BEFORE THE
PUBLIC SERVICE COMMISSION OF WISCONSIN

Joint Application of American Transmission Company, ITC Midwest LLC, and Dairyland Power Cooperative, for Authority to Construct And Operate a New 345 kV Transmission Line From the Existing Hickory Creek Substation in Dubuque County, Iowa, to the Existing Cardinal Substation in Dane County, Wisconsin, to be Known as the Cardinal-Hickory Creek Project	)	5-CE-146

DIRECT TESTIMONY OF CURT MEINE
ON BEHALF OF
DRIFTLESS AREA LAND CONSERVANCY
AND WISCONSIN WILDLIFE FEDERATION

INTRODUCTION

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

A: My name is Curt Meine. My mailing address is P.O. Box 38, Prairie du Sac, WI 53578. I am a conservation biologist, environmental historian, and writer. Although primarily self-employed, I serve as a senior fellow at the Aldo Leopold Foundation in Baraboo, Wisconsin and at the Center for Humans and Nature, which is based in Chicago. I am also a Research Associate with the International Crane Foundation in Baraboo and an Associate Adjunct Professor in the Department of Forest and Wildlife Ecology at the University of Wisconsin-Madison.

Q: Please summarize your relevant education, background and experience.

A: I received a bachelor's degree with a major in English and History from DePaul University (1980); a master's degree (M.S.) in Land Resources from the University of Wisconsin-Madison (1983); and a Ph.D. in Land Resources from the University of

Wisconsin-Madison (1988). Over the past 30 years, I have worked as a consulting conservation biologist and scholar with nonprofit organizations, businesses, and state and federal agencies. I have worked at the local, state, national, and international level on a wide variety of conservation projects, primarily involving biodiversity conservation planning and the cultural dimensions of conservation efforts. I served on the board of governors of the Society of Conservation Biology from 1995 to 2002; on the editorial board of the journal *Conservation Biology* from 1993 to 2012; and on the editorial board of the journal *Environmental Ethics* from 1997 to 2007. I regularly serve as a reviewer for publishers (including the University of Wisconsin Press), particularly on books involving conservation and environmental history, ethics, and policy.

I have been an affiliated with the University of Wisconsin-Madison for more than 25 years, and (as noted above) I am currently an adjunct associate professor. I have taught courses in conservation history and environmental literature and have guest lectured regularly in the University of Wisconsin System and at other universities in Wisconsin and beyond. I have written or edited eight books and published more than 150 peer-reviewed articles, essays, book chapters, encyclopedia entries, reviews, and other items. My writing largely involves themes at the intersection of history, culture, and conservation; biodiversity conservation, sustainability, and ecological restoration; conservation and environmental history; environmental ethics and literature; the life and legacy of conservationist Aldo Leopold; and various conservation projects to which I have contributed. At home in Sauk County, Wisconsin, I work and volunteer regularly on land conservation and restoration projects involving local public, private, and tribal (Ho-Chunk Nation) lands. In particular, I have been involved for twenty-five years in the

collaborative efforts to protect and restore the lands of the former Badger Army Ammunition Plant on the eastern edge of the Driftless Area.

Q: Would it be fair to say that you are a leading authority on the Driftless Area?

A: I am comfortable with that description. I have lived and worked in and near the Driftless Area for most of the last thirty-five years. I currently reside in the Driftless Area near its eastern boundary in Sauk County, Wisconsin. My work has taken me regularly and often to landscapes, waterways, watersheds, and communities in all portions of the Driftless Area. I have written on, about, and from the Driftless Area many times. The Driftless Area figured importantly in a documentary film to which I contributed, *Green Fire: Aldo Leopold and a Land Ethic for Our Time* (2011). In 2017 I co-edited *The Driftless Reader* (University of Wisconsin Press), a collection of readings and images from and about the Driftless Area. The volume aimed to provide a diverse and comprehensive portrait of the area, its natural and cultural history, and its places and peoples, based on the unique character of its landscape.

Q: What is the purpose of your testimony?

A: I am providing expert opinion on the special importance of the Driftless Area. My testimony highlights the unique and distinct qualities inherent in the Driftless Area's natural, scenic, and cultural landscape, and the values that are placed at risk by the proposed Cardinal-Hickory Creek transmission line project. I do wish to make it clear that my testimony reflects my personal and professional knowledge, experience, and views, and not those of any of the organizations with which I am affiliated.

Q: Please summarize your testimony.

A: My testimony: (1) describes the unique quality and characteristics of the Driftless Area, with particular attention to the route(s) of the proposed Cardinal-Hickory Creek transmission line; (2) discusses the importance of its cultural, historical, and natural assets; (3) identifies aesthetic, cultural, economic, and environmental qualities and values that the proposed transmission line and high towers will impact; (4) considers the effectiveness of mitigation measures proposed by the Applicants; and (5) discusses the impacts from other transmission lines. A large portion of my testimony addresses gaps and lapses in the Draft Environmental Impact Statement ("DEIS"), focusing on four areas of concern: biological diversity; cultural and historic resources; scenic and aesthetic values; and a more specific issue involving potential groundwater impacts. Finally, I comment on the statutory standards for siting transmission lines.

My testimony makes and elaborates on the following specific points:

- The proposed high-voltage transmission line and very high towers will have undue adverse impacts on the environmental values of the region. The project will have significant and wide-reaching negative, harmful impacts on historical, ecological, recreational, scenic and aesthetic resources in the Driftless Area, which is a distinctive and unique region highly valued for these and other natural resources.
- The proposed high-voltage transmission line and towers will also unreasonably interfere with existing land use and development plans in the Driftless Area, a region in which the communities and economies depend on the health and vitality of the landscape, and in which the rural and scenic character of the area is prized by residents and tourists alike.

