BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF SOUTH DAKOTA

IN THE MATTER OF THE APPLICATION BY CROCKER WIND FARM, LLC FOR A PERMIT OF A WIND ENERGY FACILITY AND A 345 KV TRANSMISSION LINE IN CLARK COUNTY, SOUTH DAKOTA, FOR CROCKER WIND FARM	))))))	EL 17-028

DIRECT TESTIMONY OF

ROB COPOULS

ON BEHALF OF

CROCKER WIND FARM, LLC

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Q. Please state your name and business address for the record.

A. Rob Copouls. Westwood Professional Services. 7699 Anagram Drive, Eden Prairie MN 55344

Q. Can you briefly describe your education and experience?

A. I have Bachelors of Science in Civil Engineering from Valparaiso University and I am a Professional Engineer licensed in several states. I have been working for Westwood Professional Services for over 12 years. For 10 years I have been in the renewable energy field working on wind and solar projects. I have been part of over 100 projects with roles ranging from project engineer to Senior Project Manager. I am currently the Operations Manager for our Division which includes over 170 people and works on wind, solar and power delivery projects.

Q. Have you attached a resume or CV.

A. Yes

Q. Have you previously submitted or prepared testimony in this proceeding in South Dakota?

A. No

Q. What is the purpose of your direct testimony?

A. To answer questions related to the permit application and educate the general public on my area of expertise.

Q. Which sections of the application are you responsible for?

A. I am responsible for the following sections:

15.5.6 Electromagnetic Interference – Wind Farm

19.3 Equipment Procurement, Manufacture and Delivery

19.4 Construction

20.1.3.1 – Surface Transportation

20.2.4.1 – Ground Transportation

23.0 – Decommissioning of Wind Energy Facilities

24.2.1 – Electromagnetic Fields and Stray Voltages

26.0 – Transmission Facility Layout and Construction

27.0 – Information Concerning Transmission Facilities

Q. Could you briefly summarize the information that you are responsible for in Section 15.5.6 Electromagnetic Interference – Wind Farm?

A. Because of their height, modern wind turbines have the potential to interfere with existing communications systems licensed to operate in the United States. Comsearch conducted a Licensed Microwave Study for the Crocker Wind Farm. Turbines have been sited in a manner that avoids all identified microwave beam paths and communication systems. The construction and operation of the Project will not result in interference to microwave, radio, or navigation signals. Crocker Wind received a response letter from the United States Department of Commerce National Telecommunications and Information Administration ("NTIA") on May 13, 2016 (Appendix G). The agency indicated that after a 45+ day period of review, no federal agencies identified any concerns regarding blockage of their radio frequency transmissions. The Department of Agriculture ("DOA") and Department of Justice ("DOJ") provided responses to NTIA stating No Harmful Interference Anticipated. The Department of Commerce ("DOC") and the Department of Energy ("DOE") expressed concerns the Wind Farm Project may obstruct radio frequency transmissions or weather radar. Crocker is coordinating with both agencies to assess potential impacts and will continue to do so as the Project layout is finalized. If interference to a residence's or business's television service is reported to Crocker, Crocker will work with affected parties to determine the cause of interference and, when necessary, reestablish television reception and service.

Q. Could you briefly summarize the information that you are responsible for in Section 19.3 Equipment Procurement, Manufacture and Delivery?

A. Crocker previously began procurement of project specific equipment and is in the process of procuring turbines for the Project. Turbines will be allocated to the Project after meteorological and economic studies are completed to achieve the best match of turbines for the Project. Equipment could start arriving on site as early as third quarter 2018.

Q. Could you briefly summarize the information that you are responsible for in Section 19.4 Construction?

A. Crocker personnel will oversee the primary contractors performing onsite Project construction, including, but not limited to, roads, wind turbine assembly, electrical, and communications work. The construction will take approximately twelve months to complete; however, depending upon seasonal or weather-related constraints (i.e., minimal work would occur during winter months) it may take more or less time. Construction could commence on site as early as third quarter 2018.

Q. Could you briefly summarize the information that you are responsible for in Section 20.1.3.1 Surface Transportation?

A. In general, the existing roadway infrastructure in and around the Wind Farm Project Area and Transmission Line Route is characterized by state, county, and township roads that generally follow section lines. Various county and township roads provide access to the Project and include both two-lane and gravel roads. In the agricultural areas, many landowners use private, single-lane farm roads and driveways on their property. Roads within the Wind Farm Project Area are summarized in Table 20-2. The Transmission Line Route parallels 419 th Avenue, State Highway 20, a two-track, and property lines for most of the route.

