# Exhibit No. 9

Grain Belt Express LLC – Exhibit 9
Aaron White
Direct Testimony
File No. EA-2023-0017

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| Exhibit No.: | |
| Issue(s): | Design and Engineering, Qualifications, Operations and Maintenance |
| Witness: | Aaron White |
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| Sponsoring Party: | Grain Belt Express LLC |
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# MISSOURI PUBLIC SERVICE COMMISSION

# FILE NO.

# EA-2023-0017

# DIRECT TESTIMONY

# OF

# AARON WHITE

# ON

# BEHALF OF

# GRAIN BELT EXPRESS LLC

# August 24, 2022

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# I. INTRODUCTION

**Q. Please state your name and business address.**

A. My name is Aaron White. I work for Invenergy LLC ("Invenergy") at One South Wacker Drive, Suite 1800, Chicago, IL 60606.

**Q. What is your position with Invenergy?**

A. I am a Senior Transmission Engineering Manager.

**Q. Please describe your educational background and employment experience.**

A. I obtained a Bachelor of Science degree in civil engineering from the University of Utah in May 2012. Following that, I became a Licensed Professional Engineer in December 2016 and am registered with the State of Utah.

I have been employed by Invenergy LLC as a Senior Transmission Engineer since April 2019. In that role, I have supervised the engineering and construction of several major transmission projects, which I describe in more detail below.

From May 2012 to April 2019, I worked as a consultant for Electrical Consultants, Inc. ("ECI"). In that role, among other things, I provided input to and created various ECI standards and design guidelines regarding the development, design and construction of power line systems ranging from 12.5 kV to 500 kV, which I describe in more detail below. I also provided training to multiple ECI offices for the implementation of standards and guidelines to promote early contractor coordination and efficiency.

From April 2010 to November 2011, I worked as an Engineer Technician with the United States Forest Services. In that role, among other things, I managed construction contracts, performed construction inspections and surveyed roads, bridges and culverts to produce surfaces that aided in design and reconstruction.

A copy of my curriculum vitae is attached as Schedule AW-1.

**Q. Do you have experience in engineering, construction and project management of high voltage electric transmission lines?**

A. Yes. Currently, I am managing the civil and electrical engineering teams developing the Clean Path line in New York, including its converter station sites, and 175 miles of symmetric monopolar HVDC transmission line. Clean Path New York is a 400 kV transmission line with approximately 1300 MW of capacity. It has a projected commercial operation date of 2027. I am also currently managing the civil and electrical engineering teams developing the North Path transmission project in New Mexico, including its converter stations and 400 miles of HVDC overhead transmission lines. North Path is a 525 kV transmission line with approximately 4000 MW of capacity. It has a projected commercial operation date of 2028.

I previously served as Engineer of Record for the Sagamore Wind transmission line project in New Mexico. The Sagamore Wind transmission line was 345 kV and connected the Sagamore Wind electricity generator to the Crossroads substation. I prepared the written engineering report which detailed the recommended right-of-way width of the transmission line with supporting calculations and exhibit drawings. The New Mexico Public Regulation Commission approved the project.

I also previously served as electrical engineering manager for the Energia del Pacifico El Salvador project. In that role, I managed the preparation of the construction bidding documents for tie-in components of the LNG-to-power project which will provide power for 30 percent of the country's power demand. The tie-in components included a 230 kV substation, a 115 kV substation, 0.4 miles of double circuit underground 115 kV transmission line and 28 miles of double circuit 230 kV lattice towers. I was responsible for all contract exhibits, material specifications, design specifications, preliminary design drawings and construction specifications.

I also served as a program manager for the expansion of a 115 kV transmission line system owned by McKenzie Electric Coop., including right-of-way determination, surveying, permitting and detailed transmission design for over 33 projects totaling approximately 150 circuit miles.