- The proposed mitigation measures are inadequate and do not meaningfully minimize the environmental impacts, especially as many such measures are vague and nonbinding, and effectiveness of specific mitigation measures cannot be evaluated in the absence of a meaningful analysis of cumulative impacts, including the impacts from other high-voltage transmission lines recently constructed in the area.
- The Draft EIS lacks adequate and verifiable information to support informed decision-making and fails to meaningfully discuss cumulative impacts for an expansive transmission line project that by definition involves a large landscape.

Q: What information and/or documents did you review in preparing this testimony?

A: I have reviewed many of the pertinent documents, including: the application to the PSCW and WDNR for approval of the proposed transmission line (Ex.-Applicants-Application); the PSCW/WDNR Draft Environmental Impact Statement (PSC REF#: 360500); various submitted comments related to the application and the DEIS; and direct testimony (Direct-ATC-Lee) and other materials related to the application. I closely reviewed the maps of the proposed preferred and alternative transmission line routes. On three occasions in March and April 2019, I made trips to trace and observe the preferred and alternative routes. Although I was already quite familiar with many segments of the proposed routes, I did so in order to gain more complete on-the-ground understanding of the specific locations and landscapes that the powerline would affect.

Q: Are you sponsoring any exhibits?

A: Yes, I am sponsoring the following exhibits.

Ex.-DALC/WWF-Meine-1: Curriculum Vitae of Curt Meine

Ex.-DALC/WWF-Meine-2: Scoping Comments of Curt Meine on the Proposed Cardinal-Hickory Creek Transmission Line

Ex.-DALC/WWF-Meine-3: Comments of the U.S. National Park Service on PSC/DNR DEIS

Ex.-DALC/WWF-Meine-4: Comments of Dr. Joy Zedler on Federal DEIS

Q: Please briefly describe why the Driftless Area is a unique world-class natural resources protection area.

A: The term "Driftless Area" refers to the region of the Upper Mississippi River Basin and the Upper Midwest that largely escaped the impacts of the repeated episodes of glaciation during the Pleistocene Epoch (going back 2.5 million years). Over this period, the continental ice sheets repeatedly advanced and retreated, surrounding but never covering the Driftless Area. Because the glaciers "missed" this region, it lacks the *drift*—the boulders, rocks, gravels, sands, silts, and clays that glaciers leave behind in glaciated landscapes as they melt back. Having been spared the scraping and filling that the glaciers brought to the surrounding landscape, the region stood out, and stands out now, as an island of rugged ridge-and-valley topography amid the otherwise more level Midwest. It includes portions of present-day southwest Wisconsin, southeast Minnesota, northeast Iowa, and a small part of northwest Illinois. Although there are other "driftless" landscapes associated with the Pleistocene glacial front in North America, none is as large, prominent, or distinctive as the Midwest's Driftless Area.

The region's topography is characterized by distinctive outcrops of the underlying sandstone and limestone; thin topsoil with fine loess (or wind-blown) soils overlaying (to varying degrees) the parent sedimentary bedrock; a complex dendritic network of surface

waters (rivers, streams, springs, seeps, and riparian wetlands) and associated groundwater recharge and discharge zones. Prior to European settlement, the region's landscape supported a rich mosaic of southern hardwood forests, oak savanna, scattered prairies, floodplain forests and marshes, and other distinct plant and animal communities (including goat prairies, pine relicts, dry sand prairies, and algific talus slopes). The region's geology, soils, waters, plant and animal communities, fish and wildlife, scenery, and other natural features are widely appreciated and valued as critical ecological and economic assets.

Q. Please briefly describe why the Driftless Area is vitally important from a cultural, historical, aesthetic, and natural resources perspective.

A: As I noted in my submitted scoping comments (Ex.-DALC/WWF-Meine-1) on the proposed transmission line, "The distinctive Driftless Area landscape through which the proposed Cardinal-Hickory Creek Transmission Line will cut has been more than 450 million years in the making. There is nothing like it anywhere else in North America." The unique Driftless landscape has been home to diverse human cultures and communities dating back some 12,000 years. Native Paleo-Indian, Archaic, and Woodland culture peoples adapted to the changing post-glacial conditions over those millennia, and left legacies of distinctive rock and cave art and the region's globally significant concentration of effigy mounds. Native peoples of the region included the Ho-Chunk Nation (for whom of course the region is still home), as well as the Dakota, Sauk-Fox, Menominee, Ioway, Ojibwe, Potawatomi, Mescouten, Miami, and Kickapoo. Beginning with French trappers and missionaries in the 1600s, the region was soon

subject to exploration, colonization, settlement, and transformation by European immigration.

The communities of the Driftless Area remain in transition as demographics and economies change and new populations come into the region. The Driftless Area's unique and multi-layered cultural resources derive from and reflect its distinctive landscape. The land has fundamentally influenced all these varied human communities, which in turn have influenced the land that has supported them. The result is an ever-evolving cultural landscape that is tied closely to, and has helped to shape, the contours and content of the natural landscape. As I noted in my earlier submitted comments, the "deep layers of natural and cultural history [of the Driftless Area] provide the foundations upon which the diverse human communities of the Driftless are now developing new ways to coexist with and within this ever-changing landscape. As distinctive as the landscape is, so too is the culture of innovation and creativity that has taken hold here, inspired by the land's geological, ecological, and aesthetic qualities." These cultural assets including everything from the region's scenic vistas, characteristic agricultural mosaic, and architectural legacy to its rapidly emerging local food culture, Amish communities, and network of robust small and independent businesses.

