BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF SOUTH DAKOTA

IN THE MATTER OF THE APPLICATION OF CROWNED RIDGE II, LLC FOR A FACILITIES PERMIT TO CONSTRUCTION A 230 KV TRANSMISSION LINE

Docket No. EL18-

DIRECT TESTIMONY AND EXHIBITS

OF MARK THOMPSON

April 10, 2018

INTRODUCTION AND QUALIFICATIONS

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. Mark Thompson, 700 Universe Blvd., Juno Beach FL 33408.

Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?

A. I am the Manager of Wind Engineering within the Engineering & Construction ("E&C") organization at NextEra Energy Resources, LLC ("NEER"). NEER is a principal affiliate of NextEra Energy, Inc. NEER, through its affiliated entities, is the world's largest generator of renewable energy from the wind and sun, generating over 19,000 MWs in 29 states and Canada. NextEra, through its subsidiaries, also owns approximately 8,500 circuit miles of high-voltage transmission lines and 770 substations in North America. NEER affiliates in the State of South Dakota own the following wind facilities: Day County Wind, South Dakota Wind Energy Center, and Wessington Springs Wind.

Q. WHAT IS THE ORGANIZATIONAL RELATIONSHIP BETWEEN NEER AND CROWDED RIDGE II, LLC?

A. Crowned Ridge Wind II, LLC ("the Applicant") is an indirect, wholly-owned subsidiary of NEER.

Q. WHAT ARE YOUR RESPONSIBILITIES?

A. As the Manager of Wind Engineering, one of my primary roles is to coordinate or provide support for the development of new wind sites that include transmission lines and

substations, right-of-way ("ROW") identification and selection, land acquisition, permit acquisition, system engineering, specification and standards development, material and services procurement, construction management, commissioning, system integration, compliance and project close-out in heavily regulated, environmentally-sensitive, and multi-system operational environments.

Q. **PLEASE DESCRIBE YOUR BACKGROUND AND QUALIFICATIONS**

A. I have over 16 years of experience in substation and transmission line design and engineering, transmission line siting and permitting, project management, and construction. I hold a Bachelor of Science Degree in Electrical Engineering from the University of Technology, Jamaica and a Master in Business Administration Degree from Nova Southeastern University in Florida.

Q. HAS THIS TESTIMONY BEEN PREPARED BY YOU OR UNDER YOUR DIRECT SUPERVISION?

A. Yes.

Q. **HAVE YOU PREVIOUSLY TESTIFIED BEFORE THE SOUTH DAKOTA PUBLIC UTILITIES COMMISSION?**

A. No.

PURPOSE OF TESTIMONY

Q. PLEASE DESCRIBE THE PURPOSE OF YOUR TESTIMONY.

A. The purpose of my testimony is to set forth: (1) the technical specification for the proposed transmission line (also referred to as a generation tie line); (2) an overview of the proposed route, the transmission routing and siting criteria and alternative routes; and (3) the processes associated with engineering, construction, operation and maintenance of the transmission line.

TECHNICAL SPECIFICATIONS OF THE PROJECT

Q. PLEASE DESCRIBE THE TECHNICAL SPECIFICATIONS OF THE PROPOSED PROJECT.

A. The Project involves the proposed construction of an approximately 7-mile 230-kilovolt ("kV") generation tie line ("the Project") from the collector substation at Crowned Ridge Wind II ("CRW II") to a dead-end transmission structure adjacent to the collector substation at Crowned Ridge Wind ("CRW"). Utilizing a breaker position at the CRW collector substation, the 300 megawatts ("MW") from CRW II will be aggregated with the 300 MWs from the CRW collector substation and conjoined to the Crowned Ridge 230 kV generation tie line which will terminate at the Big Stone South substation.

More specifically, the technical specifications for the proposed 230 kV transmission line are as follows:

- Tubular steel monopole structures will typically be 100 feet ("ft.") above ground level. Angle, corner and in-line dead-end structures may consist of multiple poles and guy wires;

- Line length is approximately 7 miles;
- Single-circuit, three-phase transmission line comprised of a single 1272 kcmil 45/7 Bittern conductor, one optical ground wire, and one additional shield wire where applicable;
- Typical structure span lengths range from 600 ft. – 1,000 ft.; and
- Typical transmission construction easement, also referred to as the ROW width is 150 ft., with additional easement at turning and angle structures as applicable to account for factors such as terrain, span lengths, and the need for guying for larger line deflection angles or multiple structures for corners.

