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MISSOURI PUBLIC SERVICE COMMISSION

FILE NO. EA-2024-0302

DIRECT TESTIMONY

OF

GREGORY EDDINGS

ON

BEHALF OF

AMEREN TRANSMISSION COMPANY OF ILLINOIS

St. Louis, Missouri
July, 2024

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1 **I. INTRODUCTION AND BACKGROUND**

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

3 A. My name is Gregory Eddings. My business address is 1901 Chouteau Avenue, P.O.
4 Box 66149, St. Louis, Missouri 63166-6149.

5 **Q. By whom are you employed and in what capacity?**

6 A. I am employed by Ameren Services Company (Ameren Services) as Supervising
7 Engineer, Transmission Substation Design.

8 **Q. What are your responsibilities as Supervising Engineer?**

9 A. In my current position as Supervising Engineer for Ameren Services, I lead the
10 Transmission Substation Design team that designs high voltage and extra high voltage substations
11 on behalf of Ameren Corporation's transmission-owning utilities: Ameren Transmission Company
12 of Illinois (ATXI), Ameren Illinois Company d/b/a Ameren Illinois (Ameren Illinois), and Union
13 Electric Company d/b/a Ameren Missouri (Ameren Missouri).

14 **Q. Please describe your educational and professional background.**

15 A. In 2009, I earned a Bachelor of Science in Electrical Engineering from Southern
16 Illinois University Edwardsville. In 2021, I earned a Master of Business Administration from the
17 University of Illinois Urbana-Champaign. I am a registered professional engineer (PE) in Missouri

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1 and hold a Project Management Professional (PMP) certification from the Project Management
2 Institute (PMI)

3 I have over fourteen years of experience as an engineer with nine years in the electric
4 energy industry. I started my career in 2009 at Basler Electric, a manufacturer of electric utility
5 equipment, as a Proposal Engineer. In 2011, I moved to Bunn, a manufacturer of commercial coffee
6 equipment as a research and development engineer. In 2014, I joined Ameren Services as a
7 Transmission Substation Design Engineer where I was responsible for estimating project costs,
8 designing high voltage and extra high voltage substations, supporting construction activities, and
9 performing project management duties. In 2018, I moved into a Project Manager role where I was
10 responsible for managing both transmission line and transmission substation projects. Some
11 notable aspects of this position were managing public outreach, stakeholder engagement,
12 controlling project financials and schedule, and reporting key project metrics. In 2020, I accepted
13 a position as Supervising Engineer with Utilitira, an engineering consulting firm licensed in Illinois.
14 I directed the electrical design department with expertise in overhead and underground electric
15 distribution projects as well as industrial control systems. My responsibilities included business
16 development, technical drawing reviews, managing staff and recruitment, and department
17 financials.

18 In 2021, I returned to Ameren Services in my current role as a Supervising Engineer for
19 the Transmission Substation Design team. I lead a team of nine electrical engineers that performs
20 both greenfield and brownfield designs. This team is responsible for the substation design aspects
21 of the Long Range Transmission Planning (LRTP) Tranche 1 Portfolio developed by the
22 Midcontinent Independent System Operator, Inc. (MISO) being implemented through the Northern
23 Missouri Grid Transformation Program (Program).

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1 **Q. Have you previously testified before the Missouri Public Service Commission?**

2 A. I have not testified before the Missouri Public Service Commission (Commission),
3 but I have testified before the Illinois Commerce Commission on behalf of Ameren Illinois.