Q. Could you briefly summarize the information that you are responsible for in Section 20.2.4.1 Ground Transportation?

A. During the construction phase, temporary impacts are anticipated on some public roads within the Wind Farm Project Area and Transmission Line Route. Roads will be affected by the transportation of equipment to and from the Project. Construction traffic will use the existing county and state roadway system to access the Project and deliver construction materials and personnel. Some roads may also be temporarily expanded along specific routes as necessary to facilitate the movement of equipment. Crocker expects to enter into road use agreements with the county and townships, and to have a bond set by the Commission in accord with state law. Construction activities will increase the amount of traffic using local roadways, but such use is not anticipated to result in adverse traffic impacts. Operation and maintenance activities will not noticeably increase traffic in the Project vicinity. The Project may also temporarily affect traffic numbers in the area due to construction traffic. During the construction phase, several types of light, medium, and heavy-duty construction vehicles will travel to and from the Project Area, as well as private vehicles used by construction personnel. The Applicant estimates that there will be 375 large truck trips per day and up to 875 small-vehicle (pickups and automobiles) trips per day in the area during peak construction periods. After construction is complete, traffic impacts during the operations phase of the Project will be minimal. A small maintenance crew driving through the area in pickup trucks on a regular basis will monitor and maintain the wind turbines and transmission lines, as needed. There would be a slight increase in traffic for occasional turbine, substation repair, and transmission line repair, but traffic function will not be impacted as a result.

Q. Could you briefly summarize the information that you are responsible for in Section 23.0 Decommissioning of Wind Energy Facilities?

A. At the end of commercial operation, Crocker or the Project owners will be responsible for removing wind facilities, and removing the turbine foundations to a depth of four feet below grade. In this case, a decision may be made on whether to continue operation with existing equipment or to retrofit the turbines and power system with upgrades based on newer technologies. The anticipated Project life is approximately thirty (30) years beyond the date of first commercial operation. The estimated decommissioning cost in current dollars is expected to be between $100,000 - $150,000 per turbine after salvage value, including associated facilities. Crocker will be responsible for all costs to decommission the Project and associated facilities. The cost to decommission will depend upon the prevailing rates for salvage value of the equipment and labor costs. Because of the uncertainties surrounding future decommissioning costs and salvage values, Crocker will review and update the cost estimate of decommissioning and restoration for the Project every five years after Project commissioning. Consistent with the terms of the wind lease and easement agreements with individual landowners, Crocker will complete the following list of decommissioning and restoration activities: Turbine removal - Access roads to turbines will be widened to a sufficient width to accommodate movement of appropriately - sized cranes, trucks and other machinery required for the disassembly and removal of the turbines. Control cabinets, electronic components, and internal cables will be removed. The rotor, nacelle and tower sections will be lowered to the ground where they may be transported whole for reconditioning and reuse, or disassembled/cut into more easily transportable sections for salvageable, recyclable, or disposable components. Turbine and substation foundation removal - Topsoil will be removed from an area surrounding the foundation and stored for later replacement, as applicable. Turbine foundations will be excavated to a depth sufficient to remove all anchor bolts, rebar, conduits, cable, and concrete to a depth of 48 inches below grade. The remaining excavation will be filled with clean subgrade material of quality comparable to the immediate surrounding area. The sub - grade material will be compacted to a density similar to surrounding sub - grade material. All unexcavated areas compacted by equipment used in decommissioning shall be de - compacted in a manner to adequately restore the topsoil and sub - grade material to the proper density consistent and compatible with the surrounding area. Underground collection cables - The cables and conduits contain no materials known to be harmful to the environment. As part of the decommissioning, these items will be removed to a depth of at least 48 inches. All cable and conduit buried greater than 48 inches will be left in place and abandoned. Substation and interconnection facilities - Disassembly of the substation and interconnection facilities will include only the areas owned by Crocker. Components (including steel, conductors, switches, transformers, fencing, control houses, etc.) will be removed from the Project Area and reconditioned and reused, sold as scrap, recycled, or disposed of appropriately, at Crocker's sole discretion. To remove foundations and underground components without damaging or impacting adjacent facilities to the extent possible, such foundations and underground components will be removed to a depth of 48 inches and the excavation area filled, contoured and re - seeded, if necessary (e.g., the area will not be subject to row crop agriculture after restoration). Access roads - Unless otherwise requested by the landowner, permanent access roads constructed to accommodate the Project will be removed. Ditch crossings connecting access roads to public roads will be removed unless the landowner requests they remain in place. Improvements to township and county roads that were not removed after construction will remain in place. Crocker will restore and reclaim the site to its pre - Project topography and topsoil quality using BMPs consistent with those outlined by 2012 USFWS Land- Based Wind Energy Guidelines. The goal of decommissioning will be to restore natural hydrology and plant communities to the greatest extent practical while minimizing new disturbance and removal of native vegetation. The decommissioning BMPs that will be employed on the Project to the extent practicable with the intent of meeting this goal include: 1. Minimize new disturbance and removal of native vegetation to the greatest extent practicable. 2. Remove foundations to four feet below surrounding grade, and cover with soil to allow adequate root penetration for native plants, and so that subsurface structures do not substantially disrupt ground water movements. 3. Reuse topsoil that is removed during construction and use as topsoil when restoring plant communities. Once decommissioning activity is complete, restore topsoils to assist in establishing and maintaining pre - construction native plant communities to the extent possible, consistent with landowner objectives. 4. Stabilize soil and re - vegetate with native plants appropriate for the soil conditions and adjacent habitat, and use local seed sources where feasible, consistent with landowner objectives. 5. Restore surface water flows to pre - disturbance conditions, including removal of stream crossings, roads, and pads, consistent with storm water management objectives and requirements. Conduct survey, using qualified experts, to detect populations of invasive species, and implement and maintain comprehensive approaches to preventing and controlling invasive species as necessary. 7. Remove any unnecessary overhead electrical lines and associated poles. 8. After decommissioning, install erosion control measures in all disturbance areas where potential for erosion exists, consistent with storm water management objectives and requirements. 9. Remove fencing unless the landowner requests it stay. 10. Remediate any petroleum product leaks and chemical releases prior to completion of decommissioning. Decommissioning and restoration activities will be completed within 12 months after the date the Project ceases to operate.