Over the generations, the Driftless Area has fostered a particular conservation culture in response to the vulnerability of the land and environmental degradation. Beginning especially in the mid-1800s, the Driftless Area was subject to widespread deforestation, the extensive conversion of its native prairies and savannas to agriculture, physical alteration of its surface waters, episodes of extreme soil erosion, and heavy exploitation of wildlife populations. Yet the region also became, and has remained, a

landscape of innovation, restoration, and recovery as new approaches to land conservation have taken hold. The region has played a disproportionately important role in the evolution of community-based conservation, watershed rehabilitation, ecological restoration, organic and conservation agriculture, and other creative approaches to individual and collaborative land stewardship.

In sum, as stated in my earlier submitted comments: "Driftless Area landowners have for generations been leaders in conservation, developing new ways to work on and with the land in ways that do not deplete, but regenerate, the resources that sustains us. Innovative farmers, food processors, business owners, artists, educators, service providers, and place-based entrepreneurs with a thousand different ideas have created an emerging Driftless economy that is as distinctive as the region's topography."

IMPACTS

Q: What types of harmful impacts would the proposed transmission line and very high towers impose on the Driftless Area and its resources?

A: The proposed transmission line places at risk a wide range of aesthetic, cultural, economic, scenic and environmental qualities and natural resource protection values that are distinctive to the Driftless Area in general, and to the proposed transmission line corridors in particular. These potential harmful impacts involve not only specific sites within and near the proposed corridors, but the Driftless Area as a whole. They entail not only discrete, short-term changes, but cumulative and long-term adverse effects. They include direct and indirect adverse impacts on the region's geological, ecological, historical, agricultural, recreational, and scenic assets.

Q: What is the basis for your opinion?

A: My opinion is based on my review of the transmission line application, the Draft Environmental Impact Statement, and associated background documents; on my visits to the proposed transmission line's preferred and alternative routes; and on my general familiarity with the Driftless Area's landscape and history.

Q: How would the proposed transmission line and high towers harm historical and cultural values and sites in the Driftless Area?

A: If constructed, the proposed transmission line and high towers would alter the historical and cultural character of the immediately affected landscapes, which it traverses and would detract from the distinctive landscape qualities of the Driftless Area in general. The transmission line and high towers would be an intrusive new element cutting across the southern half of the Driftless Area in Iowa and Wisconsin. The preferred route for the transmission line's eastern portion would run along several of its most used roadways, used by millions of residents of and visitors to the Driftless Area. This corridor, perched high along major ridgelines, currently provides travelers with uninterrupted and extensive views of the southern Driftless Area. The proposed transmission line's western portions would affect a large swath of less developed agricultural and forested landscapes of the Driftless Area in Wisconsin and Iowa. Together, these lands include well-known and recognized historical and cultural sites (such as Blue Mounds, the Military Ridge, and the Thomas Stone Barn); still not fully documented and protected Native American effigy/burial mounds and other prehistoric sites; and dozens of farmsteads and villages along the corridor that exemplify the unique quality of the larger Driftless landscape.

Q: How would the transmission line and high towers harm natural and recreational resources, including conservation easements and aesthetic values?

A: If constructed, the proposed transmission line and high towers would run through a landscape rich in natural and recreational resources, and one that boasts a remarkable array of conservation projects, programs, and properties. Some of these are specific protected conservation lands along and near the transmission line corridors: the Upper Mississippi River National Wildlife and Fish Refuge; state natural areas, wildlife areas, and fishery areas; state, county, and municipal parks; local, state, and national trail systems; five designated Important Bird Areas (IBAs); and important lands cared for by private conservation organizations.

This landscape also reflects the region's general conservation ethic, expressed in broad commitment to stewardship of the region's lands and waters. That ethic is reflected in efforts to protect and restore the many waterways, large and small, that dissect and define this portion of the Driftless Area; in the work of the many farmers and other landowners to restore and sustain the health, beauty, and productivity of the region's private "working" lands; and in the efforts of land trusts, conservation organizations, and resource management agencies to enhance the economic and environmental values of land through conservation easements, covenants, and collaborative land stewardship arrangements. This commitment is evident in the many conservation projects and properties located along the preferred and alternative routes of the proposed transmission line, such as the Military Ridge Prairie Heritage Area, the Pleasant Valley Conservancy, the Trout Creek and Black Earth Creek Fishery Areas, and the Ice Age Trail, as well as a

private lands protected by easements and managed under various state and federal conservation programs.

The tangible and intangible benefits of these investments in conservation, made over the generations, would be undermined by the multiple effects of the proposed transmission line and high towers. In addition, I have more specific concerns involving the potential impacts of the proposed transmission line and high towers on soils, groundwater, water quality, the spread of invasive species, and biological diversity generally. I will address these further in my testimony below.

Q: What is the basis for your opinion?

A: As noted above, my opinion is based on my review of the transmission line application, the Draft Environmental Impact Statement, and associated background documents; on my visits to the proposed transmission line's preferred and alternative routes; and on my general familiarity with the Driftless Area's landscape and history. In this case, however, my views are also informed by my own professional experience as a conservation biologist and historian working in the Driftless Area.

Q: Please briefly describe the harmful impacts that the proposed transmission line and high towers would have on land use, agriculture, and the local economy, including tourism impacts.