I also served as the project engineer for an Invenergy transmission line connecting the generation from over 150 turbines as part of the Miami Wind project. In that role, I performed detailed design work for 23 miles of 345 kV transmission line and developed routing, PLS CADD modeling, structure configuration, structure point load calculations, swing calculations, EMF calculations, flashover calculations, insulation calculations, structure detail drawings, stringing charts, plan and profile drawings, staking sheets, phasing diagram and foundation calculations. I prepared specifications for optical ground wire ("OPGW"), insulators and hardware, steel poles and construction operations. I also worked closely with client, contractor and material suppliers regarding schedules and critical project items.

I also served as a design engineer for the Sigurd – Red Butte 345 kV transmission line built by PacifiCorp, which traversed 172 miles.

Further, I served as a design engineer for the Mona – Oquirrh 345 kV/500 kV transmission line built by PacifiCorp, which traversed 92 miles.

In addition, I have served as project manager, project engineer or design engineer for 17 additional transmission lines ranging from 1 mile to 50 miles long and with voltages ranging from 115 kV to 345 kV.

All of these projects are identified on my attached curriculum vitae.

**Q. What are your duties and responsibilities in your present position?**

A. I am the Engineering Manager for the Grain Belt Express Project, as defined below. In that role, my responsibilities include managing development support, early construction activities and engineering services for the entire transmission line.

**Q. What is the purpose of your testimony?**

A. I am testifying on behalf of Grain Belt Express, which is filing an Application to Amend Existing Certificate of Public Convenience and Necessity ("Application") to construct an approximately 800-mile, overhead, multi-terminal +/-600 kilovolt ("kV") high-voltage, direct current ("HVDC") transmission line and associated facilities including converter stations and alternating current ("AC") connector lines (the "Project").

Specifically, the purpose of my testimony is to:

- Demonstrate Grain Belt Express' experience and qualifications construct, own, operate, control, manage, and maintain the Project in satisfaction of the Commission's *Tartan* Factor;
- Discuss Grain Belt Express' plans to use local resources;
- Discuss the Project development timeline;
- Provide an update on plans and specifications for the HVDC portion of the Project;
- Describe plans and specifications for the Tiger Connector;
- Provide an update on construction costs of the Project; and
- Describe plans for operating and maintaining the Project and plans for restoration of service after unplanned/forced outages

Specifically, my testimony addresses the following filing requirements:

- "A description of the asset(s) to be operated (20 CSR 4240-20.045(5)(A));

- "Plans and specifications for the asset, including as-built drawings" (20 CSR 4240-20.045(5)(D));[1]
- "A description of the plans, specifications, and estimated costs for the complete scope of the construction project that also clearly identifies what will be the operational features of the asset once it is fully operational and used for service" (20 CSR 4240-20.045(6)(C));
- "The projected beginning of construction date and the anticipated fully operational and used for service date of the asset" (20 CSR 4240-20.045(6)(D);
- "An overview of plans for operating and maintaining an asset" (20 CSR 4240-20.045(6)(I)); and
- "An overview of plans for restoration of safe and adequate service after significant, unplanned/forced outages of an asset." (20 CSR 4240-20.045(6)(J)).

**Q. Are you sponsoring any schedules or exhibits as part of your direct testimony?**

A. Yes, I am sponsoring the following exhibits/schedules:

- Schedule AW-1 – Curriculum Vitae
- Schedule AW-2 – HVDC Tower Diagrams
- Schedule AW-3 – Tiger Connector Poles and Assemblies
- Schedule AW-4 – Converter Station Layout

## II. GRAIN BELT EXPRESS' QUALIFICATIONS AND EXPERIENCE

**Q. Please describe the business of Grain Belt Express.**

A. As set forth in the testimony in Shashank Sane, Grain Belt Express is a limited liability company organized under the laws of the State of Indiana. Grain Belt Express is a wholly

[1] My testimony incudes conceptual drawings in Schedules AW-2, AW-3, and AW-4. At this stage of development "as-built drawings" are not available. However, Grain Belt Express is not opposed to providing "as-built drawings" to the Commission when available.

owned subsidiary of Invenergy Transmission LLC ("Invenergy Transmission"), a Delaware limited liability company, which is a wholly owned subsidiary of Invenergy Renewables LLC ("Invenergy Renewables"), also a Delaware limited liability company. Invenergy Transmission and its affiliate company, Invenergy Renewables, are global leaders in renewable energy and transmission development. Invenergy Transmission or its affiliates are providing engineering, procurement and construction support and management for Grain Belt Express pursuant to agreements with Grain Belt Express.