Q. Could you briefly summarize the information that you are responsible for in Section 24.2.1 Electromagnetic Fields and Stray Voltages?

A. The term electromagnetic field ("EMF") refers to electric and magnetic fields that are present around any electrical device. Electric fields arise from the voltage or electrical charges and magnetic fields arise from the flow of electricity or current that travels along transmission lines, power collection (feeder) lines, substation transformers, house wiring, and electrical appliances. The intensity of the electric field is related to the voltage of the line and the intensity of the magnetic field is related to the current flow through the conductors (wire). EMF can occur indoors and outdoors. However, there are no discernible health impacts from power lines (NIEH, 1999). The proposed interconnection transmission line will be located adjacent to the O&M facility. Wind turbine generators and associated interconnection cables will be setback from residences in excess of state standards, where EMF will be at background levels. In those instances where distribution lines have been shown to contribute to stray voltage, the electric distribution system directly serving the farm or the wiring on a farm was directly serving the farm or the wiring on a farm was directly under and parallel to the transmission line. These circumstances are considered in installing transmission lines and can be readily mitigated. Problems related to distribution lines are also readily managed by correctly connecting and grounding electrical equipment. While the general consensus is that electric fields pose no risk to humans, the question of whether or not exposure to magnetic fields potentially causes biological responses or even health effects continues to be the subject of research and debate. EMF from underground electrical collection lines dissipates very close to the lines because they are installed below ground within insulated shielding. The electrical fields are negligible, and there is a small magnetic field directly above the lines that, based on engineering analysis, dissipates within 20 feet on either side of the installed cable. EMF associated with the transformers at the base of each turbine completely dissipates within 500 ft, so the 2,000 ft minimum turbine setback from non-participating residences and 1,000 ft setback from participating residences will be adequate to avoid any EMF exposure to homes. Stray voltage is a natural phenomenon that is the result of low levels of electrical current flowing between two points that are not directly connected. Electrical systems, including farm systems and utility distribution systems, must be adequately grounded to the earth to ensure continuous safety and reliability, and to minimize this current flow. Potential effects from stray voltage can result from a person or animal coming in contact with neutral-to-earth voltage. Stray voltage does not cause electrocution and is not related to ground current, EMF, or earth currents. Stray voltage is a particular concern for dairy farms because it can impact operations and milk production. Problems are usually related to the distribution and service lines directly serving the farm or the wiring on a farm affecting confined farm animals. No impacts due to electromagnetic fields or stray voltage are anticipated and no mitigation is proposed.

Q. Could you briefly summarize the information that you are responsible for in Section 26.0 Transmission Facility Layout and Construction?

