BEFORE THE MINNESOTA PUBLIC UTILITIES COMMISSION

In the Matter of the Application for a Route Permit for the Big Stone South to Alexandria 345 kV Transmission Project in West-Central Minnesota

MPUC Docket No. E017, ET10/TL-23-160
OAH Docket No. 22-2500-40506

DIRECT TESTIMONY OF JOSHUA HUMBURG
ON BEHALF OF OTTER TAIL POWER COMPANY
and WESTERN MINNESOTA MUNICIPAL POWER AGENCY

August 15, 2025

I. INTRODUCTION AND QUALIFICATIONS

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

A. My name is Joshua (Josh) Humburg. I am employed by Otter Tail Power Company (Otter Tail). My business address is 215 South Cascade Street, Fergus Falls, MN 56537.

Q. What is your position with Otter Tail?

A. I am a Senior Project Manager.

Q. Briefly describe your educational and professional background.

A. I have approximately 10 years of experience in the electric utility industry. In my current role, I am responsible for the schedule, risk, and budget for the Project as well as Project development contract management. In my previous roles at Otter Tail, I worked at the Big Stone Power Plant in Grant County, South Dakota where I supervised the Electrical Department. My typical duties included the oversight of environmental compliance, capital and maintenance budget planning and management, compliance with North American Electric Reliability Corporation (NERC) standards, project development and execution, and plant performance optimization. I have a Bachelor of Science degree in Mechanical Engineering from South Dakota State University. I am also a licensed and registered professional engineer in the State of Minnesota. I have served in the armed forces since 2015, first with the United States Marine Corps until 2022 and presently with the 119th Wing of the North Dakota Air National Guard. My statement of qualifications is attached as **Schedule A**.

Q. Are you familiar with the Big Stone South to Alexandria 345 kilovolt (kV) Transmission Line Project (BSSA Project)?

A. Yes, it is a transmission line project being developed by Otter Tail and Western Minnesota Municipal Power Agency (Western Minnesota), through its agent Missouri River Energy Services (MRES) (together, Applicants). The BSSA Project

extends from the existing Big Stone South Substation in Grant County, South Dakota to the existing Alexandria Substation near Alexandria, Minnesota.

Q. Is the majority of the BSSA Project located in Minnesota?

A. Yes. The majority of the BSSA Project is located in Minnesota. Approximately 3.5 miles of the BSSA Project are located in South Dakota with approximately 91 to 113 miles located in Minnesota.

Q. Is the Minnesota portion of the BSSA Project (Project) the subject of the Route Permit Application submitted by the Applicants?

A. Yes.

Q. What is your role with respect to the Project?

A. In my current role, I am responsible for the schedule, risk, and budget for the Project as well as Project development contract management. During construction, I will manage all construction and restoration activities related to the Project and ensure compliance with all local, state, and federal requirements through the commissioning process.

II. PURPOSE OF TESTIMONY

Q. What is the purpose of your Direct Testimony?

A. The purpose of my testimony is to:

- provide information on the Project's design, construction, and operation;
- provide an overview of the Project's schedule;
- provide an update on the estimated costs of the Project;
- discuss engineering and constructability considerations that informed the Applicants' analysis of alternatives;
- provide an overview of the Applicants' efforts to avoid and/or minimize potential impacts on irrigation systems and airports/airstrips; and
- discuss the Applicants' coordination with local governments.

Q. What sections of the Application are you sponsoring?

A. The sections of the Application I am sponsoring are provided below:

- Section 1.0: Introduction
- Section 2.0: Regulatory Process
- Section 3.0: Proposed Project
- Section 6.0: Right-of-Way Acquisition, Construction, Restoration, and Operation and Maintenance
- Section 8.0: Agency, Tribal, Local Government, and Public Outreach
- Appendix B: 90-Day Pre-application Letter to Local Units of Government and Affidavits of Mailing
- Appendix E: Technical Drawings of Proposed Structures
- Appendix F: Agency Correspondence
- Appendix G: Public Outreach and Open House Materials

Q. What schedules are attached to your Direct Testimony?

A. The following schedules are attached to my Direct Testimony:

- **Schedule A**: Statement of Qualifications
- **Schedule B**: Updated Cost Estimates

III. PROJECT DESIGN

Q. What type of structures are proposed for the Project?

A. The Project is anticipated to be constructed on steel-monopole structures. Specialty structures such as H-frame or two- or three-pole structures may be used where unique features are encountered along the route, such as crossing roadways or other transmission lines.

The Project is expected to require approximately 525 to 575 transmission structures between 120 and 180 feet tall with spans ranging from 400 to 1,400 feet between structures, depending on geological, environmental, or engineering constraints identified during micro-siting. The structures will be bolted to concrete,

drilled pier foundations embedded in the ground. Foundation sizes vary generally from 7 to 14 feet in diameter and from 25 to 80 feet in depth.

