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MISSOURI PUBLIC SERVICE COMMISSION
FILE NO. EA-2019-0181

WRITTEN REBUTTAL TESTIMONY
OF
DR. JANET HASLERIG
ON
BEHALF OF
MISSOURI DEPARTMENT OF CONSERVATION

July 12, 2019

DENOTES HIGHLY CONFIDENTIAL INFORMATION

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REBUTTAL TESTIMONY OF DR. JANET HASLERIG

MISSOURI DEPARTMENT OF CONSERVATION

CASE NO. EA-2019-0181

I. INTRODUCTION

Q. Please state your name, title and business address.

A. Janet Haslerig, Ph.D., Resource Scientist, Missouri Department of Conservation, P.O. Box 180, Jefferson City, Missouri 65102-0180.

Q. What are your qualifications and experience?

A. I have a Ph.D. in Wildlife Ecology and over 15 years of professional experience in wildlife conservation. I have served as the Bald Eagle Recovery leader for the Missouri Department of Conservation ("MDC") since October 2010 where I am responsible for the monitoring and recovery of bald eagle populations in the state.

Q. Have you testified previously before the Missouri Public Service Commission?

A. Yes. I have provided testimony in the following cases before the Public Service Commission ("Commission"): EA-2018-0202, EA-2019-0021, and EA-2018-0010. In those cases, Ameren Missouri ("Ameren") and Empire Electric sought approval of Certificates of Convenience and Necessity for wind farms in Schuyler/Adair, Atchison, and Lawrence/Jasper/Barton/Dade counties, respectively.

Q. Are you familiar with the application for Certificate of Convenience and Necessity ("CCN") filed by Ameren Missouri for the Outlaw Wind Farm?

A. Yes. I am familiar with the project proposal to construct a wind farm in Atchison County, Missouri known as the Outlaw Wind Farm ("Project"). I have reviewed shapefiles provided by Ameren designating the Project boundary, turbine locations, and raptor nests and have compared that information with data contained in the MDC's Natural Heritage Database, which indicates current and past locations of threatened and endangered species as well as species designated by MDC as Species of Conservation Concern ("SOCC") as described below.

Q. What is the purpose of your rebuttal testimony?

A. The purpose of my testimony is to respond to the Application for a Certificate of Convenience and Necessity filed by Ameren. The purpose of this testimony is to express concern that the Project poses a risk to bald eagles and other raptors in and around the Project area and to explain why the Commission should impose conditions on the Project related to mitigation and monitoring to ensure that the construction and operation of the proposed wind turbines do not adversely impact the state's conservations interests.

II. BALD EAGLE OVERVIEW

Q. Are bald eagles currently protected by federal or state law?

A. Yes, both. While bald eagles were removed from the federal Endangered Species Act list in June 2007, they remain federally protected by the Bald and Golden Eagle Protection Act, 16 U.S.C. 668-668c, and the Migratory Bird Treaty Act, 16 U.S.C. 703-712. These acts generally prohibit anyone, without a permit, from taking or disturbing bald eagles, including their parts, nests, or eggs. The bald eagle is also designated by MDC as a Species of Conservation Concern ("SOCC"). This state designated status and rank indicate the level of concern about the species and/or natural community continued existence throughout its range in Missouri. The bald eagle is currently listed as "S3" within the state – which means that it is vulnerable in the state due to a restricted range, relatively few populations or occurrences, recent and widespread declines, or other factors making it vulnerable to extirpation. As an SOCC, the bald eagle in Missouri warrants routine monitoring to assess the population status and to document the continual recovery of the species as well as detect any eminent or pending threats to its survival.

Q. Can you generally describe the life history of the bald eagle species?

A. The bald eagle is a North American species with a historic range from Alaska and Canada to northern Mexico. As many as 300,000 – 500,000 bald eagles once made their home on the continent in the 1700s. By 1963, less than 500 nesting pairs remained in the lower 48 states. Habitat destruction and degradation, illegal shooting, and the contamination of its food source, largely because of dichlorodiphenyl-trichloroethane ("DDT"), decimated the eagle population. Consequently, the United States Fish and Wildlife Service ("USFWS" or "Service") listed the bald eagle as endangered in all 48 contiguous states under the Endangered Species Act in 1978. With the enforced federal protection, bald eagles have recovered dramatically with about 10,000 nesting pairs in the lower 48 states. In 2007, the USFWS announced the recovery of our nation's symbol and removal from the list of threatened and endangered species.