A. The Transmission Line Route will be designed to meet or surpass applicable electrical codes, and comply with good utility practices. Surveyors will stake the construction corridor within the approved right-of-way and the pole locations of the approved alignment in preparation for the construction crew arriving on site. Once the construction crew arrives; they will begin by clearing and grubbing out the right-of-way to ensure that vegetation meets the standards and that the construction crew will have easy access to the construction site. Crocker will coordinate with landowners on clearing and grubbing to ensure minimal impact to wind breaks, landscaping, and other vegetative buffers. The crew will use chain saws, lifts, tractors and bulldozers only where needed to clear vegetation. The crew will install temporary culverts and field approaches where needed to access the route and to maintain adequate access and drainage throughout construction. Construction will begin after applicable federal, state, and local approvals have been obtained, property and right-of-way are acquired, soil conditions are established and final design is completed. The precise timing of construction will take into account various requirements that may be in place due to permit conditions, system loading issues, weather and available workforce and materials. The Applicant will work with an experienced contractor to construct and maintain the transmission line in conjunction with the construction and operation of the Crocker Wind Farm. Construction will follow industry best practices. These best practices address transmission specifics such as right-of-way clearing, staging, and erecting transmission line structures and stringing transmission lines. They also address general construction best practices including but not limited to safety and storm water pollution prevention planning. Crocker will be considering the proposed schedule for activities, permit requirements, safety measures, prohibitions, maintenance guidelines, inspection procedures, and terrain characteristics throughout the Project's development, construction, and operations. In some cases these activities, such as schedules, are modified to minimize impacts to sensitive animals or environments or to enhance safety. Transmission line structures are generally designed for installation at existing grades. Typically, structure sites with ten percent or less slope will not be graded or leveled. Sites with more than ten percent slope will have working areas graded level or fill brought in for working pads. Crocker anticipates that only minimal grading will be needed because the route has very little elevation change. If the landowner permits, it is preferred to leave the leveled areas and working pads in place for use in future maintenance activities. If permission is not obtained, the site will be graded back to as close to its original condition as possible, and all imported fill, including temporary culverts and road approaches, will be removed from the site and disturbed areas will be returned to pre-disturbance conditions. Typical construction equipment used on a project consists of tree removal equipment, mowers, cranes, backhoes, digger-derrick line trucks, track-mounted drill rigs, dump trucks, front end loaders, bucket trucks, bulldozers, flatbed tractor-trailers, flatbed trucks, pickup trucks, concrete trucks and various trailers. Many types of excavation equipment are set on wheel or track-driven vehicles. Poles are transported on tractor-trailers. Staging areas are generally established when constructing a transmission project. In the case of the Project, the staging area will likely be partially shared with the associated Crocker Wind Farm. Staging involves delivering the equipment and materials to construct the new transmission line facilities. Structures are delivered to staging areas, sorted and loaded onto structure trailers for delivery to the staked location. The materials are stored until they are needed for the Project. In some cases, additional space (temporary laydown areas) may be required. These areas will be selected for their location, access, security, and ability to efficiently and safely warehouse supplies. The areas are chosen to minimize excavation and grading. Sufficient rights to use the temporary laydown areas outside of the transmission line right-of-way will be obtained from affected landowners through rental agreements. Insulators and other hardware are attached to the structure while it is on the ground in the laydown area. When it is time to install the poles, structures are moved from the staging areas, delivered to the staked location and placed within the right-of-way until the structure is set. Typically, access to the transmission line right-of-way corridor is made directly from existing roads or trails that run parallel or perpendicular to the transmission line right-of-way. In all cases where construction traffic and activities are within close proximity to local, county or state roadways, the contractor will coordinate with the governing body on traffic control and safety measures. In some situations, private field roads or trails