

**BEFORE THE MINNESOTA OFFICE OF ADMINISTRATIVE HEARINGS
600 North Robert Street
Saint Paul, Minnesota 55101**

**FOR THE MINNESOTA PUBLIC UTILITIES COMMISSION
121 Seventh Place East, Suite 350
Saint Paul, Minnesota 55101-2147**

**In the Matter of the Application of Minnesota Power for a Certificate of Need and a
High Voltage Transmission Line (HVTL) Route Permit for the HVDC
Modernization Project in Hermantown, St. Louis County**

**OAH Docket No. 5-2500-39600
MPUC Docket Nos. E-015/CN-22-607 and E-015/TL-22-611**

**INITIAL BRIEF OF
AMERICAN TRANSMISSION COMPANY LLC**

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INTRODUCTION

The clean energy transition taking place in Minnesota and across the region requires significant investment in energy infrastructure, particularly in the transmission assets needed to deliver clean energy to customers. To provide the greatest benefit to the state and region, these investments should occur in the most efficient means practicable and with the least negative impacts on customers and the environment. American Transmission Company, LLC (ATC) has participated in this proceeding to further these goals.

Minnesota Power (MP) seeks Minnesota Public Utilities Commission (Commission) approval of the High-Voltage Direct-Current (HVDC) Modernization Project (Project). The Project would upgrade and modernize certain HVDC assets and transmission facilities associated with MP's 550-megawatt (MW), 250 kilovolt (kV), approximately 465-mile long Square Butte HVDC transmission line, which runs from Center, North Dakota to Hermantown, Minnesota (HVDC Line). Specifically, MP seeks to upgrade and modernize the over forty-year-old converter stations on either end of the HVDC Line. MP also proposes to interconnect the upgraded converter station in Minnesota to the alternating-current (AC) high-voltage transmission system by constructing a new 345 kV transmission line that would run to a new 345/230 kV St. Louis County Substation to be owned by MP. MP proposes to connect that new substation to MP's current 230 kV

substation located near Hermantown (MP Arrowhead Substation) through two new 230 kV transmission lines.¹

ATC supports the overall purpose and goal of the Project. Upgrading and modernizing the current HVDC assets will better position the transmission grid for the ongoing clean energy transition and improve the overall reliability of the transmission system in Minnesota and the region. ATC also supports making efficient use of existing resources, minimizing costs, and minimizing adverse impacts on the human and natural environment. Therefore, ATC intervened in this proceeding to bring forward the Arrowhead Substation Alternative, which modifies the Project's point-of-interconnection in Minnesota by connecting the upgraded converter station to the AC transmission system through ATC's existing 345/230 kV Arrowhead Substation (ATC Arrowhead Substation), rather than through the new 345 kV St. Louis County Substation that would be constructed under the MP Proposal.

As demonstrated below, the record in this proceeding establishes that the Arrowhead Substation Alternative: (1) avoids the need to build a new substation in close proximity to the existing ATC Arrowhead Substation; (2) meets the purpose and need of the Project, while also providing efficiency and reliability benefits when compared to the MP Proposal; (3) is less expensive than the MP Proposal; and (4) will lead to fewer environmental and human impacts than MP's proposal to interconnect the Project through

¹ ATC refers to the new 345/230 kV St. Louis County substation and associated new transmission lines proposed by MP to interconnect the converter station to the AC transmission system as the "MP Proposal."

its proposed new 345 kV St. Louis County Substation. Therefore, ATC requests that the Administrative Law Judge (ALJ) recommend, and the Commission grant, a Certificate of Need for the Project and issue a Route Permit for the Project that incorporates the Arrowhead Substation Alternative into the Project. ATC further requests that, regardless of which alternative the Commission ultimately orders, the Commission remove the 800 MVA limit that the Minnesota Environmental Quality Board (EQB) previously imposed upon the 345/230 kV Arrowhead Substation and Arrowhead Weston transmission line.

I. BACKGROUND AND STATEMENT OF FACTS

The central question before the ALJ and Commission is straightforward: will implementation of the Arrowhead Substation Alternative as part of the Project make more efficient use of existing resources, cost less, and lead to fewer impacts to the natural and human environment, as opposed to the MP Proposal? Analyzing this central question requires an understanding of the electric transmission grid in this region, the specific Project at issue, and the impacts of incorporating the Arrowhead Substation Alternative into the Project, as compared to the impacts of the MP Proposal.

A. Background on the Electric Power Sector

The business of generating and transmitting electricity to the public is enormously complex. The United States' power grid—the complex web of power plants and transmission lines used to deliver electricity to homes and businesses—has been described as the largest, most complex machine in the world.² Despite this complexity, the electric

² See Phillip, F. Schewe, *The Grid: A Journey Through the Heart of Our Electrified World* at 1 (Joseph Henry Press 2006).

power sector can be broken down into three basic segments: generation, transmission, and distribution. Electricity is generated at power plants, where it is fed into a web of large, high voltage transmission lines. The electricity flows across the high-voltage transmission system and is fed into substations, where the voltage is reduced. From the substations, the electricity is spread through a series of lower-voltage distribution lines for delivery and sale to the ultimate consumer.³ The vast majority of the electric power sector operates on alternating current (AC), although there are certain transmission lines—including the one at issue in this proceeding—that operate on direct current (DC).⁴

In the early 20th century, the electric power sector was highly fragmented. Electric utilities were vertically integrated, meaning they owned their own power plants, transmission lines, and distribution systems.⁵ While there were some interconnections between utilities, they operated largely independent of one another, exercising monopoly control over a geographically defined service territory.⁶ There was very little (if any) competition or cooperation, and state or local governments heavily regulated each utility's rates and services.⁷

Since that time, the grid has undergone significant expansion and become much more interconnected. As the Supreme Court explained:

³ See generally Exhibit (Ex.) ATC-243 at 5–6 (Dagenais Rebuttal); *New York v. FERC*, 535 U.S. 1, 31 (2002) (Thomas, J., concurring in part and dissenting in part).

⁴ See Ex. ATC-214 at 4, n.2 (Bradley Direct); Ex. ATC-243 at 7–8 (Dagenais Rebuttal).

⁵ *New York v. FERC*, 535 U.S. at 5–6.

⁶ *New York v. FERC*, 535 U.S. at 5–6.

⁷ *New York v. FERC*, 535 U.S. at 5–6; see also *Morgan Stanley Capital Group, Inc. v. Pub. Utility Dist. No. 1 of Snohomish County, Wash.*, 554 U.S. 527, 535 (2008).

Since 1935, and especially beginning in the 1970's and 1980's, the number of electricity suppliers has increased dramatically. Technological advances have made it possible to generate electricity efficiently in different ways and in smaller plants. In addition, unlike the local power networks of the past, electricity is now delivered over three major networks, or "grids," in the continental United States. Two of these grids—the "Eastern Interconnect" and the "Western Interconnect"—are connected to each other. It is only in Hawaii and Alaska and on the "Texas Interconnect"—which covers most of that State—that electricity is distributed entirely within a single State. In the rest of the country, any electricity that enters the grid immediately becomes a part of a vast pool of energy that is constantly moving in interstate commerce. As a result, it is now possible for power companies to transmit electric energy over long distances at a low cost.⁸

In other words, whereas state and local utilities previously operated as "vertically integrated monopolies in confined geographic areas[,] [t]hat is no longer so. Independent power plants now abound, and almost all electricity flows *not* through 'the local power networks of the past,' but instead through an interconnected 'grid' of near-nationwide scope."⁹

Today, control of more than half of the nation's electrical grid is divided among several regional transmission organizations (RTOs), which are voluntary, non-profit organizations made up of utilities that manage and plan the transmission system over large geographic areas.¹⁰ Across 15 states and Manitoba, Canada, MISO is the RTO responsible for (among other things) managing the dispatch of electrical generation and the operation

⁸ *New York v. FERC*, 535 U.S. at 7–8.

⁹ *FERC v. Elec. Power Supply Ass'n*, 557 U.S. 260, 267 (2016) (quoting *New York v. FERC*, 535 U.S. at 7). (Emphasis added).