Q. Can you generally describe bald eagles' life expectancy, habitat and behavior?

A. Bald eagles may live 15 to 25 years in the wild, and longer in captivity. Eagles mate for life, choosing the tops of large trees to build nests, which they typically use and enlarge each year. They may also have one or more alternate nests within their breeding territory. Breeding bald eagles (beginning in fourth or fifth year) typically lay one to three eggs once a year, and they hatch after about 35 days. Hatchlings usually fly within three

months and typically remain in the nest area for several months. The foraging area during the breeding season varies based on location and the abundance of food in the area. Until the fledgling learns how to hunt for food, they are dependent on the adults for food and will remain in the nest area for several weeks at which time they will follow the adults to foraging sites. In addition, it is well documented that fledged eagles typically return to the general vicinity (86-100 miles) of their nest area (natal dispersal distance) to breed once they have reached sexual maturity between the ages of four to five. Disease, lack of food, human disturbance, lead poisoning, electrocution, collision with vehicles or power lines kill many fledglings.

Q. Describe MDC's efforts in restoring, managing and protecting bald eagles.

A. MDC has invested and will continue to invest considerable resources in the restoration, management and protection of bald eagles. From 1981 to 1990, MDC, in cooperation with USFWS and the Dickerson Park Zoo in Springfield, released 74 young bald eagles in Missouri to reestablish them as nesters. The eaglets were obtained from captive breeding facilities or healthy wild populations and released in good nesting habitat at Mingo National Wildlife Refuge and Schell-Osage Conservation Area. Since 1990, MDC has opportunistically monitored the population of nesting bald eagles in the state. After the USFWS delisted bald eagles, MDC has systematically

surveyed nesting bald eagles under the USFWS post-delisting monitoring plan. This plan calls for states nationwide to monitor the status of bald eagles for a 20-year period. In 2006 (prior to the official delisting of the bald eagle under the ESA), MDC participated in the pilot study to test the effectiveness of the post-delisting monitoring protocol. Since then, MDC conducted statewide aerial and ground surveys in 2011, 2016, 2017 and 2018. The yearly estimated monetary cost of conducting aerial surveys is approximately $10,189 (helicopter only), not including staff hours.

Initiated in the spring of 2018, the Missouri Eagle Watch Program allows volunteers to contribute to science by collecting critical monitoring information necessary for the conservation and protection of bald eagles in the state. The Eagle Watch Program is a standardized and comprehensive eagle nest monitoring program using citizen scientists to monitor bald eagle populations and their productive status. To date, there are 70 volunteers in 46 counties observing 178 nests throughout the state.

Q. Why should the Public Service Commission consider these issues when issuing a CCN?

A. The bald eagle is a symbol of national significance. In 1782, a committee of the Continental Congress selected the bald eagle as our nation's symbol. At that time, there were an estimated 100,000 nesting pairs in the United States. By 1890, bald eagles were nearly eliminated as nesters in

Missouri, and by 1963, the bald eagle population was reduced to only 487 nesting pairs nationwide. Through increased protected, reintroductions and education spanning decades, the bald eagle population slowly increased. The bald eagle's recovery is one of the great conservation success stories in the United States. Although bald eagle numbers have increased from delisting in 2009, they are still well below historic numbers. Therefore, continued monitoring is critical to ensure a stable and increasing population. The public, through the MDC's Eagle Watch Program and "Eagle Days" events held throughout the state, are enthusiastically engaged in helping ensure that the bald eagle continues to thrive in the state. As an example, the 2018 Loess Bluff National Wildlife Refuge 40th Annual Eagle Days event hosted 5,120 visitors for the two-day event.

III. OUTLAW PROJECT IMPACTS ON BALD EAGLES AND OTHER RAPTORS

Q. Are you concerned about the impact of the Project on bald eagles? Why or why not?

A. Yes, I am concerned about the impact of the Project on bald eagles. Based on shapefiles and reports provided by Ameren in response to MDC data requests, as well as a review of the MDC's Natural Heritage Database, there are ***__*** known active or inactive eagle nests within the

Project boundary. However, Eagle and Raptor Nest Surveys provided by Ameren in response to MDC data requests, indicates there were ***[redacted]*** *See* Figure 1. ***[redacted]*** *See* Figure 1.

Because the Project's 2016 and 2017 Eagle and Raptor Nest Surveys did not adhere to the same study design (i.e., bald eagle nest survey area) between years, I am concerned that the comparison of results are misleading and fail to accurately describe the full extent of nesting bald eagles in the Project vicinity. ***[redacted]*** Moreover,

information obtained by MDC from Ameren related to the 2018 Eagle and Raptor Nest Survey did not specify how the survey was conducted and whether it was comparable to the 2016 or 2017 surveys.

