STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

Petition of BNE Energy Inc. for a Declaratory Ruling for the Location, Construction and Operation of a 4.8 MW Wind Renewable Generating Project on Winsted-Norfolk Road (Route 44), Colebrook, Connecticut **Petition No. 984**

May 4, 2011

REBUTTAL PRE-FILED TESTIMONY OF DAVID TIDHAR

Q4. Mr. Tidhar, what information can you provide regarding a question asked by the CSC regarding the foraging distance and behavior of bats utilizing a hibernacula located near Winsted, Connecticut?

A4. Five of Connecticut's eight bat species overwinter in caves, mines, or buildings, hibernating for up to six months or more (Krukar 2005). These areas, known as hibernacula, are generally cool, moist, and dark, maintaining stable temperatures and humidity levels year-round. There is no suitable habitat on the Project site to support overwintering bats. The closest known hibernaculum to the Project site is located in Winsted. Other known hibernacula in Litchfield County are located in Morris, New Milford, Roxbury, and Terryville. Hibernacula are also located in Fairfield County and in Hartford County. In February and March 2005, CTDEP conducted winter bat surveys at Winsted and the other known hibernacula listed above (Krukar 2005). This survey was part of an ongoing, biennial survey conducted by CTDEP staff. These pre- White nose syndrome (WNS) era surveys generally resulted in similar census counts; for example, Winsted counts totaled 752 in 1999, 759 in 2001, 710 in 2003, and 780 in 2005. I was unable to locate more current data on hibernacula census of the Winsted hibernacula, however, the site likely suffered a decline since 2007/2008, particularly of little brown bat (*Myotis lucifiugus*), following the onset of WNS (CTDEP 2010). Of the six hibernacula surveyed by CTDEP in 2005, Winsted had the second highest number of bats (780) after Roxbury Mine (Krukar 2005). Four bat species are known to use the Winsted hibernacula: little brown bat, northern long-eared bat (*Myotis septentrionalis*), big brown bat (*Eptesicus fuscus*), and tri-colored bat (*Perimyotis subflavus*), previously known as eastern pipistrelle (Krukar 2005). Tri-colored, little brown and northern long-eared bat often cluster in hibernaculum (DeGraaf and Yamasaki 2001). In the Northeast, big brown bats also commonly overwinter in buildings and

attics, as they are able to tolerate colder temperatures than other hibernating bats (DeGraaf and Yamasaki 2001).

Bat movements in relation to hibernaculum may take two forms: 1) over-winter flights from the hibernacula, and; 2) migration movements between the hibernacula and summer range. During winter, apart from exogenous influences (eg, WNS), bats would likely only be flying in the winter to drink (there won't be any insects present) and/or to "stretch their wings" during normal periodic arousals. Lausen and Barcaly (2006) tracked winter active bats to roosts between 200 meters and 5 km from capture (drinking) sites. The figure below shoes the distance between the approximate location of the Winsted hibernacula (specific location information was not available to WEST) and the proposed Wind Colebrook project areas as slightly less than 5 miles (8.25 km) apart (as the bat flies to and from the town of Winsted). Could bats fly over the site during the overwinter period at this distance? Yes, they probably could. Would they? Probably not, unless it was the closest open water source available, and as the figure below demonstrates, that is not the case with numerous open water areas of much larger size located closer to the Winsted hibernacula than those present within Wind Colebrook .There may be no reason to suspect that winter flying bats from the hibernacula would fly over the Wind Colebrook site unless it was the nearest source of open water.

Migration movements of the four species which utilize the Winsted hibernacula vary (Kunz and Fenton 2003, DeGraaf and Yamasaki 2001). Evidence from the 2010 acoustic bat study at Colebrook South suggests that of the four possible species which use the Winsted hibernacula, three were detected during either the summer or fall migration period (see Table 7 from the final bat acoustic report below). Some individuals may breed within or near Wind Colebrook and migrate to and from Winsted hibernacula. The extent to which bats which utilize the Wind Colebrook project areas for summer range and migrate to and from the Winsted hibernacula is unknown, however, neither Colebrook South nor Colebrook North provide breeding habitat of better quality or in greater abundance than what is available in the surrounding landscape. The figure shown below illustrates landcover available within the immediate region (primarily to the Southeast). Neither Colebrook North nor Colebrook South contains a high proportion of woody or emergent wetlands relative to the surrounding landscape. Wind Colebrook is not thought to be situated within an area which may concentrate bats during spring or fall migration periods. Figure 8 from the 2010 Colebrook South bat acoustic report (shown below for easy reference) illustrates that fall migration activity (the period of the year when bats are most vulnerable to mortality from wind turbines) was substantially lower for all groups of bats compared with the summer period. Additional acoustic surveys are underway during the 2011 study year to provide further information on the temporal dynamics and extent of bat activity at both Colebrook South and Colebrook North.