Q. Please describe the Applicants' general approach to transmission structure (pole) placement.

A. The Applicants designed the Application Alignment (centerline presented in the Application) to maximize placement of transmission structures (poles) adjacent to existing linear features (such as roads, railroads and transmission line rights-of-way (ROW), field edges, and property lines) to the greatest extent practicable to avoid and/or minimize impacts to landowners and current land uses.

Q. Please describe the conductors and associated grounding/communication lines proposed for the Project.

A. The Project will include the initial installation of a single-circuit 345 kV transmission line and associated grounding wires, one of which will be an optical ground wire (OPGW) for relaying communications and the second will be an overhead ground wire (OHGW). A second 345 kV circuit will be installed in the future when conditions warrant. Each circuit of the line will consist of three sets of conductors, one for each phase, hung vertically from insulators attached to davit arms on each side of the monopole structure. Each phase will have a total of two conductor bundles with 18-inch, vertical spacing. The phase conductors are expected to be twisted pair (TP), 636 ACSR "Grosbeak." TP conductors consist of two conductors placed side by side and twisted at a predefined distance by the manufacturer. Each phase will consist of two of these TP conductors to provide optimal current carrying capacity at 345 kV.

OPGW and OHGW will be installed on the structures along the full length of the line during the initial construction. OHGW is a collection of twisted steel wires and OPGW includes a fiberoptic cable with a designated set of fibers surrounded by steel wires. Both protect the conductors from interruptions that may be caused by lightning strikes. OPGW also allows for the exchange of information (i.e.,

communication) between the endpoint substations and other locations on the transmission system.

Q. Will the Applicants need to obtain appropriate authorization to install a second 345 kV circuit when conditions warrant in the future?

A. Yes.

Q. Please describe the Regeneration Station that may be constructed as part of the Project.

A. The Project may involve the construction of a new fiber optic Regeneration Station. A Regeneration Station is required to amplify and regenerate optical communications between substations if another communication connection is not available. The Regeneration Station would have an approximate final footprint of 100-feet-wide by 100-feet-long (0.23 acre). Within the final 0.23-acre footprint, the Regeneration Station will include a small shelter building, a 30-foot-wide permanent access road, underground 240-volt electrical utilities, and may require equipment for backup power. The entire footprint of the Regeneration Station will be permanently fenced and covered with gravel and may have low wattage flood lighting on the outside of the shelter building for security purposes.

The Applicants have not determined a location for the Regeneration Station yet, although it would be installed within the Route Width but may be outside of the right-of-way (ROW) depending on the final route selected. The exact location of the Regeneration Station and its permanent access roads will be determined based on the final route and final Project design. The Applicants anticipate a temporary construction workspace of 150 feet by 200 feet (0.69 acre) to construct the Regeneration Station.

Q. Will permanent access roads outside of the permanent ROW be required for the Project?

A. If a Regeneration Station is constructed, the associated permanent access road may be located outside of the permanent ROW. No other permanent access roads are anticipated to be required for the Project.

Q. Please describe the temporary workspace that will be required for the Project during construction.

A. The construction process will include the following temporary use areas that will be restored following construction, unless the landowner requests they remain after construction is complete:

- If a Regeneration Station is constructed, a temporary construction workspace of approximately 150 feet by 200 feet (0.69 acres) would be required.
- Pulling/tensioning sites will be required to facilitate installation of the conductor, OHGW, and OPGW. These sites typically require an area approximately 200 feet by 700 feet.
- Temporary access to the structures will be required to enable foundation installation, structure assembly and erection, conductor, OPGW and OHGW installation. This access will consist of 30-foot-wide, temporary roads extending from existing roads to the structure sites. To prevent rutting, temporary mats may be installed to facilitate equipment travel to the structure sites, as determined necessary by the contractor.
- Each structure site will require an approximately 150-foot by 200-foot temporary workspace to facilitate foundation construction, structure assembly, and erection.
- Temporary laydown yards may be needed to store materials.

Q. Have the locations of these temporary use areas been finalized?

A. No. The final locations of these temporary use areas are dependent upon the Project's final design and micro-siting that will be completed once the Commission designates an approved route for the Project.

IV. PROJECT CONSTRUCTION

Q. Discuss the personnel who will be involved in the construction of the Project.

A. Although the workforce will ebb and flow over the course of the Project depending on the construction sequencing and time of the year, it is anticipated that construction of the Project will employ approximately 100 to 150 construction workers. The majority of positions needed during construction of the Project will be contracted and are expected to include, but are not limited to: project management, project assistant, safety supervisors, structure hauling, structure framing and setting, linemen, civil foundation drilling and installation, vegetation maintenance, quality assurance/quality control, inspectors, engineers, concrete truck drivers, environmental managers, and other on- and off-site support staff.