Invenergy Transmission's mission is to construct and operate high voltage transmission lines and associated facilities for the purpose of connecting the best renewable resources in the U.S. and delivering their output to load and population centers that have an increasing demand for electricity produced from renewable resources.

**Q. Is Grain Belt Express qualified to provide services associated with the Project?**

A. Yes. In the Commission's March 20, 2019 Report & Order on Remand in Case No. EA-2016-0358, the Commission found that "Grain Belt and Invenergy together have the qualifications … to develop, construct, and operate the Project," citing Invenergy's management team's extensive experience in developing, constructing and operating transmission and energy infrastructure projects and Invenergy's impressive record of development and construction of energy projects, including hundreds of miles of transmission lines, substations and transformers.[2] In the Commission's September 11, 2019 Amended Report and Order in Case No. EM-2019-0150, the Commission restated that Invenergy possessed the requisite technical qualifications to develop,

[2] Case No. EA-2016-0358, Report and Order on Remand, pp. 20-21, 43.

construct, and operate the Project.[3] Since 2019, the Invenergy family of companies have continued to expand their experience and qualifications.

**Q. Please describe the experience of Grain Belt Express' management team.**

A. Through its affiliates, Grain Belt Express has access to a management team that includes executive, professional and technical personnel who have managed, built, operated and financed projects in the renewable and traditional energy sectors. The management team has financed billions of dollars of energy projects and managed the development of projects that produce or transmit thousands of megawatts of power. Members of the management team have had management, engineering and other supervisory roles in the construction of transmission lines. Grain Belt Express is capable of planning, engineering, procurement and construction services for electric transmission systems, collection systems, substations, power generation (primarily renewable energy) and related systems.

**Q. Please describe Invenergy Transmission's and Invenergy Renewable's recent projects.**

A. Invenergy Transmission through its wholly owned direct and indirect subsidiaries is developing two significant high voltage transmission line projects in different regions of the United States. It is also associated with the development of a third significant high-voltage transmission line in the United States through its parent company, Invenergy Renewables.

Invenergy Renewables has developed and constructed over 4,000 miles of transmission and collection lines located throughout the United States and internationally, covering nearly all ice and wind structural loading regions, through various air contaminants and lightning isochronic levels, tying into weak and strong power grids while meeting interconnection requirements,

[3] Case No. EM-2019-0150, Amended Report and Order, p. 7.

traversing geographical regions such as the Nevada desert, the mountainous terrain of Idaho, the wetlands of Texas, the farmland of Illinois, the swamps of Georgia and more. All this work has been performed utilizing various local and regional contractors. The company's success comes from a culture which strives for technical expertise, versatility and accountability. This culture is dominant throughout the company and is maintained throughout the corporate structure.

For example, Invenergy Renewables and its affiliate companies recently developed and constructed, and is currently operating, a 27-mile transmission line in eastern Texas. The transmission line includes seven miles of single circuit 345 kV and 20 miles of double circuit 345 kV designed to deliver 1,600 MW of solar generation. Large areas of the planned transmission corridor were surveyed and classified as wetlands during early-stage development. A strategy was developed and discussed with the United States Army Corp of Engineers ("USACE") to perform the construction under what was Nationwide Permit 12, Utility Line Activities (prior to 2021 renewal, now Nationwide Permit 57, Electric Utility Line and Telecommunications Activities). Permit requirements included limiting the loss of waters of the United States or permanent disturbance to wetlands. Components of the strategy developed in coordination with the USACE included using non-mechanized methods to clear vegetation from the right-of-way, incorporating a foundation design which did not require the removal of any soil and designing and planning for structure erection to be performed by helicopter to avoid heavy crane access within delineated wetlands located along the transmission corridor.