A: The communities and economies of the Driftless Area have always depended on the health and vitality of the landscape. In the past, environmental degradation has put those communities and landscapes at risk. Over the last several decades, however, the Driftless Area in general—and the portion of the Driftless Area through which the proposed transmission line would run in particular—has emerged as a creative hub for innovative,

place-based development, guided by a commitment to land stewardship and sustainability. Unlike many rural areas in the Unites States, the Driftless Area's primarily small-town and rural agricultural landscape has benefitted from residents who have worked to create a more resilient and localized economy that builds upon its abundant natural and cultural assets. (These include, to choose just a few examples, the Potosi Brewery, Meadowlark Organics farm, the Uplands Cheese Company, the Botham Vineyards, and the Black Earth Institute.) This in turn has also attracted tourists who appreciate and value the quality of the Driftless Area landscape—its beauty and diversity, its human pace and scale. These are increasingly rare attributes in our increasingly fast-paced, industrialized, and commodified world. The proposed transmission line and high towers would be an awkward and unnecessary new feature in a largely undeveloped landscape, detracting from the qualities that make it special, and reducing its attractiveness to residents and visitors alike.

Q: Please explain the basis for your opinion.

A: I base my opinion on my reading of the transmission line application, the Draft Environmental Impact Statement, and associated background documents; on my visits to the proposed transmission line's preferred and alternative routes; and on my general familiarity with the Driftless Area's landscape and history. In this case, I am also familiar with many landowners, food producers and processors, local land stewards and other individuals who have devoted themselves to enhancing the quality of the affected landscape over many years.

Q: Would the proposed transmission line and high towers adversely impact local land use and development plans? If so, how?

A: I am not familiar with the land use and development plans of all the local towns and municipalities along the proposed transmission line corridor. I am aware, however, of discontent in many of these local communities regarding the proposed transmission line, involving such concerns as preservation of natural areas and scenic beauty, impacts on agricultural operations, stray voltage, soil and water quality, biological diversity and wildlife, and noise.

A specific instance of local land use impact involves the eastern portion of the line where it affects the Ice Age National Scenic Trail and Cross Plains Unit of the Ice Age National Scientific Reserve. I found this of particular concern due to aesthetic and environmental impact of the proposed transmission line and high towers on the unique geological character of this area as one of the primary "gateways" to the Driftless Area along its eastern edge.

Q: What is the basis for your opinion?

A: I base this opinion on my familiarity with the area of the proposed transmission line, on conversations with individuals in affected communities, and by my reading of background documents in my preparation of this testimony.

Q: Please discuss the degree or severity and duration of these harmful impacts.

A: The most severe impacts of the proposed transmission line would be felt on the land and by those who are in the immediate path of the proposed transmission line, and these impacts would be felt for the lifetime of the powerline (and arguably well beyond that). The proposed transmission line's impacts on the Driftless Area's aesthetic, cultural, economic, and environmental assets would reach well beyond its local footprint and viewshed. As I have stated in my prior submitted comments: "Many have found in the

Driftless Area a place to create more sustainable ways to live, and to make a living, on the land, and to build a more resilient future for ourselves and for generations to come. All of this depends on the quality of our Driftless landscape and on our capacity as citizens to influence the decisions that shape it. The proposed Cardinal-Hickory Creek Transmission Line is a challenge to, and a test of, that quality and that capacity."

MITIGATION MEASURES

Q: Are the mitigation measures identified in the application adequate to minimize the adverse impacts of the transmission line and towers that you have identified?

A: No. In reading the application, I found few references to mitigation or remediation *per se*, and these primarily addressed mitigation involving affected infrastructure (railroads, pipelines, drainage tiles, center pivot irrigation, farm buildings, airports, etc.). Section 6 of the application ("Natural Resource Impacts") does go into further detail on measures to avoid and minimize impacts on forests, grasslands, wetlands, waterways, rare species and natural communities, and archaeological and historic resources. (Ex.-Applicants-Application-§ 6).

My primary concerns are that the mitigation measures are often described in very general terms and without any context of cumulative impacts. In multiple cases, mitigating actions are proposed "where practicable," "to the extent practicable," "when and where practicable." Without a definition of "practicable," this leaves me uneasy. For example, in its discussion of "Voluntary Conservation Actions" (subsection 6.5.3.2), the application states that "the Applicants will implement recommended avoidance and impact minimization measures when and where practicable in areas where these species

or their habitat are verified to occur." It is hard to understand the Applicants' intended actions based on such general and contingent statements.

Similarly, I find it difficult to assess the effectiveness of specific mitigation measures in the absence of some analysis and discussion of cumulative impacts. The cumulative effects of the proposed transmission line and high towers are not fully anticipated or addressed. For example, in the very brief subsection (6.9) on "Restoration," the application states that "Potential remedial actions will be site-specific and developed once these factors [involving the incidence of invasive species] are evaluated" (p. 137). At no point in the application, however, is there critical analysis of the potential long-term impact of the entire powerline on the spread of extant or new invasive species.

Q: Are there other avoidance, mitigation, or minimization measures, in addition to those proposed by Applicants, that should be used if the transmission line and high towers are constructed?

A: The proposed transmission line, if constructed, will have unavoidable adverse impacts. Some of these impacts, for example on the viewsheds and aesthetic quality of the transmission line corridor, could be avoided or mitigated through burying the transmission line, but that might create other adverse and harmful environmental impacts. (I understand that there are large cost differentials in burying transmission lines, but am not an expert in this area.)