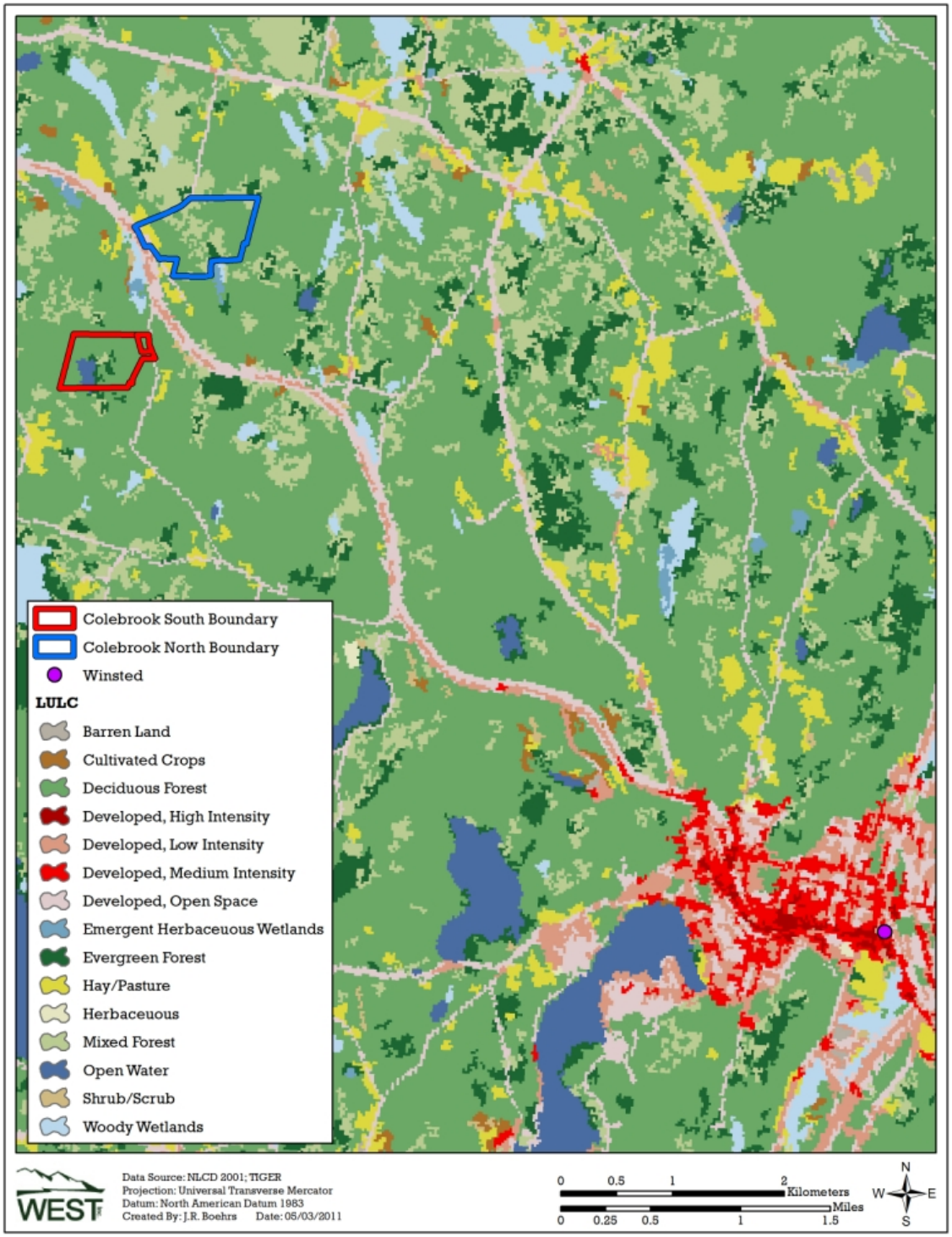
Colebrook South Boundary
Colebrook North Boundary
Winsted
LULC
Barren Land
Cultivated Crops
Deciduous Forest
Developed, High Intensity
Developed, Low Intensity
Developed, Medium Intensity
Developed, Open Space
Emergent Herbaceuous Wetlands
Evergreen Forest
Hay/Pasture
Herbaceuous
Mixed Forest
Open Water
Shrub/Scrub
Woody Wetlands
WEST
Data Source: NLCD 2001; TIGER
Projection: Universal Transverse Mercator
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Table 7. The number of detector nights (n) and percentage of detector nights with bat species identified during the maternity and migratory seasons at the CWRA.