**Q. Please describe Grain Belt Express' approach to safety.**

A. Worker safety and the safety of the public is our number one priority through design, construction, and operations. Evaluating health and safety reports or OSHA Work-Related Injuries and Illnesses is critical when selecting the general and sub-contractors for each project to

ensure the success of any project. If an incident which risks the safety of the public or those working on the project does occur, it is Grain Belt Express' and its affiliate's practice to stop work and perform a full inspection of operations and equipment.

**Q. Does Grain Belt Express have specific experience constructing electric transmission lines and other linear infrastructure projects across agricultural lands, wooded lands and other rural properties?**

A. Yes. The management team for Grain Belt Express has significant experience in each of these environments. As an example, the management team for Grain Belt Express developed the Traverse Wind Project, which crossed more than 85 miles of rural properties, including agricultural properties on which crops such as soybeans, corn, hay and alfalfa were being grown. The development and construction site team worked diligently with landowners to minimize impacts to individual properties by keeping structures out of areas which would negatively impact agricultural operations, such as avoiding pivot circles and coordinating specific access to the right-of-way and individual structures. The Traverse Wind Project also crossed rivers and other sensitive or protected environments. The management team for Grain Belt Express was responsible for mapping access routes, conducting extensive surveys of endangered species (both plant and animal), designating wetlands and other sensitive areas and training over 400 workers on environmental compliance.

Grain Belt Express' environmental regulatory specialists, like Jennifer Stelzleni, who is also testifying in support of this Amendment Application, have experience managing environmental construction concerns and will do so for the Project.

**Q. Will Grain Belt Express have the managerial and technical capabilities to develop, construct and operate the Project?**

A. Yes. As the Commission twice found in 2019, Grain Belt Express and its affiliates have established a management and technical team with significant experience in regulatory and land development, procurement, construction management, technical requirements, and operations relevant to the Project.

Consistent with standard industry practice, the management and technical teams will supervise and oversee the contractors who will perform the detailed engineering/design, procurement, construction and operating and maintenance functions for the Project. As explained in more detail below, Grain Belt Express will contract with and rely on experienced, qualified companies to perform these functions. Grain Belt Express has and will select vendors, contractors, and consultants with strong and suitable expertise in all areas relevant to the Project.

**Q. Are you familiar with the Commission's factors for granting a CCN, referred to as the "*Tartan* Factors"?**

A. Yes, it is my understanding that, in its review of CCN applications, the Commission has traditionally applied several criteria, which it refers to as the "*Tartan* Factors." In this testimony, I provide support for the fourth *Tartan* Factor, which requires that an applicant for a CCN must be qualified to provide the proposed service.

**Q. In your view, does Grain Belt Express meet this factor?**

A. Yes. I as explained above, and consistent with previous findings of the Commission, Grain Belt Express is fully qualified to design, engineer, and construct the proposed Project and provide the proposed service, utilizing the significant expertise and resources of its Grain Belt Express' affiliates.

## III. GRAIN BELT EXPRESS' USE OF LOCAL RESOURCES

**Q. Please describe Grain Belt Express' plans to use local resources.**

A. Invenergy Transmission and its affiliate companies, including Grain Belt Express, strive to utilize a local workforce, local expertise and local material sourcing. Invenergy Transmission's success in utilizing local workers comes from experience having developed projects across the country and continually building new relationships. Engagement with local workforce and material sourcing includes a range of services throughout development and construction and includes but is not limited to land survey, environmental surveys, right-of-way acquisition, vegetation clearing contractors, material procurement and construction labor.

**Q. Does Grain Belt Express have any current agreements with Missouri suppliers?**

A. Yes. Grain Belt Express has entered into a Memorandum of Understanding with Hubbell Power Systems ("Hubbell") to supply conductor hardware and insulators for the Project. Hubbell is a global manufacturer of a wide variety of transmission, distribution, substation and telecommunications products that are well known and trusted throughout the industry and are used by many of the largest utilities in the U.S. Hubbell currently has a plant and distribution center in Centralia, Missouri that can be used for the Project. Hubbell can also make its engineering resources available to aid in the design of conductor hardware assemblies and insulators.