Although the project application barely mentions it, the DEIS does note that utility rights of way "[i]f managed and restored appropriately (using native vegetation)" can have "a strong positive effect on native pollinator diversity and local abundance. In addition, much of the proposed project ROW either bisects or runs adjacent to

agricultural lands. Pollinator populations present in utility ROWs could benefit adjacent agricultural landscapes" (subsection 4.6.8.3. at p. 178). This potential positive, however, needs a much finer grained discussion to ensure that different native plant and pollinator species are encouraged at appropriate places *along entire powerlines*. Again, such benefits can accrue, and be most efficiently realized, only if planning occurs along the entire corridor.

IMPACTS FROM OTHER TRANSMISSION LINES

Q: Are you familiar with other high-voltage transmission lines recently built in southwest and central Wisconsin?

A: I am familiar with two other high-voltage transmission lines recently built in southwest and central Wisconsin: the Rockdale-West Middleton transmission line (placed in service in 2013) and the Badger-Coulee transmission line (placed in service in 2018). I travelled often along the majority of the length of both these transmission lines as they were being constructed, and have often travelled along them since their completion.

Q: Has the construction of these other high-voltage transmission lines and towers in Wisconsin had adverse impacts on natural and cultural resources?

A: Yes.

Q: What is the basis for your opinion?

A: I did not closely follow the proposals, applications, and permitting of these transmission lines. My observations are based solely upon my regular observations as an interested, conservation-minded citizen during their construction and since their completion. I live, work, and travel often within these transmission line corridors.

Q: Please briefly describe the most serious adverse, ongoing impacts created by those other transmission lines and towers.

A: The Rockdale-West Middleton transmission line follows the "Beltline" highway through and around the south and west sides of Madison. The visual impact along this heavily traveled transportation corridor is plain to all who use it and live nearby. This transmission line crosses, prominently, both the Upper Mud Lake marshes (Capital Springs State Recreation Area) and the University of Wisconsin-Madison Arboretum (well known as the "birthplace" of ecological restoration and recently added to the National Register of Historic Places). I have studied both locales at earlier stages of my career.

The Badger-Coulee transmission line follows the corridor of Interstate 90-94, skirting the northeast edge of the Driftless Area and cutting across the Driftless Area between Black River Falls to Onalaska, Wisconsin. Along the way, this transmission line traverses landscapes that include the headquarters of the Aldo Leopold Foundation and the International Crane Foundation (two conservation organizations that I have long worked with), as well as many other conservation sites.

As a conservation professional and a conservation historian—and as a local citizen—I am sensitive to the continuing environmental and aesthetic impacts of these transmission lines. It is not an easy matter, even to an interested citizen, to find out, for example: what mix of energy sources are using these transmission lines; what continuing monitoring and mitigation measures are being taken, and with what effects; what methods for reporting such results have been developed; what short-term and long-term effects were predicted in the planning phases, and which have come to pass so far; what

the economic costs and benefits have been, and to whom these accrue. In effect, we have many experiments now in building and operating high-voltage transmission lines in this region, yet the results of these experiments are not easily accessible.

Q: Will the proposed Cardinal-Hickory Creek transmission line and high towers cause cumulative adverse impacts to natural and cultural resources already impacted by existing transmission lines?

A: Yes.

Q: Please describe the nature and extent of these adverse cumulative impacts.

A: The adverse cumulative impacts of the Cardinal-Hickory Creek line and high towers have not been adequately described, and I am not aware of any description of the cumulative (and now accumulating) impacts of the other transmission lines that have been built, are now being built, and are proposed to be built in the future. The most obvious adverse impacts of the many transmission lines, as they proliferate, are the detrimental visual/aesthetic impact on the scenic landscapes of southern and western Wisconsin. These harmful impacts involve many of the transmission lines—although the impact is heightened in the unusually scenic portions of the Driftless Area. The other adverse impacts—on surface water and groundwater, on soils, on plant and animal species and ecological communities, on landscape fragmentation and connectivity, on agricultural landscapes and activities, on historic sites and other cultural resources—are more particular to each line. Different combinations of these assets are affected in different ways at different places. That, however, is all the more reason to undertake careful assessments of cumulative impacts. Landscapes and ecosystems can be resilient. But they

can also suffer, if not outright "death by a thousand cuts," continuing degradation by a thousand uncoordinated (and often unnecessary) alterations.

THE DRAFT ENVIRONMENTAL IMPACT STATEMENT

Q: Have you reviewed the Draft Environmental Impact Statement ("DEIS") prepared by the Department of Natural Resources and Public Service Commission for the proposed Cardinal-Hickory Creek transmission line?

A: Yes, I have.

Q: Does the DEIS adequately disclose negative impacts to the cultural and natural resources of the Driftless Area?

A: No. Having reviewed the DEIS, I have many general and specific concerns involving lapses, oversights, or emphases that make it, in my view, inadequate to provide a solid basis for sound decision-making. For the purposes of my testimony, I will focus on four areas of concern: biological diversity; cultural and historic resources; scenic and aesthetic values; and a more specific issue involving potential groundwater impacts.

Q: Please explain your concerns.

A: **1) Biological diversity**

Obviously, in a project of this size, in a landscape embracing so many special and critical elements of biological diversity, it is difficult to offer even a few summary comments on the details contained in the DEIS. My primary concerns involve: (1) the apparent lack of adequate and verifiable information on which the agencies may base to sounds decisions; and (2) the lack of information on cumulative impacts on a project that by definition involves a large landscape.