Q. PLEASE DESCRIBE WHY THE PROJECT IS NEEDED TO DELIVER ENERGY FOR CRW II TO THE TRANSMISSION GRID.

A. The Project is needed to deliver the energy from CRW II to the transmission grid; without the Project (i.e., collection line from CRW II to CRW collector substation) there would be no ability to transport the power to Big Stone South Substation. To facilitate an understanding of the relationship between the two wind projects, their respective transmission lines and the final point of interconnection I have provided a map as shown in Exhibit MT-1. I have also provided as Exhibit MT-2, a map showing the Project route from the CRW II collector substation to the CRW collector substation. I have also provided in Exhibit MT-3 a one-line diagram of the project to add additional detail and understanding.

The CRW II collector substation, which is located 8 miles east of Watertown, serves as a termination point for the 34.5 kV collection lines from the wind turbines from CRW II. The voltage at the substation is then stepped up from 34.5 kV to 230 kV and the 300MW of generation of CRW II is transmitted via an approximately 7 mile long transmission line which will terminate at the CRW collector substation (See also Exhibit MT-1).

TRANSMISSION ROUTING AND SITING CRITERIA

Q. WHAT WAS THE TRANSMISSION ROUTING AND SITING CRITERIA USED TO DEVELOP THE TRANSMISSION ROUTE AND SITE THE PROJECT?

A. Section 8.0 of the Application sets forth the criteria used to develop the proposed transmission line route, as well as why the proposed route is preferred over alternative routes.

Q. EXPLAIN HOW THE IMPLEMENTATION OF THE CRITERIA RESULTED IN THE PROPOSED ROUTE?

A. As explained in more detail in the Application, the proposed route was selected due its alignment with the routing criteria, including the following:

- Locating the transmission line and associated infrastructure outside of county ROW per the request of Codington County to avoid unnecessary impacts to existing infrastructure within ROW;
- Locating the transmission line and associated infrastructure as close as reasonably possible to existing ROW with the approval from Codington County for transmission line conductor blowout;

- Utilizing quarter section lines to minimize impacts to agricultural fields and farming operations where paralleling existing ROW is not practical;
- Avoiding diagonal routing across agricultural fields, wherever possible; and
- Avoiding habited structures to the extent possible.

Q. WAS THE PROPOSED ROUTE DESIGN OPTIMIZED DURING ITS DEVELOPMENT?

A. Yes, the proposed route also included an optimization process. For instance, alternative routing between the currently assumed CRW II collector substation location and the CRW collector substation was considered. Initial routing positioned the transmission alignment with closer proximity to homes and would have also resulted in 4.7 acres of additional tree clearing when compared to the Project's proposed routing. These considerations resulted in changes to the route which helped optimize the transmission line location.

Q. PROVIDE AN OVERVIEW OF THE ALTERNATIVE ROUTES?

A. The alternative route for the Project could have commenced at the location that would have required utilizing a taller turning structure to accommodate the crossing of U.S. Highway 212 in the northern direction. The alternative routing would then head west to cross 466th Avenue before running north and utilizing an existing transmission corridor between 466th Avenue and 465th Avenue for approximately 6.5 miles. As explained in more detail in Section 8.0 of the Application, the alternative route was not adopted for the following reasons:

- Closer proximity to the towns of Goodwin and Kranzburg;
- The line would be located within 250 ft. of a home;
- The crossings of existing infrastructure, including electrical lines and U.S. Highway 212;
- The intersection of a parcel of a non-participating landowner;
- Being less than 0.5 mile from three raptor nests; and
- The inclusion of 26% prairie lands, which generally has a higher cultural site density than agricultural lands.

Q. DO YOU ANTICIPATE ANY SIGNIFICANT CHANGES IN THE PROPOSED ROUTE?

A. I do not anticipate significant changes in the proposed route because, as Applicant Witness Utton explains, the Applicant has worked closely with stakeholders, landowners, local government officials, and local tribes in developing a proposed route. The active engagement was helpful to develop a proposed route because the Applicant does not have the right of eminent domain; therefore, the Applicant anticipates the route will stay within the required one mile corridor study area. Further, given the study and avoidance to the extent possible of Environmental, Cultural, Physical, Hydrological, Terrestrial, Aquatic, Land Use, Water and Air Quality, and Community Impacts, as explained in Sections 9 through 17 of the Application, the Applicant does not anticipate further significant changes in the route due to these concerns.

