TETRA TECH

September 24, 2013

Mr. Darrell Nitschke
Executive Secretary
North Dakota Public Service Commission
600 E. Boulevard Avenue, Department 408
Bismarck, ND 58505

SUBJECT: Thunder Spirit Wind Energy Project, Adams County, ND (Case No. PU-11-601)

Dear Mr. Nitschke,

On behalf of Thunder Spirit Wind, LLC, Tetra Tech is pleased to provide you 11 copies of the following documents as in support of the Application for a Certificate of Site Compatibility for the Thunder Spirit Wind Energy Project for filing in Case No. PU-11-601.

- Additional agency consultations

Please feel free to contact me at (617) 443-7552 or Tracey.Dubuque@tetratech.com if you have any questions.

Sincerely,

TETRA TECH, INCORPORATED

Tracey M. Dubuque, P.E.
Senior Project Manager

"VARIETY IN HUNTING AND FISHING"

NORTH DAKOTA GAME AND FISH DEPARTMENT

100 NORTH BISMARCK EXPRESSWAY BISMARCK, NORTH DAKOTA 58501-5095 PHONE 701-328-6300 FAX 701-328-6352

May 29, 2013

Tracey Dubuque, P.E.
Senior Project Manager
Tetra Tech Inc
160 Federal Street, 3rd Floor
Boston, MA 02110

Dear Ms. Dubuque:

RE: Thunder Spirit Wind Energy Project – Adams County, North Dakota
(Case No. PU-11-601)

The North Dakota Game and Fish Department has reviewed this project for wildlife concerns.

Our primary concern with wind power development is the disturbance of native prairie associated with construction of turbines, access roads, and other associated facilities. We ask that work within native prairie be avoided to the extent possible. This could include micro-siting turbines onto adjacent previously disturbed land, locating access roads on existing section line trails rather than across undisturbed native prairie, etc.

The National Wetland Inventory indicates various wetlands located within the proposed project area. We recommend that any unavoidable wetland impacts be replaced in kind, above-ground appurtenances not be placed in wetland areas, and no alterations be made to existing drainage patterns.

We also recommend that routine monitoring for avian and bat mortality be included as part of the facility maintenance plan for the life of the project. We would appreciate being kept informed as this project progresses, and if possible, we would like the GPS coordinates for each turbine after the site has been established.

Sincerely,

Steve Dyhe

(for) Greg Link
Chief
Conservation & Communication Division

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TETRA TECH

5/29

May 17, 2013

Mr. Terry Steinwand
Director
North Dakota Game and Fish Department
100 N. Bismarck Expressway
Bismarck, ND 58501-5095

RE: Application to the North Dakota Public Service Commission for Certificate of Site Compatibility for the Thunder Spirit Wind Energy Project in Adams County, North Dakota (Case No. PU-11-601)

Dear Mr. Steinwand:

Tetra Tech has been contracted by Thunder Spirit Wind, LLC to prepare an application for a Certificate of Site Compatibility, in accordance with Section 49-22-07 NDCC. The proposed Thunder Spirit Wind Energy Project (Project) would be constructed on up to 40 square miles of leased private property approximately 2 miles northeast of Hettinger, North Dakota. As currently planned, the Project would produce approximately 150 megawatts (MW) and would consist of up to 75 wind turbine generators as well as meteorological towers, access roads, underground collection lines, a substation, and operations and maintenance facilities. There will be one section of tie-line (less than a mile in length) connecting the Project substation to an existing substation located in the southwest corner of Section 31 of Township 130 North, Range 95 West. The proposed Project area shown in the attached figure is the primary focus of our investigation.

Per Section 69-06-01-05 of the North Dakota Public Service Commission (PSC)'s administrative rules, we are consulting with the North Dakota Game and Fish Department for assistance in identifying concerns or issues within the boundaries as shown on Figure 1 that would influence a decision regarding the use of the land, as well as applicable permits that may be required from your office.

This information will be used to help guide Project development in a manner that identifies and avoids impacts to sensitive resources where practicable. We have sent similar query letters to other agencies including, but not limited to, the U.S. Fish and Wildlife Service and the U.S. Army Corps of Engineers.

We have prepared a summary of biological information prepared to date for the Project for your review, attached as Appendix 1.