Scattered throughout the DEIS are statements that indicate that information is lacking, or not yet gathered, or not synthesized in a manner that would allow sound decisions to be made regarding impacts on the affected area's biological diversity. To choose just a few examples [emphases added]:

- Subsection 6.2.3 of the DEIS ("Grasslands") notes that "There *may be* areas of remnant prairie habitats not identified in the application… If the project is authorized, a review of grassland habitat in the approved ROW *should determine* if there are areas of remnant prairies…"
- Section 8, in providing analysis of the Eastern Routing Area, notes that: "Commission staff *are waiting on additional information* about potential mitigation options from the applicants regarding the high risk areas identified in the Avian Risk Review"; and that "If any additional easement or agreements exist, *they would be identified* during the easement acquisition process if the project is approved."; and that "…[f]or all of the areas mentioned above, the *applicants do not provide site specific information* on what would be done to minimize, avoid, or mitigate damage to grassland habitats, and specifically, any areas of remnant prairies."
- The proposed transmission line route would run through portions of the Southwest Wisconsin Grassland and Stream Conservation Area, including the Military Ridge Prairie Heritage Area. As the DEIS does note, this area's "95,000 acre grassland landscape contains more than 60 prairie remnants and is identified as the highest priority for landscape-scale grassland protection by the DNR" (p. 45). Yet the potential impacts on this prime grassland conservation area are afforded only a couple paragraphs in the DEIS. At one point, the DEIS notes that "[i]f the project is

approved and Eastern-South is selected, *detailed review would be required* to determine the extent to which the proposed route impacts grant-encumbered property. Such example do not offer confidence that the DNR and PSCW staff have had sufficient time to gather and organize the biological and ecological information required to make a fully informed decision on the application. Moreover, the Applicant has apparently not provided necessary and adequate information in order for the DEIS to fully inform a decision on the application.

Synthesis of such information is also required. That synthesis would include the cumulative impacts as described in my testimony above. A clear example of this, and one of the most consequential, from a biodiversity conservation standpoint, is the degree to which the proposed preferred and alternative transmission line routes would contribute to, or avoid, habitat loss and fragmentation. This is briefly discussed in subsection 4.6.8.2 and at scattered points elsewhere in the DEIS. However, there is no sustained, quantified, or comprehensive evaluation of habitat fragmentation and its harmful impacts, and no clear comparison of the proposed routes and their contribution to—or minimizing of—fragmentation.

2) Cultural and historic resources

As with critical elements of biological diversity, it is also difficult to summarize the adequacy of the DEIS in addressing the full range of cultural and historical resources. And the same concern arises: that the DEIS does not provide full or adequate information on which to base sound decisions. For illustrative purposes, I will focus on archaeological resources. The DEIS indicates at many points that key archaeological information is

lacking. At multiple points in subsections 6.2.8, 7.2.8, 8.2.8, and 9.2.8, recommendations are made for complete archaeological survey of sites. At subsection 10.2.8, the DEIS tabulates the archaeological and historic resources "that could be impacted by the proposed project…." Appendix J-2 ("Archaeological Survey of the Cardinal-Hickory Creek Transmission Line Alignment") also recommends additional investigations and surveys. The DEIS states, on page 220, that "Commission staff requested additional details from the applicants regarding potential impacts to [archaeological and historical] resources as well as mitigation options," but the response to this request is not provided. While having complete archaeological information may be an unattainable goal, it appears that much more survey work—and an analysis, once again, of *cumulative effects*—is essential to judging the adequacy of the project application and the DEIS.

Related to this, I am concerned that adequate consultation has not been carried out with Native tribal interests, in particular the Ho-Chunk Nation. The proposed transmission line routes are contained primarily within lands covered by treaties signed in 1829 between the United States government and the Ottawa, Potawatomi, and Ho-Chunk Nations. The Ho-Chunk Nation has a particularly strong commitment to the preservation and stewardship of remaining effigy/burial mounds, and actively stewards mounds in other portions of the archaeologically rich Driftless Area. The DEIS alludes six times to contacting the Ho-Chunk Nation. It is not possible to glean from these brief statements the nature of these contacts and consultation. (Was, for example, a representative of the Nation's Tribal Historic Preservation Office able to make site visits to the proposed transmission line routes? Are there plans for continuing consultation, regular collaborative visits, and protocols to resolve potential conflicts?)

In short, it does not seem possible to evaluate adequately the impacts of the proposed transmission line when the cultural and historical assets along the project route have not been adequately surveyed and inventoried, and when consultation with the Ho-Chunk Nation has seemingly been sporadic at best.

3) Scenic and aesthetic values

The scenic and aesthetic quality of the Driftless Area is widely recognized and, as the DEIS recognizes, strongly valued by residents of and visitors to the Area. The DEIS does discuss this important quality in subsections 4.5.1, 6.3.4, 7.3.4, 8.3.4, and 9.3.4. It does not, however, include a full discussion of aesthetic impacts in Section 10 ("Summaries and Comparisons of Route Alternatives"). The DEIS examines the proposed transmission line's harmful impacts on specific scenic resources at discrete places, but does not offer a full discussion of cumulative effects on the natural beauty of the Driftless Area in general, or the particular portion of the Driftless Area that the proposed routes traverse.

What I find missing in the DEIS is any discussion of the unique visual characteristics of Driftless Area, and what distinguishes the scenic landscape where the proposed transmission line would be located. The proposed route is not randomly located. Its western portions cross through some of the most topographically dramatic portions of the Driftless Area. These portions are more rugged, more forested, and less developed. The eastern portions are more rolling, more open, and more developed. The eastern portions sit for the most part higher on the ridgelines, and in particular along the Military Ridge. The area to the south of the Military Ridge offers more sweeping views; the area

to north (where the Eastern North alternative route would go) is more closed and intimate.