4 **II. PURPOSE OF TESTIMONY AND SCHEDULES**

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

6 A. I support ATXI’s request for a Certificate of Convenience and Necessity (CCN) and
7 related Commission approvals authorizing ATXI to construct, acquire, and operate certain
8 transmission assets as part of the first phase of the Program (Phase 1) described in the direct
9 testimony of ATXI witness Shawn E. Schukar. Phase 1 includes two projects: the Fairport-Denny-
10 Iowa/Missouri border (FDIM) Project in Worth, Gentry, and DeKalb counties, and the Maywood-
11 Mississippi River Crossing (MMRX) Project in Marion County (collectively, the Projects or Phase
12 1 Projects). Specifically, I describe the Maywood Substation upgrades that will be made as part of
13 the MMRX Project and the new 345 kV substation named Denny in northwest Missouri, which is
14 part of the FDIM Project. My testimony focuses on the new Denny Substation and, toward that
15 end, does four things. First, I generally explain ATXI’s methodology for selecting the substation
16 site for the FDIM Project. Then, I specifically describe the Denny Substation work, including how
17 the substation site was selected; the technical specifications for the substation facilities; and what
18 new real estate rights, if any, are needed to accommodate the substation’s construction and
19 maintenance. Next, I identify the substation construction schedule. Finally, I generally explain the
20 future, substation area connections that will be necessary to connect the FDIM Project to the
21 existing electric transmission grid in Missouri. I note that ATXI witness Mr. Molitor describes the
22 FDIM Project’s two line segments in detail.

1 **Q. Are you sponsoring any schedules with your direct testimony?**

2 A. Yes. I am sponsoring Schedule GE-D1 (**Confidential**), an aerial image depicting
3 the proposed physical layout of the Denny Substation, and Schedule GE-D2 (**Confidential**), a
4 diagram depicting the proposed equipment layout of the Denny Substation. Schedule GE-D1 and
5 GE-D2 have been marked “Confidential” because they contain detailed information about critical
6 energy infrastructure.

7 **Q. Are you providing any legal opinions in your direct testimony?**

8 A. No. Although I refer to several regulatory requirements, as I understand them,
9 related to construction of the Projects, I am not an attorney and none of my testimony is intended
10 to offer any legal opinions.

11 **III. THE DENNY SUBSTATION**

12 **Q. Please identify the substation work for the FDIM Project.**

13 A. The FDIM Project includes a new substation named Denny in northwest Missouri
14 to be constructed by ATXI on a site northwest of Fairport, Missouri. The FDIM Project also
15 includes a single-circuit 345kV transmission line from the Denny Substation to Associated Electric
16 Cooperative Incorporated’s (AECI) existing Fairport Substation in DeKalb County, Missouri, as
17 well as a single-circuit 345kV transmission line from the Denny Substation to the Iowa/Missouri
18 border, where it will interconnect to a 345kV transmission line that will terminate at MidAmerican
19 Electric Company’s (MEC) existing Orient Substation in Iowa. As discussed later in my testimony,
20 the design of the Denny Substation will also accommodate a planned future transmission line
21 which will connect the Denny Substation to ATXI’s existing Zachary Substation as part of the
22 Denny – Zachary – Thomas Hill – Maywood (DZTM) Project which was awarded to ATXI by

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1 MISO on April 2, 2024.¹ The modifications needed at the Fairport Substation will be performed
2 by AECI and are not part of the FDIM Project.

3 **Q. How did ATXI generally select the site for the FDIM Project’s Deny**
4 **Substation?**

5 A. As explained by ATXI witness Mr. Dodd, the FDIM Project implements a part of
6 the Missouri portion of MISO’s LRTP Tranche 1 Portfolio. That Portfolio is a transmission
7 expansion plan that represents an updated transmission “backbone” in MISO’s Midwest
8 Subregion, with transmission line segments and general connection points defined by MISO.
9 MISO did not, however, fully consider the existing facilities’ feasibility for expansion or parcel
10 size, or direct precise substation facilities for the FDIM Project as part of its LRTP process. Rather,
11 once the general area for the FDIM Project, including its new substation, was identified by MISO,
12 it was up to the Ameren Services Design team for the FDIM Project to, on behalf of ATXI, locate
13 exactly which property is best suited for the FDIM Project’s new substation. The Ameren Services
14 Design team generally takes an iterative approach to determining substation site locations for a
15 transmission expansion project. The approach that the team employed for the FDIM Project was
16 no different.

17 **Q. Please generally explain that approach.**

18 A. Since the FDIM Project called for a new substation, consideration of the option to
19 use an existing substation was not applicable. In cases where an expansion of the existing
20 substation is not feasible or applicable, the Ameren Services Design team considers a new

¹ As ATXI witnesses Mr. Schukar and Ms. Dencker explain in their direct testimony, ATXI will be filing a separate application for approval of a CCN for the DZTM Project.