With the growing concern of climate change and reducing energy dependency on carbon emitting fossil fuels[1,2] wind power generation is one of the fastest growing sources of alternative energy in the world.[3] Global wind energy production has continuously increased during the past 25 years, with an average of 25% growth each year and a world-wide total of 487 gigawatts of operating wind capacity in 2016.[4] In the United States, where total wind generation capacity stood at more than 97,000 megawatts at the end of the

[1] New, L., E. Bjerre, B. Millsap, M. Otto, and M. Runge. 2015. A Collison Risk Model to Predict Avian Fatalities at Wind Facilities: An Example Using Golden Eagles, *Aquila chrysaetos.* PLoS ONE 10(7):e0130978. DOI:10.1371/journal.pone.0130978.

[2] Miller, T., R. P. Brooks, M. Lanzone, D. Brandes, J. Cooper, K. O'Malley, C. Maisonneuve, J. Tremblay, A. Duerr and T. Katzner. 2014. Assessing Risk to Birds from Industrial Wind Energy Development via Paired Resource Selection Models. *Conservation Biology,* Volume 00. No. 0, 1-11. DOI: 10.1111/cobi. 12227.

[3] *See* n.2.

[4] Hallingstad, E., P.A. Rabie, A.C. Telander, J.A. Roppe, and L.R. Nagy. 2018. Developing an Efficient Protocol for Monitoring Eagle Fatalities at Wind Energy Facilities. PLoS ONE 13(12):e0208700. https://doi.org/10.1371/journal.pone.0208700.

first quarter of 2019,[5] capacity additions averaging 9,000 megawatts per year are expected through 2020, with additional expansion expected beyond 2020.[6]

Wind energy is perceived as a "green" alternative energy source,[7] but it is not impact-free [8] and has been referred to as one of the most controversial sources of green energy because of its direct and indirect impacts on wildlife, specifically birds and bats.[9,10]

According to the National Audubon Society, wind turbines and their associated infrastructure kill an estimated 140,000 to 328,000 birds each year

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[5] American Wind Energy Association. 2018. Wind energy facts. www.awea.org/windenergyfacts.aspx.

[6] Beston, J. A., J. Diffendorfer, Scott R. Loss, and D.H. Johnson. 2016. Prioritizing Avian Species For Tier Risk of Population-Level Consequences from Wind Energy Development. PLoS One (3): e0150813.doi:10.1371/journal.pone.0150813.

[7] *See* n.1, n.2.

[8] Beston, J. A., J. Diffendorfer, Scott R. Loss, and D.H. Johnson. 2016. Prioritizing Avian Species For Tier Risk of Population-Level Consequences from Wind Energy Development. PLoS One (3): e0150813.doi:10.1371/journal.pone.0150813.

[9] Ferrer, M., M. de Lucas, G.F.E. Janss, E. Casado, A. Munoz, M. Bechard, and C. Calabuig. 2011. Weak Relationship Between Risk Assessment Studies and Recorded Mortality in Wind Farms. Journal of Applied Ecology 49:38-46.

[10] Watson, R.T., P.S. Kolar, M. Ferrer, T. Nygard, N. Johnson, W.G. Hunt, H.A. Smith-Robinson, C.J. Farmer, M. Huso and T.E. Katzner. 2018. Raptor Interactions with Wind Energy: Case Studies From Around the World. J. Raptor Res. 52(1):1-18.

in North America.[11] Loss *et al.* (2014) concludes that associated power lines and towers, which carry the electrical power generated by wind turbines to the grids, kill an additional 8 to 57 million birds every year in the United States.[12] However, at best these are very rough estimates that are highly variable due in part to the lack of published and comparable studies or the general lack of rigorous monitoring and mortality reporting.[13]

Increasingly, estimates of raptor mortality at wind farms is the subject of intense effort and study.[14,15] Reportedly, diurnal raptors like bald eagles are relatively vulnerable to collision with wind turbines,[16] due in large part to

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[11] Bryce, E. 2016. Will Wind Turbines Ever be Safe for Birds. National Audubon Society. Chabot, Eric, and S. Slater. 2018. Evaluation of Wind-Energy Survey Protocols for Migrating Eagle Detection. Wildlife Society Bulletin 42(4):587-596; DOI:10.1002/wsb.934.

[12] Loss, S.R., T. Will and P.P. Marra. 2014. Refining Estimates of Bird Collision and Electrocution Mortality at Power Lines in the United States. PLoS ONE 9(7):e101565.doe.10.1371/journal.pone.0101565.