¹⁰ See generally *Ill. Commerce Comm'n v. Federal Energy Reg. Comm'n*, 721 F.3d 764, 769–72 (7th Cir. 2013); *Midwest ISO Transmission Owners v. FERC*, 373 F.3d 1361, 1363–65 (D.C. Cir. 2004).

of the high-voltage transmission system to reliably serve customers.¹¹ MISO's transmission owning members, such as ATC and MP, own the transmission lines that make up the bulk power system, but have transferred functional control over most (though not necessarily all) of their transmission facilities to MISO.¹² MISO, in turn, uses a security constrained economic dispatch algorithm to dispatch electric generation and manage power flows across its footprint: generators submit offers to sell electricity into the market, and MISO uses an algorithm to dispatch this generation in a manner that results in the least cost to customers, while still maintaining the security and reliability of the transmission system.¹³

B. The HVDC Line

The focus of this proceeding is MP's 550-megawatt, 250 kilovolt, approximately 465-mile long Square Butte HVDC transmission line, which runs from Center, North Dakota to Hermantown, Minnesota.¹⁴ This line transmits electricity in DC from one end to the other and is connected to the AC transmission system at either endpoint.¹⁵ This allows MP to transfer electricity directly from North Dakota to northeastern Minnesota, without any flow moving onto the AC transmission system between these two points. However, once power from the HVDC Line is injected onto the AC transmission system in northeastern Minnesota, it becomes comingled with network flows of power from other sources.¹⁶

¹¹ Ex. ATC-243 at 5–6 (Dagenais Rebuttal).

¹² Ex. ATC-243 at 5–6 (Dagenais Rebuttal).

¹³ Ex. ATC-243 at 5–6 (Dagenais Rebuttal).

¹⁴ Ex. MP-104 at § 1.1 (MP Application); Ex. ATC-243 at 6–8 (Dagenais Rebuttal).

¹⁵ Ex. ATC-243 at 6–7 (Dagenais Rebuttal).

¹⁶ Ex. ATC-243 at 6–7 (Dagenais Rebuttal).

With its application in this proceeding, MP seeks to upgrade the converter stations on either end of the HVDC Line, which need modernization after being operated since the late 1970s. MP proposes to interconnect the upgraded converter station in Minnesota to the AC high-voltage transmission system via the MP Proposal, which proposes the construction of a new 345/230 kV St. Louis County Substation and associated new transmission lines.¹⁷ In contrast, ATC has proposed that MP modify the Project's point-of-interconnection in Minnesota by connecting the upgraded converter station to ATC's existing 345/230 kV Arrowhead Substation, rather than the new 345 kV St. Louis County Substation, which would be located less than a mile away.¹⁸ The debate in this proceeding focuses on which of these points-of-interconnection the Commission should select for the Project.

C. American Transmission Company LLC

ATC is a single-purpose, transmission-only company.¹⁹ ATC is distinct from a traditional vertically integrated "investor-owned utility" (IOU), such as MP, as its *sole purpose* is to plan, construct, operate, maintain, and protect the high-voltage electric transmission system in portions of Wisconsin, Michigan, Minnesota, and Illinois.²⁰ ATC owns, operates, and maintains over 10,000 miles of electric transmission lines and more than 580 electric substations across these four states and is a transmission owning member

¹⁷ Ex. ATC-227 at 7 (Dagenais Direct).

¹⁸ Ex. ATC-227 at 9 (Dagenais Direct).

¹⁹ Ex. ATC-200 at 4 (McKee Direct); *see* Wis. Stat. § 196.485(1)(ge).

²⁰ Ex. ATC-200 at 4 (McKee Direct). ATC does not and cannot provide retail electric service to end user customers. Ex. ATC-200 at 4 (McKee Direct).

of MISO.²¹ ATC currently has 26 member-owners, including several IOUs (including MP), municipal electric utilities, and electric cooperatives.²²

As noted above, MISO is the regional transmission grid operator, whose responsibilities include managing the operation of the regional high voltage transmission system to reliably serve customers and planning expansions to that system through open, collaborative, and stakeholder-based processes such as long-range transmission planning (LRTP) and the MISO Transmission Expansion Plan (MTEP) process.²³ As a MISO member, ATC provides transmission service over its facilities under the terms of MISO's Open Access Transmission, Energy and Operating Reserve Markets Tariff (MISO Tariff), with ATC operating its transmission facilities in accordance with MISO's direction.²⁴

ATC is a Minnesota Transmission Owner and owns the Arrowhead 345/230 kV Substation, located near Hermantown.²⁵ ATC also owns two 230 kV circuit breakers and switches that are physically located in what is generally referred to as MP's 230/115 kV Arrowhead Substation (MP Arrowhead Substation), which is immediately adjacent to

²¹ Ex. ATC-200 at 4 (McKee Direct).

²² Ex. ATC-202 at 8 (McKee Rebuttal).

²³ Ex. ATC-227 at 21-22 (Dagenais Direct); Ex. ATC-243 at 5 (Dagenais Rebuttal). MISO's LRTP work is an effort to strengthen the electric grid by identifying and including in the regional transmission plan new transmission projects that will boost electric reliability for communities and consumers. The first two phases, or "tranches," have focused on the central and north areas of MISO. Tranche 1 was approved for inclusion in the regional plan by MISO's Board of Directors in July of 2022 and includes 18 projects—an investment totaling \$10.3 billion. MISO is currently working with stakeholders on developing the Tranche 2 portfolio. Ex. ATC-200 at 7, n.1 (McKee Direct). The MTEP is discussed further, below.

²⁴ Ex. ATC-200 at 4 (McKee Direct).

²⁵ Ex. ATC-200 at 4 (McKee Direct).

ATC's Arrowhead Substation; 12 miles of 345 kV line within Minnesota that connects to the Arrowhead Substation and runs southeast into Wisconsin; and a short jumper line that connects the ATC Arrowhead Substation to the MP Arrowhead Substation.²⁶

D. Regional Transmission Planning And Coordination

Because the transmission system is an interconnected grid, with multiple entities owning the interconnected assets making up the grid, transmission owners and operators do not and cannot act in isolation. Therefore, ATC regularly interacts with MP and other neighboring transmission owners in the normal course of business on matters such as planning new transmission facilities and real time system operations.²⁷ Formally, this relationship and the reciprocal obligations between owners are spelled out in transmission-to-transmission (or T-T) interconnection agreements and in ATC's local planning process, as described in MISO's tariff.²⁸

In addition, ATC interacts with MP and all transmission owning members of MISO on a broad range of matters such as planning, rates and cost recovery, and operational issues through MISO committees, such as the Transmission Owners Committee, and other collaborative efforts.²⁹ ATC actively participates in these various MISO activities, with Bob McKee, ATC's Strategic Projects and Execution Director, having previously served as chair of MISO's Planning Advisory Committee for seven years.³⁰

²⁶ Ex. ATC-200 at 4 (McKee Direct).

²⁷ Ex. ATC-200 at 4 (McKee Direct).

²⁸ Ex. ATC-200 at 4-5 (McKee Direct).

²⁹ Ex. ATC-200 at 5 (McKee Direct).

³⁰ Ex. ATC-200 at 1-2 (McKee Direct); Ex. ATC-202 at 14 (McKee Rebuttal).

One critical MISO process is the MTEP regional planning process, which MISO describes as “the culmination of a comprehensive, stakeholder-inclusive planning process to build and maintain an electric infrastructure to meet local and regional reliability standards, enable competition among wholesale capacity and energy suppliers in the MISO markets, and allow for competition among transmission developers.”³¹ This open, transparent and stakeholder-based process is required by Attachment FF of the MISO Tariff, which establishes MISO’s transmission expansion planning protocol and requires transmission owners to submit proposed transmission projects for review through the MTEP stakeholder review process.³² As Thomas Dagenais, ATC’s Director of System Planning who previously served as a MISO reliability coordinator, explained:

The [MTEP] process begins with the development or refinement of planning models in which new transmission projects will be studied: transmission owners provide MISO with their planning criteria and the models they used to develop new projects, and those models are subject to review and feedback from stakeholders (e.g., other transmission owners; transmission customers; state regulators; consumer advocates; etc.). By September 15 of the year before the plan is released, transmission owners submit new transmission projects for review and evaluation, specifying the type of project and the target Appendix for the project (i.e., A or B). Shortly thereafter, MISO posts all proposed projects and power flow models. MISO and other stakeholders review those projects through a collaborative, open, and transparent process that lasts several months: stakeholders can submit comments and feedback on, and offer alternatives to, the transmission projects that have been proposed. MISO considers this feedback and then evaluates the proposed project within planning models that were developed earlier in the MTEP process. Beginning in the first quarter of the MTEP plan year, MISO holds several subregional planning meetings (SPMs) to present proposed projects, provide the results of its independent evaluation, and address feedback received from stakeholders, including with respect to any alternatives that

³¹ <https://www.misoenergy.org/planning/transmission-planning/mtep/#t=10&p=0&s=&sd=> (last viewed May 2, 2024).