Q. Please provide an overview of the construction process.

A. Construction can begin once all necessary regulatory permits, authorizations, and clearances are obtained. Prior to any construction activities starting, landowners will be notified of the Project schedule, contact information, and other related construction activities. The general steps in the construction process are:

- construction survey and staking;
- installation of erosion control measures;
- mobilization and preparation of staging / laydown yards;
- ROW clearing;
- grading (as needed), excavation, and foundation installation;
- structure setting;
- wire stringing and clipping once there are enough structures set consecutively in a row to support a wire pull; and
- cleanup and restoration of the construction areas.

Areas disturbed by construction will be restored to preconstruction condition to the extent practicable and in accordance with landowner agreements.

Throughout the construction process, the Applicants will keep landowners and/or their tenants apprised of timelines should they change due to weather or schedule needs, as appropriate.

Q. Will the Project be constructed to maintain the minimum conductor to ground clearance required by the National Electric Safety Code (NESC)?

A. Yes.

Q. How will the Applicants minimize impacts during construction?

A. The Applicants have conducted extensive work to-date to avoid, minimize, and/or mitigate potential environmental impacts, and will continue those efforts during construction. As described in the Application, the Applicants will employ best management practices to minimize and mitigate impacts, particularly to wetlands, waterbodies, and agricultural areas. The Applicants have developed or will develop several plans to minimize and/or mitigate the potential impacts of Project construction, including:

- Agricultural Impact Mitigation Plan (AIMP). The Applicants have prepared a draft AIMP, which describes proposed measures the Applicants will implement to minimize potential impacts to and restore agricultural lands during and after construction of the Project. The AIMP details methods to preserve topsoil, prevent erosion, avoid and/or minimize soil compaction, avoid and/or minimize impacts to drain tile and other irrigation systems, prevent and/or control the spread of noxious weeds during and following construction of the Project, and restore agricultural land following construction.
- Vegetation Management Plan (VMP). The Applicants have prepared a draft VMP which describes proposed measures the Applicants will implement to minimize potential impacts to vegetation during and after construction of the Project.

- Unanticipated Discoveries Plan (UDP). The Applicants will prepare a UDP to be used in the unlikely event that previously unidentified cultural resources are encountered during construction.
- Stormwater Pollution Prevention Plan (SWPPP). The Applicants will prepare a SWPPP for the Project to meet the requirements outlined in the National Pollutant Discharge Elimination System (NPDES) Permit. The Applicants will implement the SWPPP during the construction and restoration activities associated with the Project. The SWPPP will include measures the Applicants will employ to minimize and/or mitigate the potential environmental impacts of construction.

Additional information on the Applicants' efforts to avoid and/or minimize environmental and cultural resources can be found in the Application and the Direct Testimony of the Applicants' witness Mr. Kevin Scheidecker.

Q. With respect to the use of existing local roads during construction, will the Applicants coordinate with local road authorities regarding the use and restoration of those roads?

A. Yes.

V. PROJECT OPERATION AND MAINTENANCE

Q. Discuss the personnel who will be involved in the operation of the Project.

A. It is anticipated that the Applicants will utilize existing employees and/or retain and oversee contractors for operation and maintenance of the Project. Operation and maintenance of the Project is not anticipated to require new full-time positions. Otter Tail is anticipated to have the primary role in operating and maintaining the Project.

Q. Please describe the procedures that will be employed for inspections and maintenance of the Project.

A. Once the Project is operational, regular maintenance and inspections will be performed to ensure the Project continues to operate safely, efficiently, and reliably. The Applicants will perform maintenance of the Project in compliance with the applicable reliability standards established by the NERC. Generally, the Applicants will inspect the transmission line at least once per year. Inspections are typically limited to the immediate Project ROW by utilizing pre-determined access points. If concerns or problems are found during inspections, repairs will be performed and the landowners and appropriate agencies will be notified, as needed.

VI. PROJECT SCHEDULE AND ESTIMATED COSTS

Q. Has the anticipated schedule for construction and in-service operations of the Project changed from what was contemplated in the Application?

A. Yes. As stated in Section 3.7 of the Application, the Applicants planned to commence construction of the Project in Q2 2028 and be done in 2030 or 2031, with in-service operations anticipated to commence in Q4 2030 or 2031. Under the updated Project schedule, construction is anticipated to commence in Q2 2028 and be completed by the end of 2030. In-service operations are anticipated to commence in Q4 2030. Multiple variables, such as land acquisition, obtaining the necessary federal, state, and local approvals, material lead times, contractor availability, and weather conditions could cause this schedule to change.

Q. What is the estimated total cost of the Project?

A. As discussed in the Application, the Applicants developed cost estimates for the Project in the certificate of need docket that remain valid for the Application. These costs include all transmission line costs (including materials, associated construction, and permitting and design costs) and ROW acquisition costs. A risk reserve is also included in the estimate. The total capital cost of the Project is

anticipated to be between $465 million and $535 million (escalated to the anticipated year spend) depending on the alignment selected.[1] These costs include approximately $300,000 to $500,000 for establishing a Regeneration Station along the Project.