	Maternity Season (n=7) August 4-August 15, 2010		Migration Season (n=23) August 16-November 1, 2010	
Species	**Detector Nights**	**% of Nights**	**Detector Nights**	**% of Nights**
Big brown bat	6	85.7	0	0
Eastern red bat	4	57.1	1	4.3
Hoary bat	6	85.7	1	4.3
Silver-haired bat	6	85.7	10	43.5
Little brown bat	0	0	1	4.3
Tri-colored bat	3	42.9	0	0

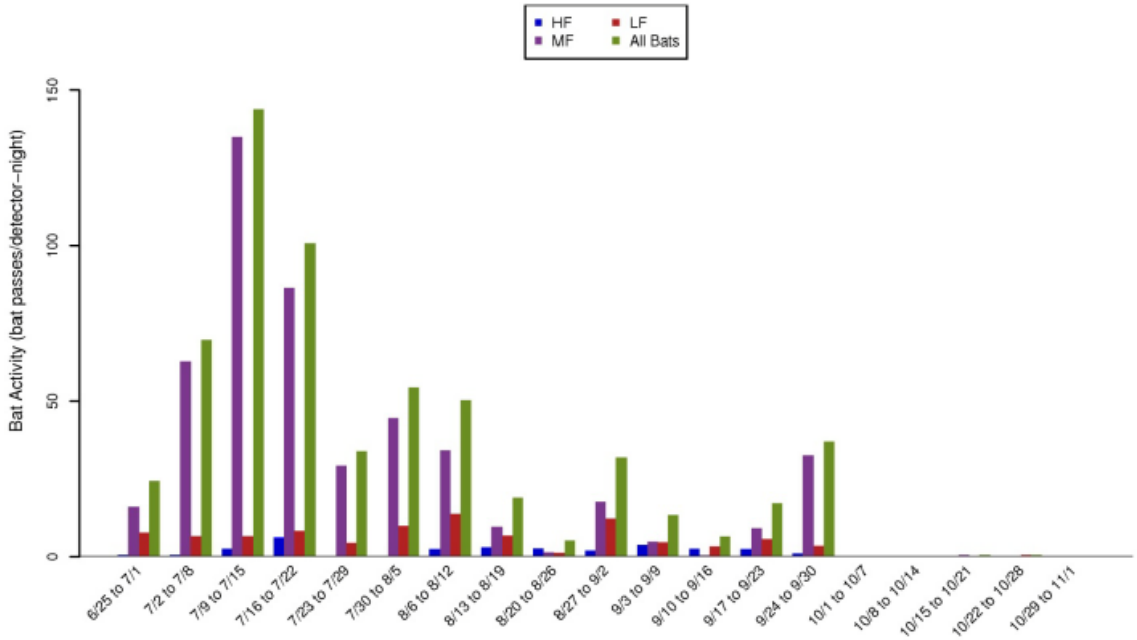
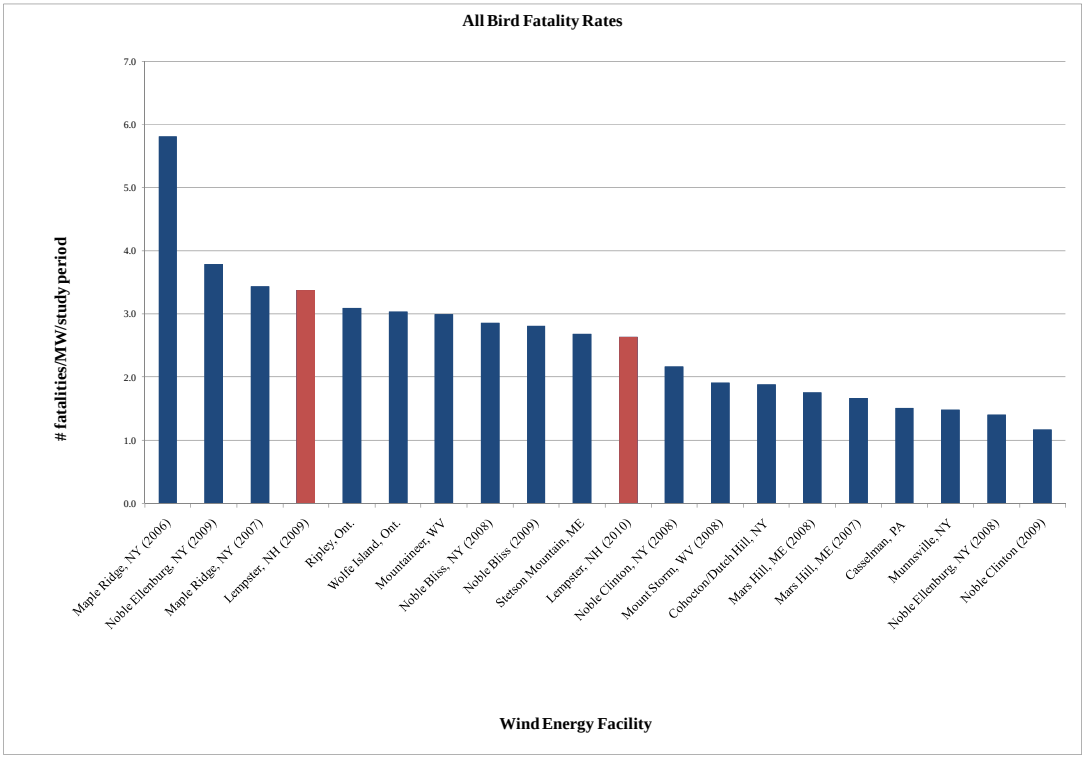