³² Ex. ATC-243 at 18 (Dagenais Rebuttal).

have been proposed. MISO staff will then present a final list of MTEP projects that will be proposed for Board approval and a draft of the current cycle MTEP report. The MISO Board of Directors then decides whether to approve the set of projects at the end of the calendar year.³³

E. The HVDC Modernization Project

MP has proposed the Project to upgrade and modernize the HVDC converter stations on either end of its HVDC Line.³⁴ MP states that, in recent years, it has experienced outages in these HVDC terminals due to failures of various pieces of aging equipment and components, and the Project is necessary to continue to position the grid for the clean energy transition and improve the reliability of regional transmission system.³⁵

As specifically proposed by MP in this proceeding, in addition to constructing a new, upgraded, and modernized HVDC converter station in Minnesota, the Project includes new transmission facilities to interconnect that new converter station to the AC transmission system and decommissioning that portion of the existing HVDC line between the new converter station and MP's existing 230/115-kV Arrowhead Substation. For this new interconnection, MP seeks approval of the MP Proposal—constructing a new 345 kV transmission line that would connect the new HVDC converter station to a new 345/230 kV St. Louis County Substation in Hermantown, and a double-circuit 230 kV line to connect this new St. Louis County Substation to MP's existing 230/115-kV Arrowhead Substation.³⁶ MP estimates the cost of this new interconnection, including the new

³³ Ex. ATC-243 at 17–18 (Dagenais Rebuttal).

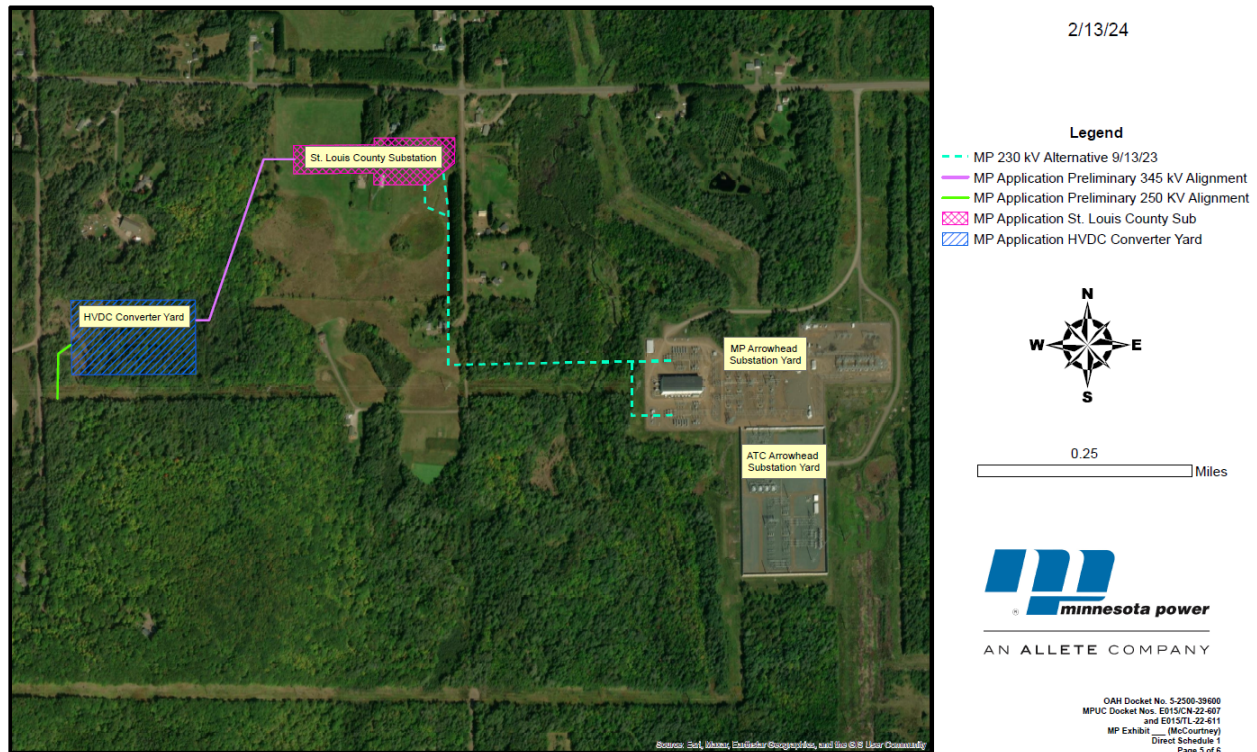
³⁴ See Ex. MP-104 at §§ 1.1, 1.2 (MP Application).

³⁵ See Ex. MP-104 at § 1.2 (MP Application).

³⁶ See Ex. MP-104 at § 2.1 (MP Application); Ex. MP-120 at 11–12 (McCourtney Direct); Ex. MP-120, Schedule 1 at 5 (McCourtney Direct) (map of the MP Proposal).

substation, to be as much as \$70 million in 2022 dollars, with a “mid-range estimate of \$55 million.”³⁷ A map of the interconnection as proposed by MP is provided below.

Figure 1: The HVDC Modernization Project



The HVDC Modernization Project is currently listed in Appendix B of the MISO MTEP, meaning that it is a placeholder project that has not been formally approved by MISO.³⁸ The Project is also not currently included on MISO’s list of MP-sponsored projects being reviewed as part of the current MTEP cycle for formal approval and inclusion in MTEP Appendix A.³⁹ Although MP has provided information regarding this Project to ATC in one-on-one discussions and to MISO during planning meetings, ATC

³⁷ Ex. MP-104 at §2.2.1.

³⁸ Ex. ATC-243 at 19 (Dagenais Rebuttal); Ex. ATC-250, Schedule 5 (Dagenais Rebuttal).

³⁹ Ex. ATC-243 at 19; Ex. ATC-251, Schedule 6 (Dagenais Rebuttal).

found no mention of the Project being evaluated or studied in documentation from MISO's West Subregional Planning Meeting held during the current MTEP study cycle.⁴⁰ In fact, ATC found no mention of the Project in documentation from MISO's West Subregional Planning Meetings and West Technical Study Task Force Meetings going back to 2021 and 2022.⁴¹

Based on ATC's review of MISO documentation, it does not appear that MP has submitted the Project—including its proposal to build a new St. Louis County Substation less the one mile from the existing ATC Arrowhead Substation—for review and approval through the MTEP process.⁴² Rather, MP chose to file the Certificate of Need and Route Permit Applications with the Commission, shifting any vetting and debate of merits of the MP Proposal versus the Arrowhead Substation Alternative to this proceeding.⁴³ As the sponsor of the Project, the onus was on MP to ensure that it was appropriately vetted through the MTEP process so stakeholders—like ATC—could provide input and feedback, including alternatives for its proposed point-of-interconnection in Minnesota. Much of the debate in this proceeding concerning the point-of-interconnection for the Project could have been avoided if MP had vetted the Project through MISO's open and collaborative MTEP process *before* initiating this proceeding.⁴⁴

⁴⁰ Ex. ATC-243 at 19 (Dagenais Rebuttal).

⁴¹ Ex. ATC-243 at 19 (Dagenais Rebuttal).

⁴² Ex. ATC-243 at 19 (Dagenais Rebuttal).

⁴³ ATC provides a full procedural history of this docket in its Proposed Findings of Fact, Conclusions of Law and Recommendation, filed concurrently with this Initial Brief.

⁴⁴ See Ex. ATC-243 at 21–22, 28–29 (Dagenais Rebuttal).

F. ATC And MP Discussions Concerning The Project

MP began studying and analyzing what is now known as the HVDC Modernization Project as early as 2012, with more definitive studies beginning in 2020.⁴⁵ As neighboring transmission owners that are parties to a T-T interconnection agreement, ATC and MP frequently communicate regarding transmission planning issues.⁴⁶ However, ATC first learned of MP's intentions with respect to the Project in a meeting on September 23, 2022.⁴⁷ There, MP notified ATC of its intent to upgrade the converter stations on both ends of its HVDC Line and, regarding the eastern converter station located in Minnesota, informed ATC of its preference to interconnect the upgraded converter station and HVDC Line to ATC's existing 345/230 kV Arrowhead Substation.⁴⁸ MP and ATC also discussed the need to coordinate efforts going forward.⁴⁹ That kind of collaborative effort would have been consistent with the past course of business between ATC and fellow transmission owners, including MP.⁵⁰

However, after ten years of what MP witness Mr. Gunderson described as “multiple, iterative studies and analyses,” with the past two years involving the “most definitive studies,”⁵¹ MP completely changed course just two and a half weeks following that

⁴⁵ Ex. MP-119 at 9-10 (Gunderson Direct); Evidentiary Hearing Transcript (Mar. 19, 2024) (Tr.) at 28 (Gunderson).