Since filing the Application, the Applicants have updated the estimated costs for each of the alternatives included within the Environmental Impact Statement (EIS) (each a Scoping Alternative). As part of this analysis, the Applicants identified updates to the cost estimates provided in Appendix C of the Application. The updated estimated costs are provided in **Schedule B**.[2]

Q. Please explain the cost estimates provided in Schedule B.

A. **Schedule B** provides the cost estimates for the Scoping Alternatives being studied in the EIS. The estimated cost per segment is only to be considered for comparison purposes between corresponding alternatives between a common start and end point; the summation of individual segments will not equal the total Project cost.

The estimates include transmission line material costs, land cost, engineering costs and construction costs but do not include other Project costs common among

[1] This cost estimate includes the proposed transmission line and associated facilities included in the Application that will be located in Minnesota. The Alexandria to Big Oaks Route Permit also included an estimated cost of $20 million to $28 million for the expansion of the Alexandria Substation (see MPUC Docket No. E002, E017, ET2, E015, ET10/TL-23-159). Additionally, the Applicants' South Dakota Facility Permit Application included estimated costs of $14.2 million to $23.6 million for the expansion of the Big Stone South Substation and an additional $15.5 million to $17.8 million for the new 345 kV transmission line and associated facilities located in South Dakota (see SDPUC Docket No. EL24-015).

[2] The estimated costs in **Schedule B** were previously provided to Energy Infrastructure Permitting (EIP) staff in a Data Request response but have been updated to reflect the current naming conventions for the Scoping Alternatives.

all segments, including but not limited to construction management, contractor mobilizations, environmental inspections, storage yards, environmental surveys, land agent costs and owners' internal costs.

VII. DISCUSSION OF ALTERNATIVES ANALYSIS

Q. In the Applicants' witness Mr. Jason Weiers' Direct Testimony, he describes the Alternatives Analysis conducted for the Project and the Applicants' Preferred Route. Are you aware of this testimony?

A. Yes.

Q. What engineering, constructability, and accessibility issues were evaluated as part of the Alternatives Analysis?

A. For each of the Scoping Alternatives evaluated in the EIS, the Applicants reviewed the routes to determine if there were clearance or safety concerns, unique design or constructability concerns, or accessibility issues. As noted above, the Applicants also considered how various design requirements would impact the cost of each alternative.

Q. What clearance or safety concerns did the Applicants evaluate?

A. The Commission's routing criteria encourage applicants to route new transmission lines along existing transmission, pipeline, and railroad ROWs (among other factors) in an effort to minimize impacts and efficiently utilize existing infrastructure corridors. The Applicants very carefully considered this routing criteria. In areas where colocation was considered, additional engineering analysis was conducted to identify design considerations that would be needed to ensure colocated portions of the Project would comply with required NESC clearances and other safety considerations.

Q. When routing along existing transmission line, pipeline, and railroad ROWs, how do these considerations impact potential routing decisions?

A. For example, where a Scoping Alternative would share and/or parallel existing transmission line ROW, certain separation distances must be implemented in order to ensure safe and reliable operation of the new and existing lines. It is standard industry practice to avoid encroaching upon or overlapping existing utility easements when siting new transmission lines. The distance between the new line and the existing line needs to be sufficient to facilitate compliance with all applicable NESC clearance requirements, ensure that conductor blowout remains contained within the limits of each respective ROW under maximum design loading conditions, and minimize the risk of electromagnetic coupling or induced voltages between parallel transmission circuits over extended distances. The preferred methodology involves aligning the proposed transmission line ROW contiguously along the boundary of the existing ROW.

Paralleling high-voltage transmission lines with pipelines presents additional challenges due to the risks of induced voltages resulting in accelerated corrosion on the pipeline facilities. Alternating currents from transmission lines can disrupt pipeline cathodic protection, increasing corrosion risk and potential for leaks or failures. Ground faults or lightning strikes on the transmission line can further pose risks to pipeline integrity due to grounding the discharge of faults or lightning strikes on the transmission line in the direct vicinity of the pipeline. Additionally, construction of the transmission lines can disturb the pipeline. When colocating transmission lines and pipelines, it typically requires site-specific engineering studies and potential mitigations to uphold the integrity of the pipelines.

With respect to paralleling railroads, electromagnetic fields from transmission lines can induce voltages in rail infrastructure, potentially interfering with signaling systems and creating shock hazards for maintenance personnel. Maintaining proper clearances can be challenging, and shared corridors often lead to access conflicts for transmission line construction and maintenance due to restrictions

often imposed by the owner of the railroad. Colocating transmission lines and railroads typically requires site-specific engineering studies, potential safety/operational mitigations for nuisance shocks and railroad communications, and additional approvals.