Figure 8. Weekly activity of high-frequency (HF), mid-frequency (MF), and low-frequency (LF) bats within the CWRA, June 25 – November 1, 2010.

Q5. Mr. Tidhar, do you have a response to testimony offered by Mr. Eric Davison in this proceeding concerning impacts of wind-energy projects to birds?

A5. The National Academy of Sciences report cited by Mr. Eric Davison dates from 2007 and refers to the mid-Atlantic region, not to the Northeast or New England. Knowledge about the impacts of wind energy to birds nationally and in the eastern US has been greatly informed since 2007, both in the mid-Atlantic as well as in the Northeast. The vast majority of the number of publically available reports of formal post-construction fatality studies available for review in the eastern US have been published since 2007, as illustrated in the figure below. What is also evident from these data is that for all birds, fatalities (as measured by the number of birds killed

per year per MW capacity) have been relatively constant and qualifiedly low to average relative to impacts observed in other regions. The figure shown below highlights the fatality estimates derived from annual studies completed at the Lempster Mew Hampshire Wind Project during 2009 and 2010. In addition, overall conclusions on the scale of impact to birds from wind energy remains qualified as being orders of magnitude lower than other sources of mortality such as windows, domestic cats, road collisions or tall lit communications towers (Erickson et al 2003, NWCC 2010). BNE Energy has committed to completing a two year post-construction monitoring study to determine whether fatality estimates for both birds and bats fall within regional and national ranges.



Q6. Mr. Tidhar, do you have a response to Mr. Scott Reynold's characterization of the Cape Vincent Wind Project?