[13] American Wind Wildlife Institute (AWWI). 2018. Wind Turbine Interactions with Wildlife and Their habitats: A summary of Research Results and Priority Questions. Washington, DC.

[14] Hutchins, Michael. 2017. Wind Energy and Birds FAQ-Part 1: Understand the Threats Wind Energy Poses to Birds. American Bird Conservancy.

[15] *See* n.10.

[16] Chabot, E. and S. Slater. Evaluation of Wind-Energy Survey Protocols for Migrating Eagle Detection. 2018. Wildlife Society Bulletin 42(4):587-596; DOI:10.1002/wsb.934.

their morphology and foraging behavior.[17] The high vulnerability of birds of prey is especially problematic as many species occur at relatively low densities, most are long-lived and have slow reproductive rates.[18] Thus, a loss of breeding adults from fatal collisions has a greater effect on the population than on many other avian species.[19] Significant losses to raptors are exacerbated by wind energy projects located in or near major migratory routes, stopover sites, or key breeding or foraging areas.[20] Indirect impacts, such as disturbance, displacement from suitable habitat, or demographic effects due to fragmentation of habitat from pre-construction, construction, or operation and maintenance activities might result in the loss of productivity.[21] Serious disturbance or mortality effects could result in the permanent or long-term loss of a nesting territory. Disturbances near

[17] Gavin, J., C. Jennelle, D. Drake and S.M. Grodsky. 2011. Response of Raptor to a Windfarm. Journal of Applied Ecology, 48-199-209.

[18] *See* n.14, n.16.

[19] Mojica, E.K., B. Watts, and C. L. Turrin. 2016. Utilization Probability Map for Migrating Bald Eagles in Northeastern North America. A Tool for Sitting Wind Energy Facilities and Other Flight Hazards. PLoS ONE ll(6):e0157807.doi:10.1371/journal.pone.0157807.

[20] Pagel, J., K. Kritz, B. Millsap, R. Murphy, E. Kershner and S. Covington. 2013. Bald Eagle and Golden Eagle Mortalities at Wind Energy Facilities in the Contiguous United States. J. Raptor Res. 47(3):311-315.

[21] *See* n.8.

important eagle use areas or migration concentration sites might stress eagles so much that they suffer reproductive failure or mortality elsewhere.

Q. Are you concerned about the impact of the Project proposed in this case upon raptors other than eagles? And if so, why?

A. Yes, I am concerned about the impact of the Project on non-eagle raptors. During the Project's 2018 Raptor Nest Survey (which appeared to include 2016 & 2017 nest surveys), ***_____ _____*** *See* Figure 2.

Q. Do you have concerns about the impacts of this Project combining with the impacts from other wind projects in the area?

A. Yes. I am increasingly concerned about the potentially cumulative effects from industrial-scale wind projects (regulated and non-regulated) upon bald eagles in and near Atchison County. Including this Project, there are seven wind farms operating or in development in Atchison County with an estimated production of 1.147 gigawatts. *See* Campbell Rebuttal Testimony.

Although impacts from individual turbines may have negligible impacts on some raptors, the cumulative effects from multiple wind farms in the area on local eagle populations may be biologically significant and the

impacts should be estimated.[22] Acknowledging the importance of cumulative effects of potentially harmful development projects on birds and bats, such as wind farms,[23] should promote serious discussions to address conservation-oriented spatial planning at the state and federal levels.

Q. Are you aware of any technological advancements which could mitigate risk to bald eagles and other raptors?

Yes. A number of innovations have recently been released or are under development. IdentiFlight has developed an aerial detection system to detect eagles and protect them from collisions by selectively shutting down turbines. Other companies are producing ultrasonic acoustic deterrents which emit a loud, high frequency noise to discourage eagles from flying into wind farm airspaces and reduce the risk of injury and death associated with wind turbine collisions.

[22] *See* n.17.

[23] Vasilakis, D.P., D.P. Whitfield, and V. Kati.2017. A Balanced Solution to the Cumulative Threat of Industrialized Wind Farm Development on Cinereous Vultures (Aegyoius monachus) in South-Eastern Europe. PLoS ONE 12(2):e0172685.doi:10.1371/journal.pone.0172685.

IV. EAGLE CONSERVATION PLANS

Q. Ameren may develop an Eagle Conservation Plan in consultation with the USFWS, which will permit the incidental take of eagles under certain circumstances. Are you familiar with ECPs?

