducted at other proposed wind energy projects in the northeast. This includes the Lempster Wind Project which documented higher passage rates during pre-construction radar surveys than the Groton Wind Project and documented low fatality rates during two years of post construction surveys. These studies were also conducted on north/south oriented forested ridgelines. *See Prefiled Direct Testimony of Adam J. Gravel,* pages 15- 17.

In spring birds, travel to their breeding grounds in a northerly direction, while in fall they fly in a southerly direction to their wintering grounds. Breeding grounds comprise a much wider land area east to west than wintering grounds. For this reason, the Project area is located within a much wider portion of the flyway than if it were located in the southern part of the country.

Q. Is there any additional information that you would like the Site Evaluation Committee to consider in this docket?

A. Yes. Since the filing of the Groton Wind Project's Application and my prefiled testimony in March 2010, results of post-construction fatality surveys at the nearby Lempster Wind Project have been reported. The report of the survey results is contained in Appendix 53. A summary of the report is as follows:

Year 1 of the post-construction fatality surveys at the Lempster Project occurred during two monitoring periods: between April 15 and June 1 in the spring of 2009 and between July 15 and October 31 in the fall of 2009. Four of the 12 turbines were searched daily and one met tower was searched weekly during the two monitoring

periods. Year 2 of the fatality surveys occurred between April 15 and June 1 in the spring of 2010; the fall survey period began July 15, 2010 and is currently ongoing. During Year 2 surveys, all 12 turbines and one met tower were searched weekly.

A total of nine birds were found during the 2009 searches, one of which was found during the spring period. An additional four birds were found incidentally. No state- or federally-listed bird species were found. Seven species of birds were recorded as fatalities, including magnolia warbler, Swainson's thrush, common yellowthroat, golden-crowned kinglet, ovenbird, red-eyed vireo and unidentified flycatcher. The seasonal fatality estimate for small birds in 2009 (calculated based on results of carcass searches, searcher efficiency trial and carcass removal trials, search plot area and visibility class) was 0.58 birds/turbine in spring and 5.51 birds/turbine in fall. In the spring of 2010, two birds were found: one golden-crowned kinglet and one American crow. No birds were found incidentally during the spring 2010 surveys. In the fall of 2010, a total of eight birds have been found to date.

No raptors were found during either of the 2009 or 2010 fatality searches.

A total of ten bats were found during the 2009 searches, one of which was found during the spring period. Half of the bird fatalities were found at one turbine, Turbine 1. An additional two bats were found incidentally. No state- or federally-listed bat species were found. Four species of bat were recorded as fatalities, including silver-haired bat, hoary bat, big brown bat and little brown bat. The seasonal fatality estimate for bats in 2009 (calculated based on results of carcass searches, searcher efficiency trial and carcass removal trials, search plot area and visibility class) was 0.70 bats/turbine in spring and

6.15 bats/turbine in fall. No bats were found during the spring 2010 fatality surveys. In the fall of 2010, a total of 17 bats have been found to date; 11 bats were found in September (hoary and silver-haired bats). These results show similar trends to other post-construction fatality searches and that the majority of fatalities observed occurred during the fall migration period.

The Lempster Project is located approximately 39 miles southwest of the Groton Project and is similar in elevation, land use, habitat, and the orientation of the ridgeline. Both the Groton and Lempster Projects are relatively low elevation forested ridges; the highest elevation found in the Lempster Project is approximately 2300' and the highest elevation in the Groton Project is approximately 2250'. Both project areas are managed for forestry products, and have experienced past and recent timber harvesting. The side-slopes of these project areas are dominated by varying age classes of northern hardwood forests and the summits of these project areas are dominated by red spruce. Due to the ecological similarities between the two sites, available habitat for passerines, raptors and bats at these sites is similar. In addition, the Lempster Project uses the same type of wind turbines as those proposed for the Groton Project. Based on the foregoing, it is expected that post-construction impacts to birds and bats at the Groton Project will be similar to those at the Lempster Project, which I would characterize as not unreasonably adverse.

Q. Does this conclude your testimony?

A. Yes.