We would appreciate a response by May 31, 2013. Please contact me at Tracey.Dubuque@tetratech.com or (617) 433-7552 if you have any questions. Thank you for your assistance.

Respectfully submitted,

TETRA TECH, INC

Tracey Dubuque, P.E.
Senior Project Manager

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Summary of Thunder Spirit Wildlife Studies

May 2013

On behalf of Thunder Spirit Wind, LLC, Western EcoSystems Technology, Inc. (WEST) conducted two years of avian point count surveys, one season of sharp-tailed grouse surveys, one season of raptor nest surveys and two years of passive acoustic bat monitoring surveys within the proposed Thunder Spirit Wind Resource Area (Project) in Adams County, North Dakota in 2007 and 2011-2012 (Figure 1). The Project area has both grasslands and agricultural areas with limited wetland areas. The overall methodology and level of effort expended thus far to identify, avoid, and mitigate potential wildlife and habitat impacts is in accordance with the tiered approach described in the *Land-Based Wind Energy Guidelines* (USFWS 2012). In particular, the field work conducted in 2007 was intended as a Tier 1 Preliminary Site Evaluation, the more extensive and focused work of 2011-2012 as a Tier 2 Site Characterization effort, and ongoing studies to learn more about eagle use of the project area are in keeping with Tier 3 efforts (Field Studies to Document Site Wildlife Conditions and Predicted Project Impacts).

Avian Point Count Surveys

The first season of avian point count surveys were conducted at 20 locations within the Project area from 5 June 2007 to 29October 2007 (Derby et al. 2008). An additional year of avian point count surveys were conducted at 25 point locations within the Project area from 6April 2011 to 13March 2012 (Derby et al. 2013).Surveys were conducted in accordance with industry-standard due diligence avian survey protocol.In 2007, surveys were conducted biweekly, at approximately 14 day intervals, during the summer season (June 5 – August 10) and weekly, at approximately 7 day intervals, during the fall season (August 24 – October 29). The 2011-2012 surveys were conducted biweekly, at approximately 14 day intervals, during spring (March 15 – May 31) and fall (September 1 – November 15) seasons and reduced to once per month, at approximately 28 day intervals, during the summer (June 1 – August 31) and winter seasons (November 16 – March 14).

In the 2007 avian surveys, 57 avian species were observed during the avian point count surveys, including six species observed only incidentally to point count surveys (Derby et al. 2009). Four species dominated the observations, European starling, horned lark, ring-necked pheasant and western meadowlark, which accounted for 61.5 percent of all observations (Derby et al. 2009). Nine species of raptors were observed, including golden eagles (2 individuals). Golden eagle observations occurred during the fall surveys and the individuals were observed flying within the anticipated rotor-swept area (RSA; Derby et al. 2009). Fourteen sensitive species listed as North Dakota Species of Conservation Priority (including the golden eagle) were observed. No other threatened or endangered (T&E) species were observed during these surveys.

In the 2011-2012 avian surveys, 73 avian species were observed during the avian point count surveys, including five species observed only incidentally to point count surveys (Derby et al. 2013).Two species, sandhill crane and horned lark, accountedfor 53.5 percent of all observations with 7.1 percent of the horned larks and 95.6 percent of all sandhill cranes recorded flying within the anticipated RSA (Derby et al. 2013). These cranes were all observed among 4 flocks on a single day in April 2012. Eight species of raptors were observed, including golden and bald eagles (6 individuals and 1 individual, respectively). Golden eagles were observed in all survey seasons in 2011-2012 with four observations recorded flying within the anticipated RSA (Derby et al. 2013).The bald eagle was observed perched during the winter survey. Twenty-one sensitive species, listed as North Dakota Species of Conservation Priority,(including the eagles) were observed including the federal candidate species Sprague's pipit (Derby et al. 2013).One Sprague's pipit was observed during the spring point count survey while two other individuals were observed during the late spring as incidental observations. No other threatened or endangered species were observed during these surveys.

Sharp-tailed Grouse Lek Surveys

One season of sharp-tailed grouse lek surveys were conducted in spring 2011 (Derby and Thorn 2013).Three aerial transect surveys (fixed-wing plane) were conducted over a single nine-day period in late April-early May 2011. Surveys followed a protocol that is consistent with prairie-chicken aerial leks surveys, as described by Martin and Knopf (1981).The leks observed were defined as either confirmed (1 lek; observed courtship behavior during more than one surveys), probable (3 leks; observed courtship behavior during one surveys) and possible (1 lek; little to no courtship behavior but individuals observed in same general location during more than one survey)(Derby and Thorn 2013).