A. I am familiar with Eagle Conservation Plans ("ECP"), but I have not yet seen a draft copy of the plan described by Ameren. An ECP describes how the project developer or operator intends to comply with the regulatory requirements for programmatic permits under the Federal Endangered Species Act and the associated federal National Environmental Policy Act process by avoiding and minimizing the risk of taking eagles up-front, and formally evaluating possible alternatives in (ideally) siting, configuration, and operation of wind projects. Post-construction monitoring (i.e., disturbance and fatality monitoring) may be required by USFWS as a condition of an eagle programmatic take permit and will be required for wind-energy projects that may potentially take eagles.

Q. If Ameren obtains an ECP and an incidental take permit from the USFWS, will your concerns about eagles impacts from Project be eliminated?

A. No. At this point, we do not know if Ameren will apply for and obtain an ECP. Even if it does, MDC has and continues to invest substantial resources in the restoration, monitoring, and preservation of bald eagles, as

well as other raptors. MDC has an interest in knowing how many eagles and other raptors are killed by wind turbines, as well as how and where they are killed. MDC needs a greater understanding of how to protect eagles and other raptors from threats such as wind turbines. This understanding can help MDC in the process described by MDC witness Jennifer Campbell in working with project developers on any number of projects to ensure MDC is meeting the state's renewable energy standards but not ignoring conservation concerns in the process. The concern is that wind energy could nullify the significant investments by our state and its taxpayers in conservation efforts.

V. MDC RECOMMENDATIONS

Q. What does MDC recommend with respect to bald eagles and other raptors?

A. MDC is asking the Commission ensure that Missouri citizens' investment in conservation of bald eagles is protected by requiring an ECP as a condition of the Certificate of Convenience and Necessity. MDC further asks that the following conditions be imposed so that MDC can adequately protect, monitor and determine the impacts of the Project on the area's bald eagle and raptor population:

1. Require Ameren to obtain an ECP from the USFWS for the project;

2. Prohibit Ameren from clearing any known occupied/active or inactive eagle nest trees;

3. Require Ameren to conduct post-construction monitoring of eagle fatality and disturbances in accordance in USFWS Guidance. Fatality monitoring efforts involve searching for eagle carcasses beneath turbines and other facilities to estimate the number of fatalities. Disturbance monitoring will determine post-construction territory or roost occupancy rates, nest success rates and productivity;

4. Require a minimum one-mile set-back from (or buffer around) known active and alternative (present and future) eagle nests within the Project area where turbines cannot be constructed or operated;

5. Require one year of post-construction monitoring for non-eagle nests located within one mile of turbines;

6. Report to MDC all eagle carcasses observed within 48 hours via email identifying the date, turbine location (UTMs), species, and sex;

7. Report to MDC observed mortalities for (a) all raptors and (b) bird species of conservation concern ("SOCC") observed annually by December 31, identifying the date, turbine location (UTMs), species, and sex; and

8. Provide a good faith effort to invest in improved methodological research and future technological advancements (i.e., IdentiFlight, acoustical deterrents, etc.) to aid in curtailing wind turbines before collisions occur, specifically in high risk areas of the Project area.

Q. Does this conclude your rebuttal testimony?

A. Yes.

Figure 1: ***_____

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Figure 2: ***_____***

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BEFORE THE PUBLIC SERVICE COMMISSION OF THE STATE OF MISSOURI

In the Matter of the Application of Union Electric Company d/b/a Ameren Missouri for Permission and Approval and a Certificate of Public Convenience and Necessity Under 4 CSR 240-3.105.	))))	Case No. EA-2019-0181

AFFIDAVIT OF DR. JANET HASLERIG

STATE OF MISSOURI)
) ss
COUNTY OF COLE)

Dr. Janet Haslerig, being first duly sworn on her oath, states:

1. My name is Dr. Janet Haslerig. I work in Jefferson City, Missouri, and am employed at the Missouri Department of Conservation as a Resource Scientist.

2. Attached to this affidavit and made a part hereof for all purposes is my Written Rebuttal Testimony (testimony) on behalf of Missouri Department of conservation. The testimony is 22 pages and has been prepared in the appropriate format to be introduced into evidence in the case above.

3. I hereby swear and affirm that my answers contained in the attached testimony to the questions promulgated therein are true and correct.

DR. JANET HASLERIG

Sworn to and subscribed before me this 12th day of July, 2019

Notary Public

My commission expires: November 24, 2021

LAURA M. STICKANN
Notary Public - Notary Seal
State of Missouri
Commissioned for Cole County
My Commission Expires: November 24, 2021
Commission Number: 13551367