To fully appreciate the particular visual impact of 120-175 foot towers along the 84-l05 mile long corridor, one must envision the Driftless Are not as a region of hills *per se*, but of an eroded plain (the Paleozoic Plateau) incised by valleys. The Military Ridge follows a long ridge line east to west. The open character of the landscape to the south—quite unlike the more wooded portions of the Driftless Area to the north and west—means that the transmission line's high towers would stand out and be visible for miles in that direction. This includes the open grasslands and prairies of the Southwest Wisconsin Grassland and Stream Conservation Area and Military Ridge Prairie Heritage Area.

The several high "mounds" that rise above the plain—Sinsinawa, Platte, Belmont, Blue—have been points of orientation and sacred areas for ancient and modern Native Americans for millennia. They are landmarks still for all who live in and visit the region. The highpoint of the western Blue Mound—only about three miles from the preferred route of the powerline—is the highest point in southern Wisconsin. Visually, the proposed transmission line towers would not only be visible *from* these high points, but would interfere *with* the viewsheds of these landmark mounds. The proposed transmission line would also affect the western portions in this way but, by contrast, would also cross over, up, and down through this segment's more intimate valleys and ridges, affecting the many small farms and towns that they hold.

The Dane County Routing Area at the eastern terminus of the proposed transmission line presents a particular case of aesthetic impact. As the U.S. National Park Service has stated in its Comments on the DEIS, "all action alternatives under

consideration… would have adverse impacts to Ice Age [National Scenic Trail]" and the Ice Age Complex at Black Earth, "particularly [the] visual, auditory, and scenic resources that are fundamental to the trail." Ex.-DALC/WWF-Meine-3. In this case, and as noted above, the particular value of the locale is that it sits at an eastern gateway between the Driftless and glaciated portions of the Wisconsin landscape. The proposed transmission line would make its way to Middleton across the Johnstown Moraine—which is mentioned only once in the DEIS, and is there misspelled ("Johnson Moraine").

For generations, geologists and citizens alike have come to appreciate Wisconsin's varied landscape not only for its beauty, but for the stories they have learned to read in the land—of the ancient forces that shaped its landscapes, which in turn have shaped our communities and cultures. For many who would be affected directly and indirectly by the proposed transmission line, this connection has inspired efforts to steward that landscape with care for their families, for their neighbors, for future generations, and for the other creatures who share the Driftless landscape. These are not intangible or unquantifiable values. It is possible using a variety of econometric tools to quantify and analyze the economic costs and benefits, and the ecosystem services and risks, that the proposed transmission line and high towers would entail. A more complete EIS should endeavor to do so.

4) Transmission line infrastructure and groundwater

Although I am not a geologist or hydrologist, I note that the text of the DEIS includes only six mentions of groundwater in its 467 pages. The terms "springs" and "seeps" occur a handful of other times. Subsection 2.5.4 ("Water Resources") does not

mention groundwater. In other sections, the matter is alluded to briefly. For example [emphases added]:

- 2.2.3.7: In the discussion of depth to bedrock: "Some members of the public have expressed concerns about constructing the proposed transmission line in areas of shallow bedrock because of *potential adverse effects on local springs and seeps*." However, this statement is not followed up with any response or analysis.
- 2.5.2.1: In the description of the Western Coulees and Ridges ecological landscape: "In this [Western Coulees and Ridges] ecological landscape, *porous sedimentary bedrock (especially sandstone) discharges cold groundwater* into the streams that occupy the numerous valleys of this highly dissected landscape."
- 4.3.3: The description of "augering and blasting" for the transmission line tower anchors includes brief discussion of action to be taken "[i]f the water table is encountered during the augering process…."
- 4.3.4: The text notes that "Several alternative foundation designs have been successfully used where conventional drilling, the deposition of concrete, the generation of spoils, or dewatering would cause significant impacts to large wetlands or wetlands that are deemed environmentally sensitive." However, there is no such discussion of alternatives related to groundwater.
- 4.6.6: The discussion here ("Waterways") notes that "Changes in hydrology (the vertical and horizontal movement of water through the soil) caused by trenching, drilling holes, de-watering soils, installing foundations, and compacting soils can alter the vegetation, reduce plant diversity, and promote the growth of invasive species." However, the discussion here does not focus on groundwater flows and functions in

their own right, and attention to specific or cumulative impacts of altered hydrology is not given to the project study area in any rigorous or comprehensive way.

- The text of Appendix J-1 ("Endangered Resource Review for the Proposed Cardinal-Hickory Creek 345kV Transmission Line Project…") mentions groundwater only once: "In areas where groundwater seeps into the excavation, or where water is needed to hold the hole during drilling, it may be necessary to dewater the excavation. Depending on site conditions, the water may be desilted and discharged to an upland area where it is allowed to re-infiltrate, or removed from site via a tank truck. Dewatering will proceed in accordance with applicable regulations and permit requirements."

These references to groundwater do not give me confidence that the DEIS provides adequate information. A thorough review and analysis of potential impacts to groundwater is especially important in the karst landscape that most of the proposed transmission line and its towers would go through. Not only are groundwater resources especially vulnerable in areas of fractured and porous sedimentary bedrock, but mitigation is especially difficult. Section 4.1.3 of the DEIS ("Identifying potential cumulative impacts") notes, wisely, that: "When assessing impacts, it is important to consider the duration of these impacts." Groundwater impacts can be especially concerning in this regard.