⁴⁶ Ex. ATC-200 at 6 (McKee Direct).

⁴⁷ Ex. ATC-200 at 6 (McKee Direct).

⁴⁸ Ex. ATC-200 at 6 (McKee Direct); *see also* Ex. MP-122, Schedule 24 at 6 (Winter Direct) (NON-PUBLIC DOCUMENT).

⁴⁹ Ex. ATC-200 at 6 (McKee Direct).

⁵⁰ Ex. ATC-202 at 5 (McKee Rebuttal).

⁵¹ Ex. MP-119 at 10 (Gunderson Direct).

September 2022 meeting.⁵² Specifically, in a follow-up October 10, 2022 meeting and subsequent October 14, 2022 e-mail, MP informed ATC of its intention to build a new 345 kV St. Louis County Substation less than a mile away from ATC's Arrowhead Substation.⁵³ Rather than interconnect the Project to the ATC Arrowhead Substation, MP indicated it would interconnect the Project to this new substation, which would in turn connect to the MP Arrowhead Substation, located directly adjacent to the ATC Arrowhead Substation. MP also indicated that, at an upcoming meeting with MISO transmission owners in Eagan, Minnesota, MP would provide an update regarding the Project and ask that MISO evaluate how the new substation and HVDC system could be further interconnected with the surrounding 345 kV system. As ATC witness Mr. McKee explained, this abrupt change, which occurred over a span of just a couple of weeks, is unusual and not consistent with the normal course of business between transmission owners.⁵⁴ Indeed, MP itself acknowledged its abrupt change in plans, with MP witness Mr.

Winter stating in an August 20, 2023 e-mail to ATC:

I recognize that MP shifted gears a bit abruptly last fall as we were having discussions with you about the interconnection configuration of our HVDC Modernization Project, so I have compiled some of the technical rationale behind that decision-making in order to share it with you. Admittedly, we probably should have been more straightforward about that at the time.⁵⁵

Since ATC's initial meeting with MP concerning the Project in September 2022, ATC has consistently supported MP's original proposed point-of-interconnection for the

⁵² Ex. ATC-200 at 6 (McKee Direct).

⁵³ Ex. ATC-200 at 6 (McKee Direct).

⁵⁴ Ex. ATC-200 at 7-8 (McKee Direct).

⁵⁵ Ex. ATC-204, Schedule 1 (McKee Rebuttal).

Project—namely, leveraging ATC’s existing Arrowhead Substation, which has ample capacity to accommodate the Project—rather than constructing a new substation less than one mile away. ATC has communicated that position multiple times, both to MP leadership and in the MISO planning efforts.⁵⁶

G. The Arrowhead Substation Alternative

1. Description

As discussed generally above, approval of the Arrowhead Substation Alternative would modify the Project’s point-of-interconnection to the AC high-voltage transmission system in Minnesota. Instead of connecting the HVDC Line and upgraded converter station to a new 345-kV St. Louis County Substation and then connecting that new substation to the MP Arrowhead Substation, ATC proposes connecting the HVDC Line and upgraded converter station to ATC’s existing 345/230-kV Arrowhead Substation, which is already connected to MP’s Arrowhead Substation.⁵⁷ This is *not* a fundamental change or systematic alternative to the Project that MP originally proposed. In fact, this point-of-interconnection was *MP’s stated preference* as recently as September 23, 2022. Far from constituting some “system alternative,” the Arrowhead Substation Alternative simply changes the location at which the Project “plugs in” to the AC transmission system in Minnesota.⁵⁸

⁵⁶ Ex. ATC-200 at 8 (McKee Direct); Ex. ATC-202 at 6 (McKee Rebuttal).

⁵⁷ Ex. ATC-205 at 3 (Johanek Direct); Ex. ATC-227 at 8–9 (Dagenais Direct); Ex. DOC DER-600 at 31 (Zajicek Direct); *see also* Ex. ATC-215, Schedule 1 (Bradley Direct) (map depicting Arrowhead Substation Alternative)

⁵⁸ Ex. ATC-227 at 8 (Dagenais Direct).

ATC's proposed point-of-interconnection for the Project—its 345/230-kV Arrowhead Substation—is located in Hermantown, Minnesota, about a mile from the location of MP's proposed upgraded converter station.⁵⁹ It is directly adjacent and connected to the MP Arrowhead Substation and houses (among other equipment) a 345/230 kV transformer, a 230 kV phase-shifting transformer (PST), and two 345 kV capacitor banks.⁶⁰ ATC constructed this substation almost 20 years ago as part of the Arrowhead-Weston 345 kV Transmission Line Project—an approximately 220-mile long 345 kV transmission line that runs from the Arrowhead Substation, generally southeast to the Gardner Park Substation in north-central Wisconsin.⁶¹ Both the Commission and the Public Service Commission of Wisconsin approved that project after two incidents in the late 1990s caused reliability issues revealing substantial weaknesses in the transmission system between Minnesota and Wisconsin.⁶² In approving the Arrowhead-Weston project, both commissions recognized that the new transmission line and substation would improve the reliability of the regional transmission system and benefit customers in both Minnesota and Wisconsin.⁶³

⁵⁹ Ex. ATC-218 at 4 (Larsen Direct).

⁶⁰ See Ex. ATC-219, Schedule 1 (Larsen Direct); Ex. ATC-220, Schedule 2 (Larsen Direct) (depicting current layout of ATC 345/230-kV Arrowhead Substation).

⁶¹ Ex. ATC-218 at 4–5 (Larsen Direct); see also Ex. ATC-243 at 8, n.8 (Dagenais Rebuttal); Ex. ATC-247, Schedule 2 (Dagenais Rebuttal) (map depicting the Arrowhead-Weston Transmission Project); Ex. ATC-248, Schedule 3 (Dagenais Rebuttal).

⁶² See, e.g., Ex. MP-122, Schedule 32 at 13 (Winter Direct); see also *In Re Joint Application of Minnesota Power Co. and Wis. Pub. Serv. Corp.*, Docket No. 05-CE-113, 2001 Wisc. PUC LEXIS 81 at **5–6, Final Decision (Oct. 30, 2001).

⁶³ Ex. ATC-243 at 8–9 (Dagenais Rebuttal); Ex. ATC-202 at 9–10 (McKee Rebuttal).

One of the main benefits of ATC's proposal is the ability to interconnect the Project to the AC transmission system without the need for an entirely new substation. ATC's 345/230 kV Arrowhead Substation is physically and technically capable of interconnecting the Project without expanding the existing substation footprint.⁶⁴ In fact, when the 345/230 kV Arrowhead Substation was initially developed, it was designed to be expanded when a future system need (such as the Project) came along.⁶⁵ The Arrowhead Substation Alternative would leverage this expandability by adding a third rung to the bus in the southwest corner of the substation, leaving three open bays to accommodate three additional 345 kV transmission lines.⁶⁶ Two of those three bays could be used to accommodate a new double-circuited 345 kV transmission line from MP's updated converter station, with one bay available to accommodate additional transmission lines that may be needed in the future.⁶⁷

2. Cost

ATC estimates the cost of the Arrowhead Substation Alternative to be approximately \$42.0 million, in 2022 dollars.⁶⁸ ATC witness and Consultant Project Manager Dustin Johanek, who has over 13 years of experience with ATC leading project teams in executing substation and transmission line projects, developed this cost estimate

⁶⁴ Ex. ATC-218 at 5–6 (Larsen Direct).

⁶⁵ Ex. ATC-218 at 5–6 (Larsen Direct); *see also* Ex. ATC-220, Schedule 2 (Larsen Direct); Ex. ATC-221, Schedule 3 (Larson Direct).

⁶⁶ Ex. ATC-218 at 5–6 (Larsen Direct); *see also* Ex. ATC-220, Schedule 2 (Larsen Direct); Ex. ATC-221, Schedule 3 (Larson Direct).