Grain Belt Express has also executed a Letter of Intent with Prysmian as a preferred supplier of conductor for the Project. Prysmian is the world's largest wire and cable manufacturer with revenues worth over 13 billion dollars in 2021. Prysmian will supply roughly 23 million feet of steel core for the transmission line conductor. Prysmian will use commercially reasonable efforts source aluminum rod used in the conductor for the Project with aluminum from the Magnitude 7 aluminum smelter near New Madrid, MO.

The aforementioned vendors and other vendors for the Kansas to Missouri portion of the project will be selected in near term and Grain Belt Express will weigh the selection of these vendors equitably for the value they bring to the local economy. On July 11, 2022, Invenergy Transmission coordinated with PAR/Quanta to host a supplier social event in St. Louis, MO where representatives provided a presentation on the scope, size, services and resources that will be needed to construct the Project. Attendees included suppliers who offer a variety of services across the route area and state-wide. Invitations were sent to about 50 suppliers[4], and about 40 individuals attended, representing 30 supplier companies. Grain Belt Express will seek to continue to maximize the use of local contractors and suppliers where practicable.

Grain Belt Express will also continue to engage local communities prior to the start of any construction by, for example, holding project awareness meetings at local facilities to allow the public and the EPC contractor(s) to meet. These meetings will serve several purposes, including the following: (i) communicating to the public the details of the construction activities, sequencing and proposed schedules; and (ii) affording Grain Belt Express the opportunity to learn about and/or firm up local suppliers and service providers in the area that may be utilized on the Project.

## IV. PROJECT DEVELOPMENT TIMELINE

**Q. Is Grain Belt Express currently developing the certificated Project?**

A. Yes. Grain Belt Express continues to develop the certificated Project. There are no material changes to the HVDC portion of the Project, which constitutes the great majority of

[4] Invited suppliers include Agricycle, Altec, ASP Enterprises, Bates Utility, CCI Effingham, Collins and Hermann, Concrete Strategies, Consolidated Pipe, DIG Castle, DJM Ecological Services, Fred Weber Building Products K&K Supply, Keeley Construction, Kiewit, Kimaterials, Kuesel, McGrath & Associates, Inc., Michaels, Millstone Weber, Nucor Harris Rebar, PAR, POWER Engineers, Rubin Brown, Safety International, Silver Eagle Construction Products, SITE,Terracon, Traffic Control Company, United Rentals, and Safety International.

the currently certificated Project. Accordingly, Grain Belt Express has been and continues to develop the certificated Project.

**Q. When will full-scale construction of the Project begin?**

A. As discussed in the Direct Testimony of Shashank Sane and others, Grain Belt Express is requesting to construct the Project in two phases (*i.e.* Phase I and Phase II). Subject to continuing land acquisition and financing, as discussed by witnesses Kevin Chandler and Ms. Shine, respectively, Grain Belt Express is targeting to begin construction on Phase I of the Project with an earliest possible construction start in 2024. It is anticipated that Phase I of the project will be fully operational and in service by the end of 2027. Grain Belt Express is targeting to begin construction on Phase II of the project lagging 18 months behind Phase I. It is anticipated that the completion or in-service period for Phase II would be the second quarter of 2029.

**Q. Please provide additional details on the construction timeline for Phase I.**

A. Grain Belt Express is currently advancing Phase I detailed engineering along with other pre-construction activities which include but are not limited to right-of-way acquisition, environmental permitting, utility crossing agreements, and road use agreements. Detailed structural design and full-scale tower testing is currently ongoing and is anticipated to be complete before the end of the year (2022). Grain Belt Express will begin tower procurement activities upon completion of the tower testing. Initial material sourcing activities for the conductor, line hardware, and insulator assemblies have begun. Limited geotechnical investigations have been performed with additional investigations anticipated to further inform design and construction of tower foundations. Structure locations and access to structures has been developed at a desktop level. Engineering and construction teams will begin micro siting structure locations the fourth quarter of this year (2022). Objectively the micro-siting of structures and access will further

minimize impacts to landowners, land resources, and the environment. Material procurement and micro siting activities will continue throughout 2023 and shall be advanced such to allow for the targeted construction start previously stated.