Q. How did these considerations impact the Applicants' routing analysis?

A. The Applicants continue to prioritize following existing ROWs, consistent with the Commission's routing criteria. However, given that in most scenarios, the Project ROW would be placed adjacent to (and not overlapping with) these existing ROWs, there were many instances where these routes compared less favorably to other Scoping Alternatives when all of the routing criteria were considered, because the combined ROWs for both the existing infrastructure and new transmission line often resulted in facilities being placed closer to residents or causing unavoidable impacts to sensitive resources.

Q. Are there any specific route alternatives (or portions thereof) where these engineering-related considerations were evaluated?

A. Yes. Route alternatives (or portions thereof) where these engineering-related issues were evaluated include the following:[3]

- Transmission lines:
  - Route Option South 1 where it parallels two existing 115 kV transmission lines.
  - Route Option South 2 where it parallels an existing 115 kV transmission line and an existing transmission line of unknown voltage.
  - Route Option Central 1 where it parallels an existing 115 kV transmission line.

[3] The Applicants analyzed the engineering-related issues on the Route Options presented in the Application; these conclusions are also applicable to many of the Scoping Alternatives as they consist of combinations of the Application's Route Options.

- Route Option Central 2 where it parallels an existing 115 kV transmission line and an existing transmission line of unknown voltage.
    - Route Option North 2 where it parallels an existing 115 kV transmission line and 345 kV transmission line.
    - Segment N11 where it parallels an existing 345 kV transmission line.
- Railroads:
    - Route Option North 2 where it parallels a railroad.
    - Segment N11 where it parallels a railroad.
- Pipelines:
    - Route Option North 2.

Q. What other engineering-related considerations influenced the Applicants' route analysis?

A. The Applicants also considered whether any of the Scoping Alternatives would require long spans (i.e., the distance between transmission poles). Long spans typically require using taller structures to maintain adequate ground clearance and meet NESC requirements. Scoping Alternatives requiring spans exceeding 1,500 feet were avoided because such span lengths require the use of transmission structures greater than 200 feet tall, which would trigger Federal Aviation Administration obstruction evaluations and mitigation requirements (e.g., requiring Determinations of No Hazard). In addition, these longer spans would require the ROW to be expanded beyond 150 feet due to conductor blowout. Therefore, routes requiring span length greater than 1,500 feet and structure heights greater than 200 feet were not selected in order to avoid aviation-related constraints and additional ROW acquisition.

Q. Are there any specific route alternatives or Scoping Alternatives (or portions thereof) that were not preferred by the Applicants because they required long spans?

A. Yes. Long spans would be required on the following:[4]

- BSSR11 (long span would be required over protected features).
- Route Option Central 2 (long span would be required over the middle of a center pivot).
- Route Option South 2 (long span would be required over gravel pits).

VIII. MINIMIZING IMPACTS TO IRRIGATION

Q. Please discuss the Applicants' coordination with local irrigators when developing and selecting the Preferred Route.

A. The Applicants have and are continuing to make extensive outreach and communication efforts with all landowners within the Project Study Area and potential route corridors. One constraint identified early in the process was the potential impact that the Project could have on landowners with center-pivot irrigation. To address this concern, the Applicants engaged in direct outreach to individual landowners at a series of Project-sponsored public open houses and completed a desktop survey utilizing satellite and aerial imagery to identify and digitize locations of center-pivot irrigators within the Project Study Area. As the Applicants narrowed the Project Study Area to final route corridors, they also hosted meetings with a local group of irrigator-owners on July 25 and August 7, 2024 to solicit input on the Project to avoid and/or minimize potential impacts on irrigators.

[4] The Applicants analyzed the engineering-related issues on the Route Options presented in the Application; these conclusions are also applicable to many of the Scoping Alternatives as they consist of combinations of the Application's Route Options.

The Applicants incorporated these comments from landowners, including by making adjustments to the route alternatives, into the Route Options presented in the Application. Since the Application was filed, the Applicants have continued to communicate with irrigator-owners, including holding another meeting with the group on December 2, 2024. Minnesota State Representative Paul Anderson and State Senator Torrey Westrom also attended this discussion. Additionally, the Applicants met with the Minnesota Department of Agriculture Commissioner Thom Petersen on October 29, 2024.

Q. Please describe the types of irrigation systems present along the Scoping Alternatives under consideration.

A. Most irrigators within the Scoping Alternatives are center-pivoting type and cover between 180 and 360 degrees of rotation within their fields. Those in the Project Study Area vary in length from approximately 520 to 1900 feet. A typical practice in this region involves centering the irrigator in a quarter-section field where its radius reaches but does not extend beyond each edge of the field. Several landowners within the Scoping Alternatives have installed irrigators with a feature called a corner system. Corner systems act as a rotating final span of the irrigator and rotate to extend the irrigator's radius to reach field corners and rotate to trail or lead the rest of the irrigator in areas where it is not needed to reach the field edges.