Five grouse leks were identified, including one confirmed lek, three probable leks, and one possible lek (Derby and Thorn 2013). The confirmed lek was located within the Project area in planted grassland habitat. Two of the three probable leks were located in native prairie habitat outside of the Project area while the third was within the Project area in alfalfa hay cropland (Derby and Thorn 2013). The one possible lek was located in an unknown grassland habitat type inside the Project area (Derby and Thorn 2013). The two leks outside the Project area were within the 1.6 kilometer (km; 1 mile) survey buffer (Derby and Thorn 2013)

Raptor Nest Surveys

Aerial and ground raptor nest surveys were conducted in spring 2011 (Derby and Thorn 2013). Aerial nest surveys were conducted within the Project area and 16.1 km (10 mile) buffer from a fixed-wing aircraft and, focused on potential nest structures for eagles. Ground-based raptor nest surveys were conducted concurrent to avian point count surveys.

Two active raptor nests were identified including one nest occupied by great-horned owls within the Project area and one nest occupied by Swainson's hawks approximately 1.2 km (0.75 miles) east of the Project (Derby and Thorn 2013). Although no eagle nests were identified during the aerial surveys, WEST requested a database review of known eagle nest locations within 10 miles of the Project area from USFWS. One known historic golden eagle nest approximately 5 miles west of the Project boundary was identified by the USFWS, but was not identified during the 2011 season.

Passive Acoustic Bat Monitoring Surveys

The first year of passive acoustic monitoring surveys was conducted from 23July to 15 October, 2007 with two ground-level AnaBat II (Titley™Scientific, Australia) ultrasonic bat call detectors placed in the southwestern and northwestern portions of the Project area; (Derby et al. 2008). A second year of passive acoustic monitoring surveys was conducted within the Project area from 25 May to 20 October 2011 using AnaBat SD1 ultrasonic bat call detectors (Derby and Sichmeller 2013). Incoming echolocation calls are digitally processed and stored by the detector. The integrated zero crossings analysis interface module (ZCAIM) produces a file that, when viewed in appropriate software (i.e., Analook®; 2008, C. Corben), displays digital sonograms of the echolocation calls that show change in frequency over time (Derby and Sichmeller 2013). Frequency versus time displays were used to separate bat calls from other types of ultrasonic noise (e.g.wind, insects, etc.) and to identify the call frequency classification and species (when possible) of bat that generated the calls (Derby and Sichmeller 2013).One pair of detectors was placed at a pre-existing meteorological tower in the southwest corner of the Project area with one unit placed near the approximate turbine rotor-swept area (50m) and another at ground-level. Two additional ground-level detectors were placed in suitable bat foraging habitat in shortgrass habitats near agricultural fields in the south-central and northwest sections of the Project area.

In 2007, detectors collected 126 bat passes, defined as a sequence of echolocation calls produced by an individual bat as indicated by at least two calls (pulses) with no pause between calls of more than one second (Derby et al. 2009).Overall bat activity was 1.13 bat passes per detector night, and the bat activity between detectors was relatively similar (1.0 bat passes per detector night at the northwestern detector, and 1.13 bat passes per detector night at the southwestern detector; Derby et al. 2009). Of the bat passes not identifiable to species, calls were mainly low frequency species, such as silver-haired bat, big

brown bat, Townsend's bat and hoary bat.Bat passes identifiable to species included the hoary and eastern red bat (Derby et al. 2009). Neither of the bat species identified to species are "Species of conservation priority," although both have been identified as fatalities at wind projects in North America.

In 2011, bat detectors were operational for approximately 82% of the survey period, and collected 406 bat passes (Derby and Sichmeller 2013). Overall bat activity was 0.78 bat passes per detector night, and the majority of calls were recorded at the ground-level detectors (364 bat passes; Derby and Sichmeller 2013). Of bat passes not identifiable to species, calls were mainly high-frequency bats, defined by report authors as *Myotis* species and eastern red bat.Of bat passes identifiable to species, hoary and eastern red bat were identified (Derby and Sichmeller 2013). Neither of these species are "Species of conservation priority," although both have been identified as fatalities at wind projects in North America.