Q. ARE THERE ASSOCIATED FACILITIES WITH THE TRANSMISSION LINE?

A. Yes. There is the 230 kV CRW II collector substation, which includes two 230-34.5kV generation step-up transformers, circuit breakers, bus work, disconnect switches, protection and control equipment, a control building and low voltage cap banks.

CONSTRUCTION PROCESS

Q. PLEASE DESCRIBE THE CONSTRUCTION PROCESS?

A. Provided the South Dakota Public Utilities Commission approves this Application, the Applicant expects to start construction of the transmission line in April 2019. The construction process begins with a route survey of the ROW boundaries and a delineation of critical environmental areas and those additional areas of concern that the landowner has specified in the easement agreements. The construction team will mobilize, and, as required, initiate matting, clearing, grubbing and the installation of access roads. Equipment and materials such as structures, conductor, optical ground wire, insulators, hardware and materials will be delivered to laydown areas or directly to the pole location. Pole locations within the ROW will be surveyed and staked.

Monopole installation is essentially a two-step process. One crew augers the hole in the ground for the monopole and another crew embeds the pole directly into the ground and backfills the hole. In certain specific locations drilled shaft concrete foundations will be required. The tubular steel structures are framed with steel arms, insulators, hardware and pulling blocks on the ground and assembled and set with cranes. The conductor will be pulled through the pulling blocks and attached to the insulators. The shield wires will be pulled through pulling blocks and attached to arms on the tubular steel structure. Splice boxes will be attached to the structure approximately 12 ft. above the base of the tubular steel pole every 3-4 miles to facilitate fiber splicing.

On-site supervision will work with landowners during construction to minimize crop damage and site accessibility issues, as well as work to minimize impact in the areas that have been further identified by the Sisseton Wahpeton Oyate tribe. The construction team will be responsible for maintenance of traffic, crew/landowner/public safety and will adhere to applicable U.S. Occupational Safety and Health Administration standards. The Applicants construction supervision will also engage in safety and construction inspections to ensure the contractor adheres to safe work practices and constructs the line in accordance with the approved design.

Q. WHY IS THE PROJECT STARTING CONSTRUCTION IN 2019?

A. The commercial operation date for CRW and CRW II is on or before December 31, 2019. The Project is required to be energized approximately 3-4 months earlier than the CRW and CRW II windfarms in order to allow sufficient time to commission the collection substations, reactive power compensation substation and subsequently the wind turbines. Thus, by starting construction in April 2019 all of these timelines and milestones can be met.

Q. AFTER THE CONSTRUCTION IS COMPLETE, HOW WILL THE LINE BE ENERGIZED?

A. The Applicant expects to complete the Project's construction no later than October 2019. The line will be inspected by the construction contractor, the Applicant, the engineer of record, and the environmental coordinator prior to energization to ensure that the line meets all the design requirements and can be safely energized. Once completed, the

Applicant will coordinate with Otter Tail Power Company to complete the energization of the line.

OPERATION AND MAINTENANCE

Q. EXPLAIN HOW THE GENERATION TIE LINE WILL BE OPERATED AND MAINTAINED.

A. As explained in more detail in the Application, regular maintenance and inspections will be performed during the life of the facility to ensure its continued integrity. Generally, the Applicant will inspect the transmission line by ground at least once per year with a ground inspection one every five years. Inspections will be limited to the easement and areas where obstructions or terrain may require off-easement access. Any issues identified inspections will be appropriately addressed by the Applicant.

CONCLUSION

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes.

STATE OF FLORIDA)
) ss
COUNTY OF PALM BEACH)

I, Mark Thompson, being duly sworn on oath, depose and state that I am the witness identified in the foregoing prepared testimony and I am familiar with its contents, and that the facts set forth are true to the best of my knowledge, information and belief.

Mark Thompson

Subscribed and sworn to before me this 10 day of April 2018.

SEAL

Notary Public

My Commission Expires _____

NANCY E. LLAMA
MY COMMISSION # FF 900481
EXPIRES: November 14, 2019
Bonded Thru Notary Public Underwriters