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1 substation location as close to the existing infrastructure as possible or where needed based on the
2 proposed project, taking into consideration a host of factors.

3 **Q. What sorts of factors does the team consider?**

4 A. The geology and topography of the land must be taken into account. The size and
5 capability of highways and local roads as well as any bridges on those thoroughfares are also
6 considered for equipment deliveries and site accessibility. Environmental concerns and the
7 potential for flooding also need to be considered. And in addition to those more physical factors,
8 it is important to consider some societal factors. It is desirable to keep substations as close as
9 possible to existing infrastructure to minimize system integration (e.g., relocations, extensions)
10 costs. But this must be balanced with the general preference to keep these large facilities out of
11 populated areas. This last point is also important since any future circuit routes would have to
12 traverse through those populated areas to reach the substations; there must be sufficient space and
13 good routes for those future circuits. When possible, it is advantageous that substations are not in
14 the way of future economic corridors, to ensure the highest and best use of land. Moreover, the
15 cost of the land to be acquired is a factor. I would note that this list is not exhaustive.

16 **Q. How was the site of the FDIM Project's Denny Substation determined?**

17 A. As shown in Schedule GE-D1 (**Confidential**), a new substation named Denny will
18 be constructed as part of the FDIM Project. The substation site is in DeKalb County near the
19 intersection of NW Pleasant Rd and NW Grant Rd. The MISO LRTP plan modeled Denny
20 Substation, and showed a strong preference to locate the substation within 2 miles of the existing
21 Fairport Substation, which the chosen location achieves. The chosen site also has access to roads,
22 and the parcel size was large enough to accommodate the substation. The chosen location results

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1 in a design that minimizes the length of the transmission lines that connect to Denny. Additionally,
2 the terrain of this location is such that it can be graded to internal standards without the need to
3 bring in or haul away fill.

4 **Q. Does ATXI already own that real estate?**

5 A. As explained in the direct testimony of ATXI witness Ms. Tara Green, the site for
6 the Denny Substation has already been purchased in fee.

7 **Q. Does the site touch any existing electric, gas, or telephone conduit, wires,**
8 **cables, or lines of any regulated or nonregulated utilities, railroad tracks, or underground**
9 **facilities?**

10 A. Yes. There is an existing distribution power line owned by NW Electric Power Coop
11 that will be modified as part of the FDIM Project. ATXI will work with the owner to reroute the
12 line, within the parcel, to ensure adequate clearance to the Denny Substation.

13 **Q. Who will fund the new substation construction?**

14 A. ATXI.

15 **Q. Who will own the new substation?**

16 A. ATXI partnered with the Missouri Joint Municipal Electric Utility Commission
17 (MJMEUC) on the FDIM Project, and will sell 49% of the FDIM Project to MJMEUC shortly
18 before it is placed into service. ATXI will maintain 100% ownership of the substation land and
19 will provide an easement to MJMEUC.

1 **Q. Who will operate and maintain the new substation?**

2 A. Ameren Services on behalf of ATXI will operate and maintain the Denny
3 Substation.

4 **Q. Will the Denny Substation site be secured as required by applicable protocol?**

5 A. Yes. The substation yard will be fully enclosed by chain-link fencing and will only
6 be accessible by authorized personnel. It will be physically protected by security equipment as
7 required by North American Electric Reliability Corporation (NERC) standards and defined by
8 internal policies.

9 **Q. Please describe the technical specifications for the new Denny Substation.**

10 A. The Denny Substation will be a four-position ring bus 345 kV substation. The four
11 positions would support the new transmission line to the Iowa/Missouri border (connecting to a
12 transmission line in Iowa and continuing on to the existing Orient Substation in Iowa), the new
13 transmission line to Fairport, a future transmission line to ATXI's Zachary Substation in Missouri,
14 and a new 50 MVar shunt reactor. The shunt reactor is a requirement made by MISO in the scope
15 of Denny Substation. The substation property and layout are also designed to accommodate a
16 future expansion to an eight-position breaker-and-a-half.

17 **Q. Please describe the proposed equipment layout for the Denny Substation.**

18 A. Schedule GE-D2 (**Confidential**) is a scaled diagram depicting the proposed
19 equipment layout of the Denny Substation. It depicts the equipment and planned drive paths to
20 allow convenient access for maintenance activities and deliveries.