Habitat Mapping

In 2011, WEST conducted a desktop habitat mapping of the Project area using 2004 GAP Land Data for North Dakota. In 2013, Tetra Tech conducted additional field reconnaissance to determine the location and potential impacts to any wetlands and to verify the condition of the grassland habitat features with respect to potential impacts to native prairie. This reconnaissance included additional information on the dominant plant species which were then used to identify grassland habitats that are pasture and hayfields from actual native prairie habitats. Project facilities are located on land parcels comprised of the following categories:

Vegetation Class	Acres*
Agriculture	7240.4
Developed Lands	193.6
Native Prairie	3727.9
Native Prairie/Hayfields	799.3
Pasture/Hayfields	2464.7
Road	137.2
Shrubs/Trees	42.2
Wetlands	269.5

*Acres calculation is comprised from the Wind Energy Facility Perimeter as shown on Figure 1.

ONGOING STUDIES

Helicopter Surveys for Eagle Nests

Because eagles were observed in all seasons during the 2011-2012 field effort, in 2013, WEST is implementing a dedicated eagle nest survey using a helicopter within the Project area and a surrounding 10-mile buffer area. Detection levels can be higher using this type of aircraft compared to a fixed-wing. WEST will also request another database search to determine whether eagle nests have been documented and reported since 2011.

Grassland Surveys

Thirty six turbines are currently sited in Native Prairie and Native Prairie/Hayfields based on the 2011 desktop survey. Current 2013 survey efforts are underway to update the current land use by refining and differentiate between actual native prairie and planted herbaceous grasslands such as hayfields and pastures for cattle. Hayfields and pastures are often planted with species that are introduced, such as smooth brome, crested wheatgrass, alfalfa and sweet clover although some plantings are native grass species. In addition to planted fields, smooth brome and other non-native species often invades into areas of native prairie and further degrades the value of the habitat for wildlife. It is also very likely that additional areas classified as grasslands may have been turned into agriculture or some other form of development since the 2011 desktop mapping. Updated land use may help further site Project features away from sensitive areas.

Bird and Bat Conservation Strategy

Thunder Spirit and WEST are currently developing a Bird and Bat Conservation Strategy (BBCS) that outlines the species of concern for the Project, how investigations were done to identify use of the area and results of those studies, what actions were done and will be done to avoid, minimize, and mitigate potential impacts, and what measures will be taken during the operation of the Project. This plan will include specific sections on golden eagles, Sprague's pipit, and sharp-tailed grouse but will also include other species of concern.

PSC Site Compatibility Permit Process

As part of the PSC process, Thunder Spirit will continue to gather information in order to arrive at a determination as to whether the location, construction, and operation of the proposed Project facilities produce minimal adverse effects on the environment and upon the welfare of the citizens of North Dakota. Also, Thunder Spirit will demonstrate whether the proposed Project iscompatible with the environmental preservation and the efficient use of resources. The application is currently scheduled to be submitted to the PSC inJune 2013.

REFERENCES

Derby; C., A. Dahl, and K. Seginak.2009. Baseline Wildlife Studies for the Two Creeks Wind Resource Area Adams County, North Dakota – Final Report: June 2007 – October 2007. Prepared for Two Winds, LLC.65 pp.

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Derby; C. and T. Thorn. 2013. Wildlife Baseline Studies for the Thunder Spirit Wind Resource Area, Adams County, North Dakota - Sharp-tailed Grouse Lek and Raptor Nest Report: Spring 2011.Prepared for Thunder Spirit Wind, LLC.10 pp.

Derby; C., A. Dahl, and S. Nomani.2013.Wildlife Baseline Studies for the Thunder Spirit Wind Resource Area, Adams County, North Dakota – Final Report: April 2011 – March 2012.Prepared forThunder Spirit Wind, LLC. 76 pp.

Martin; S.A. and F.L. Knopf. 1981. Aerial Survey of Greater Prairie Chicken Leks. WildlifeSociety Bulletin 9(3): 219-221.

USFWS 2012. Draft U.S. Fish and Wildlife Service Land-Based Wind Energy Guidelines. September 13, 2011. Available online at http://www.fws.gov/windenergy/docs/WEG_final.pdf, accessed February 2013.