A6. Mr. Reynold's has incorrectly characterized the Cape Vincent Wind Project as a "three turbine project adjacent to another three turbine project similar to Colebrook South and Colebrook North". The Cape Vincent Wind Project has been proposed as a wind project with a turbine array of between 60 – 90 turbines, depending on turbine technology, commercial considerations, permitting and other factors. The "adjacent" project Mr. Reynolds is referring to may be the proposed St. Lawrence Wind Project, which has been proposed as a 70+ turbine project immediately abutting the Cape Vincent Wind Project. Mr. Reynolds characterization of these projects is misleading and false.

Q7. Mr. Tidhar, do you have a response to testimony offered in this proceeding concerning guidelines for studying birds and bats at proposed and operating wind energy facilities?

A7. Guidelines have been developed by several states and the US Fish and Wildlife Service (USFWS) which provide frameworks for studying proposed wind-energy facilities as well as monitoring operating wind-energy facilities for impacts to wildlife, principally birds and bats. These guidelines include recommendations for wildlife study designs and methodologies; however, they are not, to my knowledge, documents of greater regulatory authority. Guidelines developed at the state level have generally been prepared by the primary state wildlife agency (e.g. the New York Department of Environmental Conservation, Pennsylvania Game Commission, etc.). Guidelines have numerous technical differences in both the scope and type of studies recommended. Guidelines include specific survey types reflecting landscape, habitats, and taxanomic groups of interest or concern to wildlife agencies and/or stakeholders. In addition, I note that the interim USFWS draft guidelines referred to in this proceeding were just released in February, 2011. Therefore, it would be impossible for BNE to have designed any of its studies to comply with these guidelines that did not exist at the time.

Connecticut currently lacks guidelines for the evaluation of impacts of wind energy facilities to wildlife. BNE Energy and it's wildlife consultant, WEST Inc., do not purport to assume the responsibility to craft such guidelines for the state. BNE Energy met with the CT Department of Environmental Protection in March, 2010 to discuss the BNE wind projects and specifically discuss protocol for the bird and bat studies to be undertaken. BNE Energy surpassed the level of work requested by the CT DEP at this meeting by completing breeding bird surveys in addition to the requested acoustic surveys for bats. Moreover, the CT DEP did not request that acoustic detectors be elevated on met towers at this meeting. Delay in initiation of the bat acoustic studies (which consequently missed the spring 2010 season) was a result of BNE awaiting response from the CT DEP as to the type of bat detector and scope of bat study requested.

Q8. Do you have a response to criticisms raised regarding the scope of work for both the bird and bat studies in comparison with regional state guidelines?

A8. The opposition has repeatedly attempted to characterize the level of biological investigation at the Project as failing to meet recommendations included in state guidelines found in neighboring states. This characterization is misleading. In comparison to state guidelines in New York, Maine and Pennsylvania, BNE Energy will exceed the temporal scope of acoustic surveys by a year for the critical seasons when impacts to bats occur (summer and fall) – BNE is completing a total of 1.7 study years pre-construction acoustic bat surveys compared with the recommendations included in these guidelines for one year of pre-construction surveys (a study year is typically considered April 15 – October 31). Moreover, BNE Energy has committed to

completing post-construction acoustic bat surveys coincident with fatality monitoring for two years, which meets these state guidelines requests. The use of a full spectrum bat detector to compile data on species composition of bats also exceeds the recommended study requests for bats in these guidelines. In terms of bird surveys, BNE Energy is completing spring and fall migration surveys and breeding bird surveys for a single study year, again, this level of effort meets these state guidelines. The methods and metrics used in the Project study follow closely recommendations included in some of these guidelines, though the surveys have been tailored to match the size and habitats of the Project. Because there are no state guidelines in Connecticut, this approach meets recommendations included in the draft federal USFWS Guidelines (2011).

Importantly, despite the small size of the Project, BNE Energy has completed, is in the process of completing, or has committed to completing, a Scope of Work for biological surveys greater than the level of work completed at most other facilities of similar size (or even those larger), to our knowledge.

Q9. Do you have any comments regarding compliance with the Draft USFWS Guidelines?