Q. What measures are available to minimize impacts to irrigators?

A. Measures to avoid and/or minimize impacts to irrigators may include selecting route segments that avoid areas with irrigators, incorporating into the design pole placement to minimize impacts to irrigator operations, working with landowners to modify systems, and providing educational materials related to safe operations near transmission lines.

Q. Does the Preferred Route minimize potential impacts to irrigators?

A. Yes.

Q. Will the Applicants place transmission structures so as to minimize impacts to irrigators?

A. Yes. If the Project is routed through areas with irrigators, the Applicants will place poles in locations that would minimize impacts to the irrigators in coordination with landowners.

Q. What other minimization measures will the Applicants implement to minimize impacts to irrigators?

A. In addition to selecting a route that avoids irrigators to the extent practicable, there are additional measures, such as technology, that may be available to minimize impacts to irrigators. For example, there may be limited situations where the Project could interfere with the rotational pathway of existing irrigation. In such situations, the Applicants would work closely with the landowner to determine if implementation of additional equipment, such as GPS guidance or other technology, would allow additional maneuvering of the irrigation equipment to avoid or minimize impacts from the Project. The Applicants would cover the costs to implement such additional technologies where implementation is determined feasible and prudent.

Additionally, the Applicants have prepared an AIMP for the Project that includes measures to avoid and/or minimize impacts to irrigation systems. The Applicants have coordinated with the Minnesota Department of Agriculture to update the draft AIMP to address electrical induction and grounding relative to irrigation systems. The updated draft AIMP is included as Schedule C to the Direct Testimony of Mr. Scheidecker. Educational materials for landowners with irrigation will be distributed prior to construction.

Q. In the May 1, 2025 Order on Route Alternatives for the EIS, the Commission ordered that the draft permit section on grounding must require the applicants to include in the AIMP educational materials on appropriate grounding of structures and operation of equipment near the Project and that the information be provided to all landowners with permanent metal structures and irrigation systems within a certain distance (not yet determined) of the alignment. Are you aware of this requirement?

A. Yes.

Q. What is your response to this requirement?

A. The Applicants are supportive of providing educational materials to landowners on appropriate grounding and operation of equipment near the Project. However, the Applicants believe there is a better way to ensure this educational information is provided to landowners than by how it is currently envisioned in the Commission's order. Rather than including this information as part of the AIMP (which does not typically get distributed to landowners and is not written for the general landowner audience), the Applicants believe that the best way to provide this information to landowners is to include the educational materials on grounding as part of the package of information that is distributed to all landowners within or adjacent to the designated route following permit issuance from the Commission (along with the route permit and complaint procedures). While the possibility of induced voltage largely dissipates at the edge of the ROW, supporting a condition requiring distribution of the educational materials to all landowners within 75 feet of the transmission line (approximately half of the Project ROW), providing this information with the other Project-related information to landowners within or adjacent to the route would ensure that the landowners for whom the grounding information is relevant receive the information, without creating multiple and potentially duplicative mailings to different subsets of landowners along the route.

Q. What measures will the Applicants implement to minimize impacts to drain tile?

A. Prior to start of construction, the Applicants will work with landowners to identify drain tile systems and avoid them to the extent practicable. In the event that drain tile is impacted as a result of the Project, the Applicants will coordinate with the respective landowner(s) to ensure proper repairs at the Applicants' expense.

IX. AIRPORTS AND AIRSTRIPS

Q. Please describe the airports and airstrips located in proximity to the Scoping Alternatives under consideration.

A. The Applicants identified the following existing airports/airstrips located within two miles of the routes evaluated in the Application: three airports/airstrips located in proximity to routes in the South Region (the Ortonville Municipal Airport, the Ortonville Hospital helipad, and one private airstrip); and two private airstrips located on private land in the Central Region. The Applicants did not identify any existing airports or airstrips located in close proximity to any routes in the North Region. The Applicants have not identified any additional airports or airstrips that were not previously evaluated in the Application based on the Scoping Alternatives under consideration.

Q. Of the Scoping Alternatives studied in the EIS, are there any that may impact existing airports/airstrips?

A. Yes. Scoping Alternatives in the South Region in the portion of the Project in Big Stone County that follow Big Stone County Road 15 to the north near the South Dakota – Minnesota border crossing will be closer to the Ortonville Municipal Airport and the Ortonville Hospital helipad. These Scoping Alternatives include BSSR01, BSSR03, BSSR05, BSSR07, and BSSR09. In the area near the Ortonville Municipal Airport, one Scoping Alternative (S210) is proposed to parallel US Highway 12, resulting in a reduced distance from the airport to the route.

Additional information regarding the Applicants' analysis of these Scoping Alternatives is provided in Schedule B of Mr. Weiers' Direct Testimony.