⁶⁷ Ex. ATC-218 at 5–6, 8 (Larsen Direct).

⁶⁸ Tr. at 122 (Johanek).

after consultations with ATC's suppliers and contractors.⁶⁹ Mr. Johanek provided a breakdown of those costs, which is shown below in a side-by-side comparison with MP's cost estimate for the Arrowhead Substation Alternative.

Table 1: Arrowhead Substation Alternative Cost Estimate Comparison (\$M)⁷⁰

	Project Component	ATC Estimate			Owner	MP Estimate ⁷¹		
		Low	Med	High		Low	Med	High
1	Minnesota Land Acquisition	0.5	0.5	0.5	MP	7	10	13
2	HVDC Line Entrance	2	2	2	MP	1.4	2	2.6
3	HVDC 345 kV Line Entrance for Ckt #2	2.2	3.1	4.0	MP	2.2	3.1	4
4	HVDC-Arrowhead 345 kV Double Ckt	7.8	8.7	10.4	MP	4.7	6.7	8.7
5	Arrowhead 345 kV Line Reconfiguration	Included in line 4			ATC	1	1.4	1.8
6	Arrowhead 345 kV/230 kV Sub Expansion	24.0	27.7	33.2	ATC	15.4	22	28.6
7	Arrowhead 230 kV Phase Shifting Transformer	0	0	0	ATC	23.5	33.5	43.6
8	Arrowhead 230 kV Bus Reconfigurations	Included in line 6			MP	3.4	4.9	6.4
TOTAL		37.4	42.0	50.1		60	85	110

⁶⁹ Ex. ATC-205 at 1-2, 4 (Johanek Direct); Ex. ATC-206, Schedule 1 (Johanek Direct Schedule 1); Ex. ATC-209 at 7 (Johanek Rebuttal).

⁷⁰ Ex. ATC-209 at 8 (Johanek Rebuttal) (modified by corrections Mr. Johanek provided at the Evidentiary Hearing to add \$500,000 in estimated easement costs for the transmission lines included in the Arrowhead Substation Alternative and \$2 million for the HVDC Line entrance). Tr. at 120–21 (Johanek).

⁷¹ The total for MP's cost estimate includes rounding. See Ex. MP-1221, Schedule 2 at 2 (Winter Direct) Schedule 2 at 2.

As this table demonstrates, the primary driver of the cost difference between these two estimates is MP's unnecessary inclusion of the cost of a new phase shifting transformer at ATC's Arrowhead Substation.⁷² As discussed in ATC witness Tom Dagenais' direct and rebuttal testimonies, the transmission system is operated far differently in 2024 than it was in the early 2000s, when the current PST was planned and incorporated into ATC's Arrowhead Substation.⁷³ The Arrowhead PST was initially installed to help manage power flows and support voltage stability between the transmission systems in Wisconsin and Minnesota.⁷⁴ However, significant changes in the operation of the transmission system over the last 20 years have rendered the *current* PST of no purpose, meaning that a new PST is wholly unnecessary.⁷⁵

The ATC and MP cost estimates for the Arrowhead Substation Alternative also differ in terms of land acquisition costs. As noted above, Mr. Johanek included \$500,000 in land acquisition costs, related to the small expansion of the right-of-way required for 345 kV double circuit line running from the HVDC converter station to the ATC Arrowhead Substation.⁷⁶ In contrast, MP carries over *its* land acquisition costs for the MP Proposal and alleges *all* of those costs should also be applied to the Arrowhead Substation Alternative. This *twenty-fold increase* over ATC's estimate cannot be justified, as MP's

⁷² Ex. ATC-209 at 8 (Johanek Rebuttal).

⁷³ Ex. ATC-227 at 33, 37–38 (Dagenais Direct); Ex. ATC-243 at 31–33 (Dagenais Rebuttal).

⁷⁴ Ex. ATC-227 at 33, 37–38 (Dagenais Direct); Ex. ATC-243 at 31–33 (Dagenais Rebuttal).

⁷⁵ Ex. ATC-227 at 33, 37–38 (Dagenais Direct); Ex. ATC-243 at 31–33 (Dagenais Rebuttal).

⁷⁶ Tr. at 120–21 (Johanek).

costs necessarily include all rights-of-way necessary for the new 345 kV line, new St. Louis County Substation, and two new 230 kV lines necessary for the MP Proposal, and none of which are necessary for the Arrowhead Substation Alternative.⁷⁷ Since the MP land acquisition costs are not necessary for the Arrowhead Substation Alternative, they should not be included in the cost estimate for this option. Thus, the record demonstrates the best estimate of the cost of the Arrowhead Substation Alternative is \$42 million.⁷⁸

3. Route

ATC considered a wide range of factors when determining the proposed route for the double-circuited 345 kV line included as part of the Arrowhead Substation Alternative, including construction access, pulling locations, access points into ATC's 345/230 kV Arrowhead Substation and MP's new converter station, other transmission line crossings, construction and operational safety, and the ability to utilize and share existing easements and ROW to the greatest extent feasible.⁷⁹ ATC also considered environmental concerns

⁷⁷ MP may argue that some unidentified portion of its estimated \$10 million of land acquisition costs applies to the new HVDC converter station and that those unquantified costs should also be applied to the Arrowhead Substation Alternative. *See* Tr. at 134-136 (Johanek). However, MP's Certificate of Need and Route Permit Application presented the cost of the "HVDC Converter Stations" separate and apart from the cost of the "Minnesota Interconnection Facilities." Ex. MP-104 at § 2.2.1. Thus, any land acquisition costs related to the converter stations should not be included in the cost of the Arrowhead Substation Alternative, which relates solely to the means of interconnection.

⁷⁸ To determine the impact to MP, certain of these costs (the assets that would be owned by ATC) require a tax gross-up to be applied, resulting in a best estimate cost to MP of \$45.5 million. Tr. at 130-31 (Johanek).

⁷⁹ Ex. ATC-214 at 9 (Bradley Direct).

in developing the route, such as stream crossings and the location of an existing archaeological site.⁸⁰

ATC also designed its proposed route to allow MP's HVDC Line to remain in-service during construction of the new double-circuited 345 kV line, while limiting environmental and community impacts by siting that line within the existing ROW for MP's HVDC Line to the maximum extent possible.⁸¹ Specifically, the east-west segment of the Arrowhead Substation Alternative transmission line runs adjacent to MP's existing HVDC Line and will share 25 feet of that line's existing ROW; this minimizes impacts as much as possible and provides enough clearance for the new line to be safely constructed while the existing HVDC Line remains in service.⁸² Additionally, ATC selected the location of the north-south segment to minimize impacts to forested wetlands, minimize waterway crossings, and avoid impacts to archaeological sites.⁸³ There are no houses within the proposed route for the Arrowhead Substation Alternative and thus no landowner relocation would be required.⁸⁴ A map of the Arrowhead Substation Alternative is provided in Figure 2, below.⁸⁵

⁸⁰ Ex. ATC-214 at 9 (Bradley Direct).

⁸¹ Ex. ATC-214 at 9 (Bradley Direct).