Detailed engineering for the converter stations will begin in 2023 following the initial engineering studies to be performed by the converter station vendor. It is intended that a civil contractor will be engaged prior to beginning detailed engineering and that civil contractor will assist in the construction planning process for the converter station. Construction planning activities will include but are not limited to logistics for major materials, site grading, structural design of valve hall and other converter station structures. The procurement of the converter station main components is currently anticipated to begin mid-2024.

**Q. Please provide additional details on the construction timeline for Phase II.**

A. Phase II is currently targeting start of construction lagging 18 months Phase I start of construction. No additional construction schedule details are available at this time.

## V. UPDATE ON THE OPERATIONAL FEATURES OF THE HVDC PORTION OF PROJECT

**Q. Are there any material changes to the operational features of the HVDC portion of the Project?**

A. As discussed above, there are no material changes to the HVDC portion of the Project, and Grain Belt Express continues to develop that portion of the Project. However, Grain Belt Express has made some improvements to the operational features of the HVDC portion of the Project that are worth mentioning.

**Q. Has Grain Belt Express made improvements to the converter station and HVDC conductors?**

A. Yes. Improvements to the converter technology and technical specifications of the HVDC conductors are described in the Direct Testimony of my colleague, Carlos Rodriguez.

**Q. Has Grain Belt Express made improvements to the HVDC towers?**

A. Yes. The lattice towers for the ±600 kV HVDC have adopted several updates specific to further strengthen the operational performance of the transmission line. The "extreme wind" structural load case for which the lattice towers were originally designed was based on wind speeds consistent with the 50-year Mean Recurrence Interval ("MRI"). The current lattice tower design has been updated to account for the 100-year MRI wind speed for the "extreme wind" structural load case. This is per recommendations released in the Guidelines for Electrical Transmission Line Structural Loading, 4th ed. ASCE (2020) 4th edition. Additionally, the lattice tower design was updated to account for modifications to the Dedicated Metallic Return ("DMR") conductor. The DMR was modified to improve operational performance and to reduce electrical losses during various operating modes. Conceptual tower performance drawings for the HVDC towers are provided in Schedule AW-2.

**Q. Do you consider the foregoing improvements to be "material change[s] in the design and engineering of the Project"?**

A. From my perspective as an engineer, the foregoing improvements are not material changes in the design and engineering of the Project, as was approved in the Report and Order on Remand in Case No. EA-2016-0358. Improving upon design and technology as a project progresses from the permitting phase to construction is a common and beneficial process for any transmission project.

## VI. OPERATIONAL FEATURES OF THE TIGER CONNECTOR

**Q. What is the Tiger Connector?**

A. As discussed in the Direct Testimony of Carlos Rodriguez, Grain Belt Express is proposing to use two points of interconnection ("POIs") at and near the McCredie Substation in Callaway County, Missouri. In order to reach the POIs, Grain Belt Express is proposing to move the Missouri converter station from Ralls County to Monroe County and in lieu of AC interconnection facilities in Ralls County, construct an approximately 40-mile, 345 kV AC transmission line from the converter station in southern Monroe County to the POIs in Callaway County. This approximately 40-mile transmission line is referred to as the "Tiger Connector."

**Q. Is the construction of an AC transmission line in Missouri a new feature of the Project?**

A. No. The Project has always included AC interconnecting facilities to be constructed by Grain Belt Express to connect the converter station to the existing AC grid.[5] However, as a result of finalizing the proposed POIs, we now know the specifics of the AC facilities required to reach the POIs.