Q. Does the Preferred Route minimize potential impacts to airports and airstrips?

A. Yes. The location of existing airports and airstrips was one of the Applicants' many considerations during the route analysis process. The Applicants' Preferred Route minimizes potential impacts to existing airports and airstrips to the extent practicable. In the South Region, the Preferred Route avoids impacts to the Ortonville Municipal Airport and the Ortonville Hospital helipad. One private airstrip is located north of Holloway near the Preferred Route (specifically, Scoping Alternative SSR01). In this area, the Applicants' Preferred Route is routed north to avoid the airstrip's flight path and minimize impacts to the airstrip to the extent practicable. There are two private airstrips in the Central Region near the Preferred Route (specifically, Scoping Alternative CSR02). The Applicants have proposed a wider Route Width through this area to allow for flexibility during final design of the Project and pole placement to minimize potential impacts on these airstrips. Mr. Weiers' Direct Testimony includes a figure of this area for reference. The Preferred Route avoids all airports and airstrips in the North Region.

X. COORDINATION WITH LOCAL GOVERNMENTS

Q. Please generally describe the Applicants' coordination with local governments.

A. The Applicants have engaged in extensive outreach efforts with local governments throughout the Project development. As discussed in more detail in the Application, the Applicants have coordinated with seven Minnesota counties, 44 Minnesota cities and townships, and 12 other local government units such as water conservation districts, economic development groups, and watershed districts.

Q. Please describe the Applicants' continued coordination with local governments on the Project since filing the Application.

A. Since filing the Application, the Applicants have met with the boards of commissioners of each affected county. The Applicants presented the county boards of commissioners with an update following the Commission's scoping decision, focusing on the additional Scoping Alternatives included via the scoping process, the approved procedural schedule including next steps for public feedback, and answered further questions from the county boards of commissioners. The Applicants presented to Swift County on May 20, 2025, Douglas County on June 3, 2025, Stevens and Big Stone Counties on June 17, 2025, and Pope County on July 15, 2025.

XI. CONCLUSION

Q. Does this conclude your Direct Testimony?

A. Yes.

DIRECT TESTIMONY OF JOSHUA HUMBURG

SCHEDULE A: STATEMENT OF QUAILIFICATIONS

JOSHUA D. HUMBURG

215 S Cascade Street, Fergus Falls, MN 56537 || C: (605) 651-3191 | jhumburg@otpco.com

Summary

Registered Professional Engineer with experience in personnel management, power generation, and project management. Skilled in capital project management, craft leadership, mechanical system performance monitoring, and efficiency optimization. Familiar with numerous technical aspects of mechanical equipment requirements, standards, operation, and maintenance. Has extensive leadership experience through both civilian and military service.

Highlights

- Capital Project Management
- Budgeting and forecasting
- OSHA Process Safety Management
- Power Plant Performance Optimization
- Strong mechanical aptitude
- Radiation Safety
- Expertise in thermo-fluids applications
- Strong background in safety

Experience

Otter Tail Power Company

Senior Project Manager **12/2023 to Present**

- Overall responsibility for budget, risk, and schedule for the Big Stone South to Alexandria 345-kV Transmission Line Project
- Responsible for all Professional Services, Major Supply, and Construction Services Agreements related to the project's development
- Extensive interface with state and government agencies such as but not limited to South Dakota and Minnesota Public Utilities Commissions, Minnesota Department of Transportation and Department of Natural Resources, U.S. Fish and Wildlife Service
- Establish overall project schedule spanning through the execution, ensuring that key development milestones including state permitting have been achieved to maintain the targeted in-service date
- Liaison between numerous internal department and external resources to deconflict and ensure alignment of project priorities

Electrical Supervisor **06/2020 to 12/2023**

- Supervise day-to-day function of Big Stone Power Plant's Instrument and Control Technicians and Plant Electricians
- Responsible for all hiring, mentorship, and discipline of personnel within the I&C Technician and Electrician shops
- Develop and forecast annual O&M and capital budgets for all electrical and controls needs of Big Stone Power Plant
- Ensure strict adherence to the unit's OSHA Process Safety Management covered program and its associated requirements
- Oversee the facility's radiation safety program and all associated training and preventative maintenance requirements
- Responsible for all environmental testing and compliance with EPA, NERC, and state requirements

Plant Engineer **01/2015 to 06/2020**

- Produced and issued technical specifications and requirements for capital project charters and O&M improvements
- Evaluated and select appropriated contract labor and technical services to execute contracts
- Supervised both internal and external craft work to ensure quality and on-time project execution
- Monitored daily unit performance, emissions, and trends, ensuring that each stay within acceptable parameters

Major, North Dakota Air National Guard **Service dates: 06/2015 to Current**

- Responsible for the leadership, supervision, and safe training of 60 servicemen and servicewomen
- Develop logistical requirements and timelines to execute unit training operations
- Frequently direct and facilitate discussions or training sessions with up to 100 service members present
- Evaluate, counsel, and develop subordinate leaders within the unit, preparing them for greater leadership opportunities
- Technical expertise includes antiterrorism and force protection, military policing, weapons handling, and security