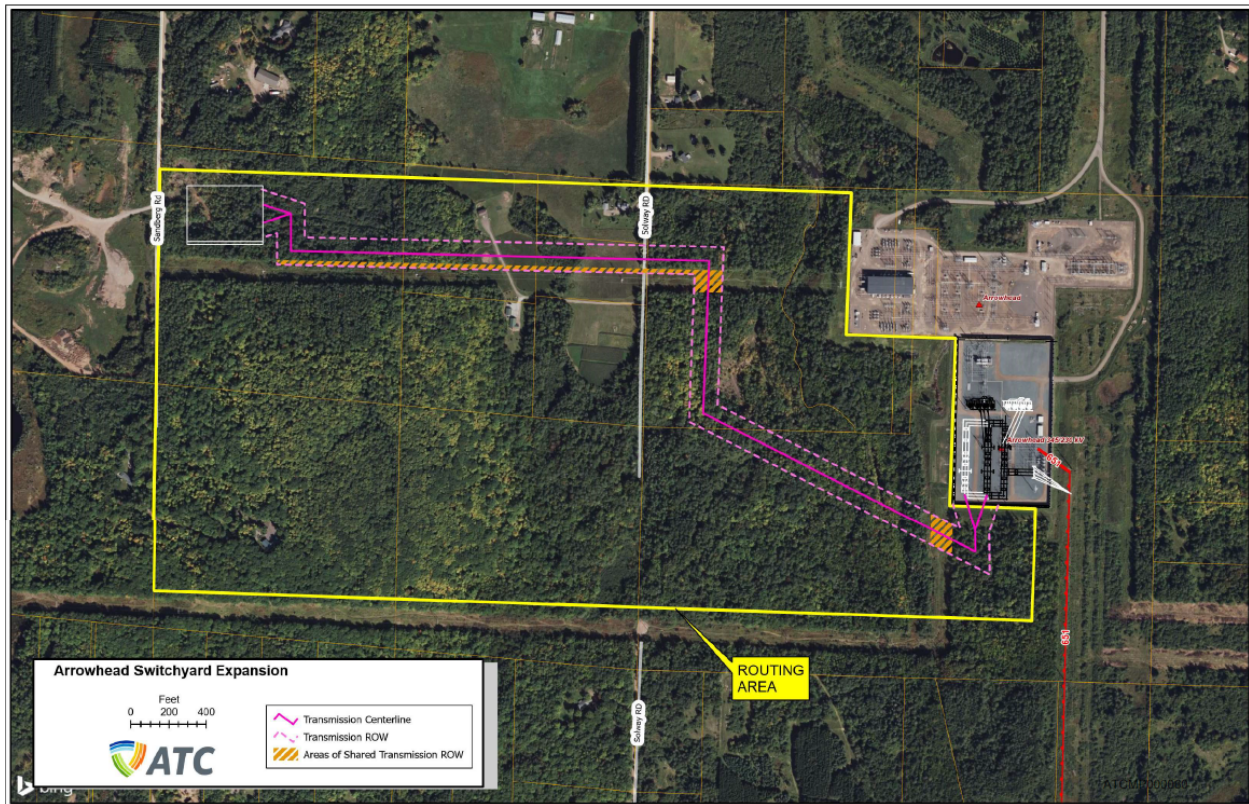
⁸² Ex. ATC-214 at 9 (Bradley Direct).

⁸³ Ex. ATC-214 at 9–10 (Bradley Direct).

⁸⁴ Ex. ATC-214 at 10 (Bradley Direct).

⁸⁵ *See* Ex. ATC-215, Schedule 1 (Bradley Direct).

Figure 2: Arrowhead Substation Alternative



In contrast, for the MP Proposal, MP acquired parcels including residences and has indicated that those residences will be vacated and demolished by the end of 2025.⁸⁶ Further, the MP Proposal requires the construction of a new substation along the route, converting that land to a new use, while the Arrowhead Substation Alternative does not require an expansion of the footprint of the existing ATC Arrowhead Substation.⁸⁷ As a result, the Arrowhead Substation Alternative avoids much of the impact to aesthetics that would occur with the MP Proposal.⁸⁸ Although both projects will require clearing of trees and other flora for the right-of-way, ATC proposes routing the new double-circuit 345 kV

⁸⁶ Ex. MP-120 at 6–7 (McCourtney Direct).

⁸⁷ Ex. ATC-214 at 10 (Bradley Direct).

⁸⁸ Ex. ATC-214 at 10 (Bradley Direct).

transmission line adjacent to the existing HVDC Line as much as possible and utilizing existing cleared ROW.⁸⁹ Further, ATC will minimize the aesthetic impacts of the Arrowhead Substation Alternative, and specifically the visual impacts of the transmission infrastructure, through the use of weathering steel transmission structures.⁹⁰

4. Timing

As a single-purpose transmission-only company, ATC has substantial experience planning, designing, and constructing transmission projects. ATC's Project Manager for the Arrowhead Substation Alternative, Mr. Johanek, explained that ATC prepared a high-level schedule for construction of the Arrowhead Substation Alternative to confirm that ATC can meet the April 2030 in-service date (ISD) for the Project indicated by MP in its Certificate of Need Application.⁹¹ As Mr. Johanek explained, procurement for substation materials—including a second new 345/230 kV transformer—has been identified as the critical path long lead time item and ATC contacted its approved vendors and incorporated the lead times communicated by them into this schedule;⁹² however, ATC can reliably serve the Project using the existing 345/230 kV transformer at the Arrowhead Substation until the new transformer is obtained and installed.⁹³ ATC has also discussed procurement matters with its potential suppliers and has added this major equipment to the ATC material

⁸⁹ Ex. ATC-214 at 10 (Bradley Direct).

⁹⁰ Ex. ATC-214 at 10 (Bradley Direct).

⁹¹ Ex. ATC-205 at 8 (Johanek Direct); Ex. ATC-207, Schedule 2 (Johanek Direct); Ex. ATC-209 at 3–4 (Johanek Rebuttal). For the MP indicated in-service date, *see* Ex. MP-104 at §§ 2.2.1 and 2.2.3.

⁹² Ex. ATC-205 at 8 (Johanek Direct).

⁹³ Ex. ATC-227 at 32–33 (Dagenais Direct).

forecast sheet to increase visibility to these potential vendors.⁹⁴ Finally, ATC built an extended amount of scheduling contingency into its construction timeline, allowing for flexibility in completing portions of the work prior to the critical path items, coordination with MP, and acceleration of the ISD if desired.⁹⁵

Approval of the Arrowhead Substation Alternative will also require amendment of the ATC-MP T-T interconnection agreement by editing Appendix A, “Points of Interconnection,” of the current agreement—a two-page document that describes the various facilities owned, operated, and maintained by either utility at their respective Arrowhead substations.⁹⁶ This appendix would be edited to describe the facilities approved by the Commission in this proceeding, which utility is responsible for owning, operating, and maintaining those facilities, and a “one-line” diagram depicting the updated facilities.⁹⁷ This is a straightforward process that should only take a few days to accomplish and would not in any way delay the ISD of the Project.⁹⁸

5. Benefits

As discussed further below, the Arrowhead Substation Alternative will meet the purpose and need of the overall Project, while generating substantial benefits for MP’s customers and the region alike. It will produce lower overall system losses than the MP Proposal, meaning there will be more energy available from the HVDC Line to meet the

⁹⁴ Ex. ATC-209 at 4 (Johanek Rebuttal).

⁹⁵ Ex. ATC-209 at 4 (Johanek Rebuttal).

⁹⁶ Ex. ATC-200 at 16 (McKee Direct); Ex. ATC-202 at 17 (McKee Rebuttal).

⁹⁷ Ex. ATC-200 at 16 (McKee Direct); Ex. ATC-202 at 17 (McKee Rebuttal).

⁹⁸ Ex. ATC-200 at 16–17 (McKee Direct); Ex. ATC-202 at (McKee Rebuttal).

needs of MP's customers.⁹⁹ It will also provide highly reliable service by adding a second, parallel 345/230 kV transformer to the existing substation, providing backup if one transformer is forced out-of-service.¹⁰⁰ Finally, ATC's planning analysis indicates that, from a reliability perspective, the Arrowhead Substation Alternative will perform better than MP's proposed configuration of the Project by providing regional voltage support, simplifying transmission system operations, and creating stronger, more reliable ties on the regional transmission network.¹⁰¹

II. STATEMENT OF THE ISSUE

While there are a number of sub-issues for the ALJ and Commission to consider and which ATC discusses below, because no party challenges the overall need for the Project, there is only one core issue that must be decided: in granting a Certificate of Need and any Route Permit(s) necessary for the Project, should the Commission incorporate the Arrowhead Substation Alternative or the MP Proposal as the means of interconnecting the upgraded HVDC converter station to the AC transmission system?

The record demonstrates that implementation of the Arrowhead Substation Alternative as part of the Project makes more efficient use of existing resources, costs less, and leads to fewer impacts to the natural and human environment than would implementation of the MP Proposal. Therefore, ATC requests that the Commission grant

⁹⁹ Ex. ATC-227 at 11–12 (Dagenais Direct).

¹⁰⁰ Ex. ATC-227 at 14 (Dagenais Direct).

¹⁰¹ Ex. ATC-227 at 6, 31–33 (Dagenais Direct); Tr. at 79–80 (Dagenais).

MP a Certificate of Need and Route Permit for the Project, incorporating the Arrowhead Substation Alternative.

III. APPLICABLE LAW

Minnesota Statutes and Rules govern this proceeding and provide the criteria the ALJ and Commission must apply in determining whether to grant MP and Certificate of Need and Route Permit for the Project and, if so, whether any conditions should be included in those approvals.