**Q. What are the plans and specifications for the Tiger Connector?**

A. The Tiger Connector as proposed is a double circuit 345 kV AC transmission line designed to deliver 2,500 MW to the proposed POIs. The structures for the Tiger Connector will be steel poles on concrete pier foundations. Typical in-line ("Tangent") and tension holding

[5] 2016 Application, ¶ 1 (seeking a CCN to, among other things, "construct, own, operate, control, manage and maintain … alternating current ("AC") interconnecting facilities, including an AC switching station and related AC transmission lines."); CCN Order, p. 10 ("Grain Belt proposes to construct the Missouri converter station and associated AC interconnecting facilities in Ralls County"); CCN Order Attachment 1 at Section III.3 (discussing the "Grain Belt-owned portion of the AC electric transmission line connecting the Grain Belt proposed Missouri conversation to the AC grid").

("Dead End") structures are depicted in Schedule AW-4. Each circuit of the transmission line will include three phases consisting of double bundle conductors and an Optical Ground Wire ("OPGW") for communication and lighting protection. Typical span lengths will be range between 800 and 1,000 feet. The insulator assemblies which will support the conductors are anticipated to be v-string as depicted in Schedule AW-4. The v-string insulator assembly is intended to minimize the conductor movement due to wind within the right-of-way.

## VII. UPDATES TO PROJECT COST

**Q. What is the anticipated cost for the complete scope of the Project?**

A. The total cost for Phase I and Phase II is estimated to be 4.95 billion dollars. This cost excludes network upgrades. The cost for Phase I is estimated to be 3.52 billion dollars with Phase II estimated at 1.43 billion dollars. A portion of the Kansas converter station may be built out with Phase II in which case the proportional amount would change. [Add discussion of total cost, Phase I cost, Phase II cost, etc.].

**Q. How does the currently anticipated cost impact the economic viability of the Project and the ability to finance the Project?**

A. Economic viability of the Project is discussed in the Direct Testimony of Mark Repsher and Shashank Sane. Plans for financing the Project are discussed in the Direct Testimony of Rolanda Shine.

## VIII. PLANS FOR OPERATING AND MAINTAINING THE PROJECT

**Q. Please describe Grain Belt Express' plans for operating and maintaining the Project.**

A. Grain Belt Express will have a dedicated operations organization to oversee the operations and maintenance activities associated with the Project. This organization may utilize

in-house personnel to plan, manage and schedule the required maintenance on the HVDC and transmission facilities. The Project may also contract with a firm or firms experienced in maintaining transmission facilities to provide operational and maintenance services for the Project when it is in service. These firms will be required to have sufficient maintenance resources in place along the route of the Project in Kansas, Missouri, Illinois and Indiana to ensure timely responses to any operational or service issues. Further, in connection with its grant of authority by FERC to negotiate rates for transmission service, Grain Belt Express has committed to turn over functional control of the Project, including scheduling responsibilities, to an RTO (which will be SPP, MISO or PJM) and to operate the transmission line pursuant to an OATT.

With respect to maintenance of the Project, Grain Belt Express will contract with a firm or firms experienced in electric transmission maintenance and operations to provide maintenance services and capital replacements and upgrades as necessary. This contract could be with a utility or utilities or with a firm that performs transmission line maintenance and construction services. Given the approximately 800-mile length of the Project, Grain Belt Express could contract with more than one company to provide these services. Additionally, Grain Belt Express will work closely with the interconnected utilities, relevant RTOs and other entities in the region to ensure that appropriate operational agreements, which ensure coordinated operations, are in place per NERC reliability standards. Operations and maintenance will be performed to meet or exceed all applicable standards and codes.

**Q. Does Grain Belt Express expect to have an office or offices in Missouri in connection with the construction and the operation and maintenance of the Project?**

A. Yes. There will be temporary construction offices opened at various points along the route of the Project during its construction, including in Missouri. These offices may be

facilities of Grain Belt Express or facilities of one or more of the project contractors. After the transmission line is placed into service, Grain Belt Express anticipates that there will be one or more facilities opened along the route of the line as the base(s) of operations for operating and maintenance personnel. Again, these facilities will either be facilities of Grain Belt Express or facilities of the contractor or contractors retained to provide operating and maintenance services for the Grain Belt Express. The facility or facilities will be located such that resources can be quickly allocated to any point on the transmission line where maintenance or restoration services may be needed.