are used. Permission from the property owner is obtained prior to accessing the transmission line corridor outside of public rights-of-way. Where necessary to accommodate the heavy equipment used in construction (including cranes, concrete cement trucks, and hole-drilling equipment), existing access roads may be upgraded or new roads may be constructed. Once construction is complete the temporary field approaches and access roads installed for the Transmission Line Route will be removed and revegetated. Previously removed woody vegetation will be allowed to regrow so long as it does not encroach on NESC prescribed clearances. At this time, the Applicant anticipates the predominant method for securing the poles for the Project to be concrete foundations. Monopole structures are generally placed on foundations measuring between 6 to 11 feet in diameter and will typically be between 100 and 120 feet tall. Spacing intervals will be between 400 and 1,000 feet. The spoils will be removed from site unless other arrangements are made with the landowner. Crocker will not dispose of spoil materials within remnant prairie lands, areas restored to native plant communities, wetlands, protected water bodies, protected watercourses, or in a manner that could impact these areas through erosion or transport of the spoil materials. Concrete foundations will be used when warranted by site specific design criteria or circumstances. For concrete foundations, the excavation process will utilize temporary steel casing and rebar, concrete and anchor bolts will be placed in the hole. The standard projection of a concrete foundation is one foot above grade. The ground will be disturbed during the normal course of work (as is typical of most construction projects), which can take several weeks in any one location. The Applicant will take the steps necessary to lessen the impact of the Transmission Line Route on the surrounding environment by restoring areas disturbed by construction in accordance with BMPs and the Project's permit conditions. This will begin with a pre-construction survey that will identify areas requiring special restoration procedures. During construction, crews will also attempt to limit ground disturbance wherever possible. As construction on each parcel of land is completed, disturbed areas will be restored to its original condition to the maximum extent practicable. In addition, a management plan will be developed to prevent the spread of noxious and invasive weeds during construction and ongoing operations. The Applicant or their contractor will contact each property owner after construction is completed to identify and address any damage that may have occurred as a result of the construction of the Project. If damage has occurred to crops, fences or the property, the Applicant will fairly compensate the landowner for the damages sustained in accordance with the terms and conditions agreed upon in the Transmission Easement Agreement entered into by Crocker and the landowner. In some cases, the Applicant may engage an outside contractor to restore the damaged property to its original condition to the extent practicable. Portions of permanent vegetation that are disturbed or removed during construction of transmission lines will be reestablished to pre-disturbance conditions. Resilient species of common grasses and shrubs typically reestablish naturally with few problems after disturbance. Areas with significant soil compaction and disturbance from construction activities along the route will require assistance in reestablishing the vegetation stratum and controlling soil erosion. Commonly used BMPs to control soil erosion and assist in reestablishing vegetation that may be used on the Transmission Line Route include, but are not limited to: Erosion control blankets with embedded seeds, silt fences, hay bales, hydro seeding, planting individual seeds or seedlings of non-invasive native species Transmission lines are designed to operate for decades. Typically, they require only moderate maintenance, particularly in the first few years of operation. The estimated service life of the proposed Transmission Line is approximately forty years. However, high-voltage transmission lines are seldom completely retired. The Applicant anticipates that the line could potentially, and would likely be broadly integrated into the transmission system over time, ultimately providing wider utility than just interconnecting the Crocker Wind Farm into the electrical grid. The principal operating and maintenance cost for transmission facilities is the cost of inspections, which will be performed monthly by either truck or by air. Inspections will be conducted to ensure that the transmission line is fully functional and that no vegetation has encroached so as to violate required clearances. Annual operating and maintenance costs for 345 kV transmission lines in South Dakota and the surrounding states are expected to be approximately $300 to $600 per mile. Actual line-specific maintenance costs depend on the setting, the amount of vegetation management necessary, storm damage occurrences, structure types, materials used, and the age of the line.