1 **Q. Why is the new substation necessary?**

2 A. MISO's LRTP Tranche 1 Portfolio transmission expansion plan requires the new
3 Denny Substation with new transmission lines connecting into the Fairport Substation, the Orient
4 Substation, and the Zachary Substation. MISO performed the technical and economic analysis and
5 further details are publicly available through MISO. MISO's LRTP Tranche 1 Portfolio
6 transmission expansion plan is also discussed in the direct testimony of ATXI witness Mr. Dodd.

7 **Q. Will ATXI require new or expanded real estate rights to construct or maintain**
8 **the Denny Substation?**

9 A. ATXI has acquired the new real estate rights, approximately 40 acres, to construct
10 the new Denny Substation.

11 **Q. Did ATXI explore alternatives to the Denny Substation?**

12 A. ATXI explored several parcels in the area to construct Denny Substation. The site
13 directly to the east of the Fairport Substation was considered but found to have environmental
14 challenges. Several other parcels were evaluated in the area, but all resulted in longer lead lines to
15 connect into the substation or excessive site development costs. Additionally, ATXI collaborated
16 with AECI and Northwest Electric Cooperate to evaluate utilizing the existing parcel that the
17 Fairport Substation is located on. A technical analysis showed that the existing site and equipment
18 arrangement were not adequate to make the necessary connections and contain the new equipment.

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1 **Q. Are all known costs associated with the proposed Denny Substation reflected**
2 **in the overall Phase 1 and Program costs presented in ATXI witness Tracy Dencker’s direct**
3 **testimony?**

4 A. Yes. The numbers contained in Tracy Dencker’s direct testimony reflect the
5 currently estimated cost of the substation.

6 **Q. When will the FDIM Project’s Denny Substations be constructed and placed**
7 **in service?**

8 A. Construction on Denny Substation is planned to start in May 2027. Construction,
9 testing, and commissioning of Denny is expected to be substantially completed by February 2028,
10 and is expected to enter service by June 2028. The overall schedule for the FDIM Project is further
11 discussed in the direct testimony of ATXI witness Ms. Dencker.

12 **IV. MAYWOOD SUBSTATION UPGRADES**

13 **Q. Please describe the upgrades to the Maywood Substation that will be made as**
14 **part of the MMRX Project.**

15 A. ATXI’s Maywood Substation is currently a breaker-and-a-half arrangement and
16 already configured to accommodate the additional connections, with certain modifications to add
17 terminal positions within the existing substation footprint. As part of Phase 1, ATXI will install the
18 necessary 345 kV equipment within the existing substation footprint to integrate two additional
19 345 kV lines, including three (3) 345 kV circuit breakers, six (6) instrumentation voltage
20 transformers, two (2) dead-end terminal structures, bus work, and protective relays.

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1 **Q. When will the upgrades at Maywood Substation be constructed and placed in**
2 **service?**

3 A. ATXI anticipates construction of the upgrades at Maywood Substation to start in
4 June 2027. Construction, testing, and commissioning is planned to be completed in December
5 2027, and the upgraded facilities put in service by June 2028.

6 **V. CONCLUSION**

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

8 A. Yes.

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

In the Matter of the Application of Ameren)
Transmission Company of Illinois for a)
Certificate of Convenience and Necessity)
under Section 393.170.1, RSMo and Approval)
to Transfer an Interest in Transmission Assets)
Under 393.190.1, RSMo relating to)
Transmission Investments in Northwest and)
Northeast Missouri.)

File No. EA-2024-0302

AFFIDAVIT

1. My name is Gregory Eddings. I am a Supervising Engineer in Transmission Substation Design for Ameren Services Company, which is a subsidiary of Ameren Corporation and an affiliate of Ameren Transmission Company of Illinois, the Applicant in the above-captioned proceeding.

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. I am authorized to make this statement on behalf of Ameren Transmission Company of Illinois.

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

/s/ Gregory Eddings
Gregory Eddings
Supervising Engineer in Transmission
Substation Design for Ameren Services
Company

On behalf of Ameren Transmission
Company of Illinois

Date: *July 16, 2024*