A. Certificate Of Need

Minnesota Statutes Section 216B.243 (the CN Statute) requires the Commission to issue a Certificate of Need prior to the siting or construction of a “large energy facility,” which includes “any high-voltage transmission line with a capacity of 200 kilovolts or more and greater than 1,500 feet in length.”¹⁰² Since the Project—either as proposed by MP or as modified by the Arrowhead Substation Alternative—requires such new high-voltage transmission lines (HVTLS) to connect the new HVDC converter station to the transmission system, Minnesota law requires the Commission to issue a Certificate of Need for the Project to move forward.

Recognizing the interconnectedness of the transmission system, in assessing need for a HVTL, the CN Statute specifically requires the Commission to consider, among other factors:

¹⁰² Minn. Stat. § 216B.2421, subd. 2 (2).

- “the relationship of the proposed line to *regional* energy needs;”¹⁰³
- possible alternatives for satisfying the transmission needs including but not limited to potential for upgrading of existing transmission facilities;¹⁰⁴ and
- “the benefits of enhanced *regional* reliability, access, or deliverability to the extent these factors improve the robustness of the transmission system or lower costs for electric consumers in Minnesota.”¹⁰⁵

The Commission has also adopted rules regarding Certificates of Need (CN Rules) which provide the criteria the Commission applies to determine whether such a certificate should be granted.¹⁰⁶ The CN Rules focus on the need for any new large energy facility to assure “the future adequacy, reliability, or efficiency of energy supply to the applicant, to the applicant’s customers, or to the people of Minnesota and neighboring states” and specifically require consideration of “the effect of the proposed facility, or a suitable modification thereof, in making efficient use of resources” to meet the identified need.¹⁰⁷ In considering an alternative or modification to a proposed facility, the CN Rules require the Commission to consider the comparative costs, the comparative effects on the natural and socioeconomic environments, and the expected reliability of the proposed facility and any such proposed alternative or modification.¹⁰⁸

¹⁰³ Minn. Stat. § 216B.243, subd. 3 (3) (emphasis added). In contrast, this same section of the statute focuses exclusively on state energy needs when examining the need for other large energy projects.

¹⁰⁴ Minn. Stat. § 216B.243, subd. 3 (6) (emphasis added).

¹⁰⁵ Minn. Stat. § 216B.243, subd. 3 (6) (emphasis added).

¹⁰⁶ Minn. R. Chapter 7849 (the CN Rules).

¹⁰⁷ See Minn. R. 7849.0120 (A).

¹⁰⁸ See Minn. R. 7849.0120 (B), (C).

B. Route Permit

Minnesota Statutes also require a Route Permit from the Commission prior to constructing a HVTL.¹⁰⁹ The Commission's Route Permit determination "must be guided by the state's goals to conserve resources, minimize environmental impacts, minimize human settlement and other land use conflicts, and ensure the state's electric energy security through efficient, cost-effective power supply and electric transmission infrastructure."¹¹⁰ Similar to a Certificate of Need, Commission Rules set forth the factors to be considering in issuing a Route Permit, including, among other factors: effects on human settlement, including, but not limited to, displacement, noise, aesthetics, cultural values, recreation, and public services; effects on the natural environment; use of existing transportation, pipeline, and electrical transmission systems or rights-of-way; electrical system reliability; and the costs of constructing, operating, and maintaining the facility which are dependent on design and route.¹¹¹

IV. ARGUMENT

ATC supports the overall purpose and goals of the Project to modernize the current HVDC Line assets. The Project will better position the transmission grid for the ongoing clean energy transition and improve the overall reliability of the transmission system in Minnesota and the region. ATC has consistently communicated its general support for the Project to MP senior leadership. However, the Project's overall value to Minnesota and the

¹⁰⁹ Minn. Stat. § 216E.03, subd. 2.

¹¹⁰ Minn. Stat. § 216E.03, subd. 7.

¹¹¹ Minn. R. 7850.4100.

region does not mean that the specific configuration of the Project as proposed by MP appropriately achieves the Project's purpose and goals.

As discussed above, in the normal course of transmission planning, the sponsor of a transmission project brings its proposals to MISO for consideration in the MTEP process. As part of this process, project sponsors submit into the MTEP database all projects for which they are seeking formal MISO approval (i.e., projects proposed to be included in MTEP Appendix A) to allow MISO and other stakeholders to review projects through a collaborative, open, and transparent process that lasts several months.¹¹² Stakeholders can submit comments, provide feedback on, and offer alternatives to the transmission projects that have been proposed. MISO also holds several subregional planning meetings (SPMs) throughout the year to present proposed projects, provide the results of its independent evaluation, and address feedback received from stakeholders, including with respect to any alternatives that have been proposed. Following this vetting process, MISO staff presents a final list of MTEP projects for MISO Board approval and a draft of the current cycle MTEP report. Ultimately projects move through the process and progress from MTEP Appendix B (where the Project continues to sit) to MTEP Appendix A, indicating MISO Board approval of a proposal as the preferred transmission solution for the identified transmission need.

Thus far, MP has not followed this process for the Project. Had it done so, the relative merits of the Arrowhead Substation Alternative and the MP Proposal would have

¹¹² See, e.g., Ex. ATC-249, Schedule 4 (Dagenais Rebuttal).

been fully vetted through the MISO process. As part of that process, ATC and any other interested stakeholders—including the Large Power Intervenor, with whom MP has had “little to no dialogue on this Project”¹¹³—would have had the opportunity to scrutinize the benefits and risks that may be associated with either configuration of the Project. In other words, had MP submitted the Project through the MTEP stakeholder review process, the debate that is occurring in this proceeding could have been avoided entirely. ATC would have welcomed collaborating with MP directly or through MISO’s MTEP process, as is the normal course of business between transmission owners.

For reasons only MP can explain, this did not occur. MP unilaterally decided that the Arrowhead Substation Alternative did not merit further analysis or discussion and filed its Application for a Certificate of Need and Route Permit, necessitating ATC’s intervention in this proceeding. While ATC would have preferred to avoid formal contested case proceedings over this issue, the company felt its participation in this case was necessary to ensure the Arrowhead Substation Alternative receives the full consideration that it deserves. As discussed below, because the Arrowhead Substation Alternative generates greater benefits for Minnesota and the region, better leverages existing transmission assets, and avoids constructing duplicative facilities, thereby avoiding unnecessary costs to customers and unnecessary environmental and human impacts, Minnesota law requires that it be incorporated into any Certificate of Need and Route Permit issued for the Project.

¹¹³ Ex. LPI-300 at 23 (Maini Direct).

A. Implementation Of The Arrowhead Substation Alternative Will Provide Adequate, Reliable And Efficient Energy Supply For Minnesota Power, The State And The Region and Make Efficient Use Of Existing Resources

According to MP, the “fundamental need driver” for the Project is to upgrade and modernize the converter stations on either end of its HVDC Line.¹¹⁴ According to MP, this involves constructing: (1) a new HVDC converter station; (2) a new 345 kV St. Louis County Substation in Hermantown, Minnesota; (3) a new less than one-mile 345 kV transmission line to connect the new converter station to the new St. Louis County Substation; and (4) a new less than one-mile double-circuit 230 kV transmission line to connect the new St. Louis County Substation to the MP Arrowhead Substation, to which the current HVDC converter station is interconnected.¹¹⁵

MP argues that the new 345 kV St. Louis County Substation—which would be located less than a mile away from ATC’s existing 345/230 kV substation—is required to interconnect the Project to the AC bulk electric transmission system and to accommodate potential future transmission expansion.¹¹⁶ However, the Arrowhead Substation Alternative is more than capable of achieving MP’s stated needs for the Project—upgrading and modernizing the HVDC assets and interconnecting those assets to the AC transmission system. To be clear, ATC supports the Project generally and is not offering a

¹¹⁴ Ex. ATC-227 at 6 (Dagenais Direct).

¹¹⁵ See Ex. MP-104 at § 2.1 (MP Application); Ex. ATC-227 at 7 (Dagenais Direct); *see also* Ex. MP-120, Schedule 1 at 5 (McCourtney Direct) (depicting MP’s proposed configuration of the Project).

¹¹⁶ See Ex. MP-104 at §§ 2.1.1 and 2.1.2.4 (MP Application); Ex. ATC-227 at 7–8 (Dagenais Direct).