A9. The Draft USFWS Guidelines post-date (February 2011) the start of consultations made with the CTDEP (March 2010) and initiation and completion of wildlife surveys during year one (2010). These guidelines are Draft only and have not been finalized pending public comments and further internal review by the Department of Interior. Nonetheless, BNE has demonstrated compliance with terms of Tiers 1 through 3 of the guidelines. Despite Dr. Reynolds testimony, there is absolutely no reference within the guidelines to a "requirement" of elevating bat detectors. The guidelines repeatedly state that wildlife studies should be tailored to individual project conditions. Once again, it is important to note that this proposed Project is much smaller than the average operational commercial wind energy facility in the US today. Despite the small Project size, BNE Energy has completed, is in the process of completing, or has committed to completing, a Scope of Work for biological surveys greater than the level of work completed at most other facilities of similar size (or even those larger), to our knowledge.

Q10. Do you have a response to the criticism raised regarding the lack of spring bat acoustic data?

A10. Data on bat acoustic activity will be collected during spring 2011, as well as during two springs during the operational phase of the project. As previously mentioned, spring is not the period when most bat fatalities have been observed at operating wind energy facilities (see for example Tidhar et al 2010, Arnett et al 2010, NWCC 2010). While it is useful to collect bat activity information from the spring period, it is not, however, as critical a time period as the summer and fall for compiling a risk assessment.

Q11. Do you have a response to the criticism regarding the lack of mobile acoustic bat surveys?

A11. Dr. Reynolds criticized the lack of mobile acoustic surveys at the Project. Mobile acoustic surveys are recommended in New York State as a means to gather enhanced data on bat species composition and use of areas within a proposed project area which may not be adequately characterized through passive (fixed) stations. These objectives are tailored to the study of larger project areas which may encompass multiple habitat types and multiple features which support different communities of bats. The proposed Project is not large (only 3 turbines – we are not aware of any operational facility in New York of such a small size which has implemented the NYSDEC Guidelines), is located in a small extremely homogonous area, and important features for bats (e.g. wetlands) are being avoided through project planning. In addition, during the 2010 and 2011 acoustic surveys at the Project, WEST has used and is using a full-spectrum bat detector to gather enhanced data on species composition. Therefore, it is our opinion that mobile surveys would not actually provide a greater amount of information on bat use and bat species than via the current protocol.

Q12. Do you have any comments regarding the timeframe for WEST's study of bats and birds at the Project?

A12. The dates used to define particular seasons are based on general understanding of the phenology of reproduction and seasonal movements by bats in North America. For example, the maternity season for colonial insectivorous bats in North America may be considered to be the period from arrival at summer grounds up until the period when maternity colonies disband following weaning of the young. However, the timing of reproductive events may vary by several weeks in any given year or among individuals that comprise a maternity colony, depending on a number of external factors (eg, temperature (Wilde et al. 1999) and precipitation (Grindal et al. 1992)). The dates used to define particular seasons, therefore, are most appropriately considered approximations of reproductive progress, rather than precise markers of that progress. The USFWS defines the maternity season for Indiana bat to be May 15 until August 15, and this is the generally accepted period for other species as well.

Although the study extended to the end of October, only the interim report (June 25 to August 31) was available for review by Dr. Reynolds at the beginning of this proceeding process. The majority of the data presented in the interim report, therefore, was collected during the maternity season. However, the point of the study was not to characterize maternity season activity or migratory season activity exclusively. Instead, the goal was to capture the variation and differences in bat activity that occurred as the maternity season faded into migration. In the context of pre-construction studies at proposed wind projects, the period of greatest risk to bats occurs at the blurry interface between the end of the maternity season and beginning of migration season, a fact recognized by Dr. Reynolds in his pre-filed testimony. On page 4 Dr. Reynolds' quite correctly summarizes that "Temporal analysis of the mortality data show that most of this mortality [from wind turbines] occurs in the month of August…". The study dates for the Project were designed to capture this critical period as well as a substantial time before and after.

Although data for a much of the migration season were not available for the interim report, they are in the final report.

Comprehensive spring and fall migration surveys for birds, as well as additional breeding bird surveys, are being completed in 2011 based on comments received by the CT DEP in March 2011. Study dates and survey protocols have been submitted during previous supplemental testimony.

Q13. Do you have any comments concerning potential noise interference of bat detectors?

A13. Dr. Reynolds expresses concern about the calibration and sensitivity levels for the microphones, and that concern is based on what he considers to be a low number of noise files collected during the study. The basis for his concern appears to stem from the fact that monitoring times were apparently reported as 1700-0900, and that for projects that he has been involved with using similar techniques, noise files have comprised a higher proportion of all files than was reported in the interim report. We are confident that microphone calibration and sensitivity were set in accordance with standard accepted practices (eg, Arnett et al. 2007, Weller 2007, Stantec 2010).