Education

Bachelor of Science: Mechanical Engineering **Graduation 05/2014**
South Dakota State University
Magna cum Laude

Certifications

Licensed and Registered Professional Engineer
State of Minnesota: License Number 57231

Technical Skills

Microsoft Office Suite, Autodesk AutoCAD, Onshape 3D, Emerson Ovation

DIRECT TESTIMONY OF JOSHUA HUMBURG

SCHEDULE B: UPDATED COST ESTIMATES

Scoping Alternatives Cost Estimates

Unique Route ID	Length (mi)	Estimated Cost
North 1 (Appendix C of Application)	18.13	$95,246,500
North 2 (Appendix C of Application)	25.26	$127,668,000
Central 1 (Appendix C of Application)	34.43	$165,629,500
Central 2 (Appendix C of Application)	38.52	$193,163,000
South 1 (Appendix C of Application)	41.94	$203,544,500
South 2 (Appendix C of Application)	38.82	$192,279,000
N11	2.07	$11,569,000
N11_North2_Eq	2.13	$12,026,500
N207	1.84	$11,011,000
N207_North2_Eq	2.27	$10,990,500
N206	2.09	$11,178,500
N206_North2_Eq	2.46	$12,731,500
N10	2.06	$12,678,500
N10_North1_Eq	1.53	$10,427,500
N205	1.30	$6,742,000
N205_North1_Eq	1.33	$8,595,500
N9	3.04	$17,115,500
N9_North1_Eq	3.03	$14,894,500
ASR01	18.13	$95,246,500
ASR02	25.26	$127,668,000
C202	2.00	$10,414,500
C202_Central1_2_Eq	2.01	$10,870,500
WBLSR01	12.04	$58,455,500
WBLSR02	12.07	$62,087,000
WBLSR03	12.05	$62,059,000
WBLSR04	12.06	$58,905,000
CAA01	0.49	$3,269,500
CAA01_Central2_Eq	0.47	$4,105,500
CSR01	8.98	$44,288,000
CSR02	8.93	$43,794,500
C203	3.00	$15,133,000
C203_Central2_Eq	2.99	$15,119,500
C208	4.58	$26,622,500
C208_Central2_Eq	4.76	$23,257,000
HSR01	13.41	$64,144,000
HSR02	17.55	$86,758,000
HSR03	17.50	$88,328,000
SAA01	2.03	$10,897,000
SAA01_South1_Eq	2.03	$9,981,500

Unique Route ID	Length (mi)	Estimated Cost
SAA02	2.22	$12,233,500
SAA02_South2_Eq	2.19	$9,418,000
SAA03	0.51	$4,193,000
SAA03_South1_Eq	0.53	$3,350,500
S203	1.78	$13,343,000
S203_South2_Eq	1.98	$11,281,500
S201	2.61	$17,807,500
S201_South2_Eq	1.64	$10,358,000
S202	8.10	$40,535,500
S202_South2_Eq	3.32	$20,789,000
S18	2.39	$14,604,000
S18_South2_Eq	1.46	$7,506,500
S204	3.00	$15,133,500
S204_South1_Eq	3.00	$14,212,000
S205	7.52	$36,069,500
S205_South1_Eq	8.50	$43,418,000
SSR01	26.02	$124,861,500
SSR02	25.16	$121,842,000
SSR03	25.50	$117,994,000
SSR04	25.52	$121,500,000
SAA04	0.65	$4,967,500
SAA04_South2_Eq	0.68	$4,127,000
S208	3.65	$27,334,000
S208_South2_Eq	2.55	$13,327,000
S210	4.66	$23,736,500
S210_South1_Eq	3.74	$17,511,500
S207	1.99	$12,405,500
S207_South2_Eq	1.52	$13,657,000
BSSR01	15.93	$78,683,000
BSSR10	15.62	$80,303,500
BSSR03	14.90	$76,388,500
BSSR02	13.66	$71,358,000
BSSR04	14.67	$75,664,859
BSSR06	15.59	$77,468,097
BSSR05	14.97	$80,270,000
BSSR08	14.67	$75,178,729
BSSR07	15.95	$81,605,000
BSSR11	14.10	$67,878,500
BSSR12	14.13	$67,934,000
BSSR09	15.98	$84,575,500

Notes:

1) The estimated cost per segment are only to be considered for comparison purposes between corresponding alternatives between a common start and end point. The summation of individual segments will not equal the total Project cost. The estimates include transmission line material costs, land cost, engineering costs and construction costs but do not include other project costs common among all segments including but not limited to construction management, contractor mobilizations, environmental inspections, storage yards, environmental surveys, land agent costs and owners' internal costs.