Q. **Could you briefly summarize the information that you are responsible for in Section 27.0 Information Concerning Transmission Facilities?**

A. Crocker will design the structures to best blend with the broader visual environment. Typical structures for the Transmission Line Route will be primarily self-supporting galvanized or weathering steel, wood, or concrete. Monopole structures will be used unless conditions require the use of a more custom structure like an H-frame. Additionally, some guying may be required and will be determined once geotechnical investigations and structural design is completed. Crocker anticipates using Type 2-bundle 954 aluminum conductor steel reinforced ("ACRS") conductors or conductors of comparable capacity. Monopole structures are generally placed on concrete foundations measuring between 6 to 11 feet in diameter and will typically be between 100 and 120 feet tall. Spacing intervals will be between 400 and 1,000 feet. As previously mentioned, transmission lines are designed to operate for decades. Typically, they require only moderate maintenance, particularly in the first few years of operation. The estimated service life of the proposed Transmission Line is approximately forty years. Transmission infrastructure includes very few mechanical elements, which results in reliability. It is built to withstand weather extremes, with the exception of severe weather such as tornadoes and heavy ice storms. Transmission lines are automatically taken out of service by the operation of protective relaying equipment when a fault is sensed on the system. Such interruptions are usually momentary. Scheduled maintenance outages are also infrequent. As a result, the average annual availability of transmission infrastructure is very high, in excess of 99 percent. The Transmission Line Route will be designed in compliance with local, State, and good utility standards regarding clearance to ground, clearance to utilities, clearance to buildings, strength of materials, and right-of-way widths. The Applicant's contracted crews will comply with local, state, and good utility standards regarding installation of facilities and standard construction practices. Crocker will use proper signage and guard structures when stringing wire across roads and railroads. Installation of the guard structures and signage will be coordinated with the owner of the transportation corridor being protected. Guard structures can be temporary wood poles with a cross arm or line trucks with their booms used to hold the wire and protect the lanes of traffic. The proposed transmission line will be equipped with protective devices, such as breakers and relays, to safeguard the public from the transmission line if a transmission line or pole falls or other accident occurs. Breakers and relays are located where the line connects to the substation, and will de-energize the line in the event of an emergency. In addition to protective devices, proper signage will be posted warning the public of the safety risks associated with the energized equipment. The frequency of transmission line EMF in the United States is 60 hertz and falls in the extremely low frequency ("ELF") range of the electromagnetic spectrum (any frequency below 300 hertz). For the lower frequencies associated with power lines, the electric and magnetic fields are typically evaluated separately. The intensity of the electric field is related to the voltage of the line, while the intensity of the magnetic field is related to the current flow along the conductors. Concerns about health effects of EMF from power lines were first raised in the late 1970s. Since then, considerable research has been conducted to determine if exposure to magnetic fields, such as those from high-voltage power lines, causes biological responses and health effects. Initial epidemiological studies completed in the late 1970s showed a weak correlation between surrogate indicators of magnetic field exposure (such as wiring codes or distance from roads) and increased rates of childhood leukemia (Wertheimer et. al, 1979). Toxicological and laboratory studies have not shown a biological mechanism between EMF and cancer or other adverse health effects. In 2007, the World Health

Organization ("WHO") concluded a review of health implications from magnetic fields and concluded, "...virtually all of the laboratory evidence and the mechanistic evidence fail to support a relationship between low-level ELF magnetic fields and changes in biological function or disease status" (WHO, 2007). Natural and human-made electromagnetic fields are present everywhere in our environment. Natural electric fields in the atmosphere range from background static levels of 10 to 120 volts per meter ("V/m") to well over several kilovolts per meter ("kV/m") produced by the build-up of electric charges in thunderstorms. The Earth itself has a magnetic field that ranges from approximately 300 to 700 milligauss ("mG"). In addition to the presence of the earth's steady state electric field, an average home experiences additional magnetic fields of 0.5 mG to 4 mG which arise from the general wiring and appliances located in a typical home. Crocker conducted an EMF study for the transmission line and estimated the maximum magnetic field at 62.98 mG, which occurs at approximately 10 feet from the proposed transmission line centerline. The maximum electric field for the Crocker transmission line is calculated to be 6.73 kV/m at 15 feet from the proposed transmission line centerline. At 75 feet from the proposed transmission line centerline (the edge of the proposed right-of-way), the calculated electric field is 1.11 kV/m. The results of this study are presented in Appendix I. Impacts from stray voltage are typically related to improper grounding of electrical service to the farm (distribution lines) or on-farm electrical wiring. Transmission lines do not, by themselves, create stray voltage because they do not connect to businesses or residences and they are typically grounded properly. However, transmission lines can induce stray voltage on a distribution circuit that is parallel to and immediately under the transmission line. Appropriate measures, such as proper grounding, will be taken to prevent stray voltage problems. Crocker must acquire easement rights to route facilities across private property. During the route development process, the Applicant reached out to landowners to obtain feedback on proposed routes and to negotiate land rights. The Transmission Line Route covers approximately 102 acres, all of which are privately owned parcels subject to easement agreements between Crocker and Clark County landowners. Crocker will also coordinate with the appropriate agencies where the Transmission Line Route shares right-of-way with other public utilities or public roads. This coordination is anticipated to be complete by the first quarter of 2018. The Transmission Line will be built primarily with monopole structures, which typically require a 150 foot right-of-way for the length of the route. Diagrams of typical structures to be used on this Project are shown in Appendix J. The Transmission Line has been routed to minimize tree clearing to the extent feasible. Isolated trees may need to cleared to allow safe operation of the Transmission Line. Refer to Section 26.1 for information on route clearing. No portion of the Transmission Line will require underground transmission.

Q. Does this conclude your written pre-filed direct testimony?

A.

Dated this 21 day of September, 2017.

/s/Rob Copouls

Rob Copouls