Dr. Reynolds' assumption that there would have been a large number of noise files recorded based on the recording period going 1700 to 0900 hours each day. This is a reasonable assumption, as all of the files collected from 1700 to sunset and from sunrise to 0900 would have contained noise. However, files that were recorded more than ½ hour before sunset or ½ hour after sunrise were removed from the analysis pool before file counting occurred. Therefore a large proportion of the daytime noise was correctly excluded from counts. It is not clear whether noise counts from the studies referred to by Dr. Reynolds include the daytime noise collected well before sunset or after sunrise, though both common sense and Dr. Reynolds' experience with studies at wind projects suggest that they probably did not.

Dr. Reynolds also indicates that in his experience, "calls [*sic*] with clear bat activity usually fall within the range of 0.3% to 4.5% of total files." He does not provide a definition of what "clear bat activity" means to him, and he may have used a more conservative approach than we did when determining number of files with bat call activity. If so, he would have proportionally fewer files with bat activity and more files with noise. If so, this may help explain why bat activity was estimated to be lower at the projects that Dr. Reynolds cites in his pre-filed testimony.

A third explanation relates to the method used to protect the microphone from weather. During the study at the Project, microphones were encased in a PVC elbow with 45° bend. Recent testing has demonstrated that significant differences in the number and quality of recorded echolocation files can result from different microphone weather protection treatments (Britzke et

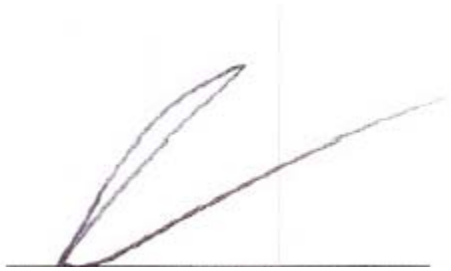
al. 2010). The two most commonly used weatherproofing treatments, BatHat reflector plate and PVC elbow, produced significantly different results, with the reflector plate faring poorly in terms of both call quantity and call quality. While we do not know what weather protection technique was applied in all the studies cited by Dr. Reynolds, the Maple ridge study cited on page 16 (Reynolds 2006), relied on reflector-plates to bounce the echolocation sounds to the microphone. If the other studies cited by Dr. Reynolds also relied on BatHat-style reflector plates, then one would expect that fewer files would have contained clear bat activity, and more files would have contained what appeared to be noise.

It is interesting to note that there was a trend for the PVC elbow protection used at the Project to produce more bat call files on average (albeit not statistically significantly more) than an unprotected microphone (Britzke et al. 2010). To the extent that the trend reflects real differences, it is possible that the PVC elbow blocked some of the wind noise that may have contributed to degradation of echolocation signals in the unprotected microphone. In any event, we do not believe that the perceived lack of noise files indicates incomplete sampling.

Q14. Do you have a response to concerns raised regarding species identifications of hoary and eastern red bat during acoustic bat surveys?

A14. Yes, we identified all LABO and LACI passes that were distinctive of those species. That we identified relatively few LACI within LF or LABO within MF, may reflect their actual relative abundance during the period covered in the interim report. Low rates of capture and detections of red and hoary bats in New England during summer are common in the published literature (eg, Reynolds and McFarland 2001, Reynolds 2006, Veilleux et al. 2008, Brooks 2011). For example, in central Massachusetts Brooks (2011) reported a mean of 1.98 bat call sequences per hour for eastern red, hoary and big brown bats, but estimated 93% of those sequences were from big brown bats, meaning that approximately 0.14 sequences per hour were by red and hoary bats. During his study period, mean night length was 8.9 hours. Therefore, during the maternity season in central Massachusetts, red and hoary bats were recorded at an average rate of approximately 1.23 passes per night. At Brooks' Old field site, the one most similar to the open meadow used at CWRA, the rate was approximately 2.2 passes per night, and these rates are similar to the rates recorded by Anabat at the CWRA.

Date: May 4, 2011



David Tidhar

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