It is in this context that a particular feature of the proposed transmission line raised questions that were only briefly noted, and unanswered, in the DEIS. Subsection 2.2.3 of the DEIS describes the transmission structure foundations, and notes that "[t]he bulk of the structures are anticipated to be supported by reinforced concrete caissons."

The design and configuration of these caissons is detailed in subsection 2.2.3.2: “For reinforced concrete caissons, the excavated holes would range from 5 to 14 feet in diameter and 20 to 60 feet in depth. If poor soil conditions exist, greater diameters and depths may be required.” In considering this, I found no further information in the DEIS to help assess the specific or cumulative impacts of such foundations for the route of the proposed transmission line.

The map in Appendix A, Part 2, Figure 5 (“Depth to bedrock in the project area”) would seem to indicate that virtually the entire route is in areas where depth to bedrock is no more than 50 feet, and is mostly five feet or less. This confirms what is fairly obvious to most who are familiar with Driftless Area geology and soils—that the excavated holes would be drilled or blasted through thin soils and the sandstone/limestone bedrock. (Subsection 4.3.3. of the DEIS also notes that “When bedrock is close to the soil surface or when subsoils primarily consist of large boulders and large cobbles, blasting might be required to complete the tower excavation.”) Given that “the excavated holes would range from 5 to 14 feet in diameter and 20 to 60 feet in depth,” this raises questions about the potential for surface-to-groundwater migration, disrupted movement of groundwater, local impacts on springs and seeps, breaking into or through sub-surface gaps and fissures in the bedrock (or even caves), and so forth.

Dr. Joy Zedler touches on this issue in her federal DEIS comments (Ex.-DALC/WWF-Meine-4). (“Belowground, it might seem that plunking a power tower in a wetland has no effect. But the tower foundations inserted belowground interfere with flows of groundwater, as do the berms that connect towers for maintenance access.”) I am uncertain if mitigation measures exist to prevent or minimize such impacts, and would

hope that a final EIS can address this. Geological and hydrological analysis ought to be able to identify which specific segments of the proposed routes are most potentially at risk, and which least.

In addition to these potential impacts on groundwater, excavation for the structure foundations also raises questions involving the handling of the excavated materials. Since thin soils predominate in the Driftless Area, I would assume that much of the excavated material would be sandstone and limestones, perhaps crushed to gravel. Using the figures provided above for the reinforced concrete caissons ("5 to 14 feet in diameter and 20 to 60 feet in depth"), the volume of excavated material per caisson would (according to my calculator) range between 392-9236 cubic feet, or 14.5-342 cubic yards. (A small dump truck, I am told, holds about 5 cubic yards. And a cubic yard of dirt covers a 10-foot-by-10-foot area with about 3 inches of dirt.) For cumulative effects along the entire proposed transmission line, these figures would of course need to be multiplied by the total number of towers, recognizing that other types of tower structure foundations may also be used. The DEIS does not, to my knowledge, describe a plan for the transfer or handling of these materials, which could in themselves could have substantive, harmful, and lasting impacts on soils, hydrology, and plant and animal communities.

STATUTORY STANDARDS

Q: Does the routing and design of the high-voltage transmission line minimize environmental impacts?

A: Any route through the Driftless Area will have significant adverse impacts to wide-ranging environmental values, including biological diversity and ecological function,

historical and cultural resources, recreational opportunities, and aesthetics. The proposed mitigation does not meaningfully minimize these impacts.

Q: In your professional opinion, will the proposed transmission line and towers have undue adverse impact on environmental values, including historic sites, aesthetics, and recreational use in the Driftless Area?

A: Yes. Based on the concerns addressed above in my testimony, it is my professional opinion that the proposed high-voltage transmission line and structures would have an undue adverse impact on the environmental values of the Driftless Area.

Q: Please explain the basis for your opinion.

A: I base this opinion on my familiarity with the area of the proposed transmission line, on conversations with individuals in affected communities, and by my reading of background documents in my preparation of this testimony.

Q: In your professional opinion, will the proposed transmission line and towers unreasonably interfere with the orderly land use and development plans for the Driftless Area?

A: Yes, I believe that the proposed transmission line and towers would unreasonably interfere with local communities' values and aspirations for future development. I address these concerns above, but would like to reiterate the concluding thoughts from my submitted written comments (Ex.-DALC/WWF-Meine-2): We know that climate change requires that we expand the availability of energy from renewable sources. But we also know that resilience in the greatest sense requires that we not attempt to solve one problem by creating others. There are multiple options before us—ways to conserve and to develop clean and sustainable energy—that can serve the Driftless Area and all the

landscapes beyond it. We must strive together for energy solutions that do not sacrifice other conservation goals and degrade the quality of our land. The decision on this proposed powerline is a test. It will show if we as a society are willing to resist the easy path of expediency and short-term profit. It will show that we can do the hard and necessary thing: meeting current needs in innovative ways that also and simultaneously protect the quality of the land that sustains us.

The people and landscapes of the Driftless Area have long provided leadership in the conservation arena by experimenting with, demonstrating, and developing such innovative and integrative solutions. In addressing historic conservation issues of wildlife depletion, deforestation, soil erosion, and watershed degradation, conservation leaders and citizens in the Driftless Area have made a positive long-term impact on their lives, livelihoods, and landscapes. Our need for "orderly land use and development plans" will necessarily entail even more complex challenges and opportunities than those our ancestors faced. We will ask ourselves: What approaches to sustainable energy production, use, and conservation best fit this landscape? What approaches will allow us to avoid new problems and advance effective solutions? What approaches will reflect the special legacy, conditions, and values of the Driftless Area?

Q: Does this conclude your direct testimony?

A: Yes.