**Q. Will Grain Belt Express be prepared to comply with applicable NERC reliability standards in operating the Project?**

A. Yes. NERC reliability standards are mandatory and enforceable (through the imposition of monetary penalties or other sanctions), pursuant to Section 215 of the Federal Power Act and regulations and orders of the FERC. Compliance with these standards is important to ensure the reliability of the bulk power system. Grain Belt Express expects to be registered on the NERC Compliance Registry for the reliability functions of a "Transmission Owner," a "Transmission Operator" and a "Transmission Service Provider" (depending on the nature of its arrangements with a third party or parties to operate the Project, which could result in some or all of the Transmission Operator or Transmission Service Provider functions being assigned to the third party). Therefore, Grain Belt Express will be subject to applicable requirements of one or more NERC reliability standards in some or all of the following categories: Resource and Demand Balancing; Communications; Critical Infrastructure Protection; Emergency Preparedness and Operations Procedures; Facilities Design, Connections and Maintenance; Interchange Scheduling and Coordination; Interconnection Reliability Operations and Coordination; Modeling, Data and

Analysis; Personnel Performance, Training and Qualifications; Protection and Control; Transmission Operations; Transmission Planning and Voltage and Reactive Control. Grain Belt Express will be prepared to comply with the requirements of the reliability standards that are applicable to its activities.

**Q. Please describe Grain Belt Express' plans for restoration of safe and adequate service after significant, unplanned/forced outages of an asset.**

A. Worker safety and the safety of the public is our number one priority through design, construction, and operations. Evaluating and maintaining health and safety reports or OSHA Work-Related Injuries and Illnesses, established operational procedures, pre-work inspections of equipment and tools, and the presence of health and safety inspectors during operations are all critical components for successful long-term operations.

Grain Belt Express will develop project specific procedures for unplanned or forced outages which will define the roles and responsibilities of those performing work under such conditions. Following disruption of operational data, the responsible party will assess the data and dispatch qualified field technicians to inspect the transmission line as determined. Those dispatched will be responsible for performing and documenting the initial assessment work which would include assessing whether the current status is safe, implementing protocol to ensure the safety of the public and immediate site safety as required, damage assessment, assessment of additional resources, and further coordination with operations and asset management to determine a detailed restoration plan which ensures worker safety and the safety of the public.

Grain Belt Express restoration procedures will involve maintaining readily available components and additional spare materials for replacement when needed. Spare materials would be located or staged at multiple locations such that resources can be quickly allocated to any point

on the transmission line where maintenance or restoration services may be needed. In the unlikely event that multiple structures fail in unison and insufficient materials are available for immediate replacement, restoration of the line would be addressed using predetermined temporary structures and material for rapid response and restoration. Additional materials would be procured, and a full restoration planned and coordinated with a scheduled outage.

## IX. CONCLUSION

**Q. Does this conclude your testimony?**

A. Yes, it does.

**BEFORE THE PUBLIC SERVICE COMMISSION**
**OF THE STATE OF MISSOURI**

| | | |
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| In the Matter of the Application of Grain Belt Express LLC for an Amendment to its Certificate of Convenience and Necessity Authorizing it to Construct, Own, Operate, Control, Manage, and Maintain a High Voltage, Direct Current Transmission Line and Associated Converter Station | ) | File No. EA-2023-0017 |

## AFFIDAVIT OF AARON WHITE

1. My name is Aaron White. I am the Senior Transmission Engineering Manager for Invenergy, LLC ("Invenergy"). My business address is One South Wacker, Suite 1800, Chicago, Illinois 60606.

2. I have read the above and foregoing Direct Testimony and the statements contained therein are true and correct to the best of my information, knowledge, and belief.

3. Under penalty of perjury, I declare that the foregoing is true and correct to the best of my knowledge and belief.

DocuSigned by:
Aaron White
445ACDCE7BC94A2...
Aaron White
Senior Transmission Engineering Manager
Invenergy LLC

Date: 8/24/2022