“system alternative” that fundamentally changes the Project; it is simply proposing a modification to one aspect of that Project—namely, the means by which the HVDC Line and converter station interconnect to the high voltage transmission system in Minnesota.¹¹⁷ Nothing about this proposal undermines what MP has characterized as the “fundamental need driver” for the Project. Modifying MP’s proposal to interconnect the Project to ATC’s 345/230 kV Arrowhead Substation—rather than a new St. Louis County Substation, located less than a mile away—will still enable MP to modernize the aging converter stations for the HVDC Line, to continue serving its customers with carbon-free renewable energy from that line, to connect the HVDC System to the 345 kV transmission network, and to accommodate future 345 kV transmission development in the area, should the need to do so arise.¹¹⁸

In fact, the Arrowhead Substation Alternative can meet the Project’s overall purpose and need, while providing greater system benefits than the MP Proposal. As discussed in greater detail below, the Arrowhead Substation Alternative will result in lower overall electrical losses on the transmission system; will provide highly reliable means for MP to transfer power from the HVDC Line to its customers in northeastern Minnesota; will allow for reliable operation of the local and regional transmission system; will simplify and strengthen the overall operation of that system; and will make better use of existing transmission infrastructure.

¹¹⁷ Ex. ATC-227 at 8 (Dagenais Direct).

¹¹⁸ Ex. ATC-227 at 41–42 (Dagenais Direct).

1. The Arrowhead Substation Alternative Will Result In Lower Overall Electrical Losses Than MP's Proposed Configuration Of The Project

Generally speaking, some of the electricity that is transmitted across high-voltage transmission lines is lost as waste heat: the greater the amount of impedance (i.e., resistance to electrical current) on a transmission line (or other equipment, such as a transformer), the greater amount of heat losses.¹¹⁹ If implemented, the Arrowhead Substation Alternative would reduce impedance between MP's 230 kV transmission system and ATC's 345 kV transmission network in Wisconsin, compared to the MP Proposal.¹²⁰ As such, about one megawatt (MW) less of electricity will be lost during the summer peak, relative to MP's proposed configuration of the Project.¹²¹ Practically speaking, this means more energy from the HVDC Line will be available to serve MP's customers under ATC's proposal.¹²² This is a clear advantage of the Arrowhead Substation Alternative, as it defers the need for MP to dispatch more generation from existing resources or to construct new generating resources to meet customer demand.¹²³

2. The Arrowhead Substation Alternative Provides A More Reliable Means Of Interconnecting The Project To The AC High-Voltage Transmission System

ATC's proposal provides an inherently more reliable method of interconnecting the Project to the transmission system. ATC's 345/230 kV Arrowhead Substation currently

¹¹⁹ See Ex. MP-104 at § 3.7 (MP Application); Ex. ATC-243 at 17–18 (Dagenais Rebuttal).

¹²⁰ Ex. ATC-227 at 11–13 (Dagenais Direct); Ex. ATC-243 at 17–18 (Dagenais Rebuttal).

¹²¹ Ex. ATC-227 at 11–13 (Dagenais Direct); Ex. ATC-243 at 17–18 (Dagenais Rebuttal).

¹²² Ex. ATC-227 at 11–13 (Dagenais Direct); Ex. ATC-243 at 17–18 (Dagenais Rebuttal).

¹²³ Tr. at 85 (Dagenais).

contains one 345/230 kV transformer, which has historically been highly reliable. Between January 1, 2014 and December 31, 2023, the transformer has only been forced out of service for a total of 39 hours, meaning it has been available better than 99 percent of the time.¹²⁴ The Arrowhead Substation Alternative would add a second, parallel 345/230 kV transformer to this substation. If one of these transformers were forced out-of-service, the second would be available to continue serving the Project.¹²⁵ This is a notable advantage compared to MP's proposed configuration of the Project, which calls for installation of a single transformer at the new St. Louis County Substation: if that transformer were forced out of service, then the HVDC Line would be completely unable to transfer power to MP's customers, resulting in significant replacement power costs to its customers.¹²⁶ ATC's proposal avoids this outcome by having two parallel transformers available to serve the Project.

3. The Arrowhead Substation Alternative Will Better Allow For Reliable Operation Of The Local And Regional Transmission System

ATC conducted a comprehensive planning analysis to compare the performance of the Arrowhead Substation Alternative to MP's proposal to interconnect the Project through the new St. Louis County Substation.¹²⁷ Grid operators and utility planners commonly conduct these studies using software that simulates how the transmission system will react to the addition of new transmission projects; generally speaking, the purpose of these

¹²⁴ Ex. ATC-227 at 13–14 (Dagenais Direct); Ex. MP-131, Schedule 35 (Winter Rebuttal).

¹²⁵ Ex. ATC-227 at 13–14 (Dagenais Direct).

¹²⁶ Ex. ATC-227 at 13–14 (Dagenais Direct); Ex. DOC DER-600 at 10–11 (Zajicek Direct).

¹²⁷ *See generally* Ex. ATC-227 at 15–29 (Dagenais Direct).

analyses is to evaluate how the addition of such projects will impact the overall system's ability to reliably deliver power to customers.¹²⁸ ATC's planning analysis—which included over 75 different modeling runs across multiple different scenarios and model sets—demonstrates that the Arrowhead Station Alternative performs as well or better than MP's Proposal to interconnect the Project through the new St. Louis County Substation.¹²⁹

ATC conducted three different studies to compare the performance of its and MP's proposed method of interconnecting the Project: a steady state reliability analysis, a dynamic stability analysis, and a voltage stability analysis.¹³⁰ The steady state analysis evaluated whether and to what extent either alternative would result in thermal or voltage overloads on various transmission facilities at a single point in time, under various contingencies. The dynamic stability analysis evaluated whether either alternative would create unstable conditions on the transmission system in the presence of either alternative, under various contingencies. And the voltage stability analysis evaluated whether and to what extent each alternative would maintain acceptable voltage levels under normal operating conditions and after a contingency.¹³¹

ATC conducted each study using a model that contains varying assumptions about how the transmission system will operate under certain conditions.¹³² Because no model

¹²⁸ Ex. ATC-227 at 16 (Dagenais Direct).

¹²⁹ Ex. ATC-227 at 15 (Dagenais Direct).

¹³⁰ Ex. ATC-227 at 15–16 (Dagenais Direct).

¹³¹ Ex. ATC-227 at 15–16 (Dagenais Direct). In this context, a “contingency” refers to the failure of a key piece of equipment (*e.g.*, transmission line, transformer, or generating unit) on the high-voltage transmission system. Ex. ATC-227 at 15–16 (Dagenais Direct).

¹³² Ex. ATC-227 at 16 (Dagenais Direct).

can perfectly simulate future conditions on the system or how it will react to changes in transmission topology, ATC sought to conduct each study using a broad but realistic range of assumptions to ensure its analysis was as robust as possible. Specifically, ATC conducted the steady state and dynamic stability analysis across multiple different model sets and scenarios, which were initially developed by MP and MISO.¹³³ For all three studies, ATC also evaluated a sensitivity to examine whether a single 345/230 kV transformer at its 345/230 kV Arrowhead Substation could reliably serve the Project up to the HVDC Line's existing capacity (550 MW) and planned future capacity (900 MW).¹³⁴ In total, ATC conducted over 75 different modeling runs as part of these studies.¹³⁵

The results of these analyses demonstrate that, from a system reliability perspective, the Arrowhead Substation Alternative performs better than MP's Proposal.¹³⁶ While both alternatives performed similarly in the steady state and dynamic stability analyses, the Arrowhead Substation Alternative provides better voltage support to the surrounding transmission system than MP's proposed method of interconnection (i.e., through the new St. Louis County Substation); this is because it enables larger power transfers across the system under system intact conditions and under the worst contingency, before voltage instability sets in.¹³⁷ The ability of the Arrowhead Substation Alternative to provide voltage

¹³³ See generally Ex. ATC-227 at 18–27 (Dagenais Direct).

¹³⁴ See generally Ex. ATC-227 at 20–21, 27, 29 (Dagenais Direct).

¹³⁵ Ex. ATC-227 at 15 (Dagenais Direct).

¹³⁶ See generally Ex. ATC-234, Schedule 4 (Dagenais Direct); Ex. ATC-236, Schedule 5 (Dagenais Direct); Ex. ATC-238, Schedule 6 (Dagenais Direct); Ex. ATC-240, Schedule 7 (Dagenais Direct) (detailed results of ATC planning analyses); Tr. at 79–80 (Dagenais).

¹³⁷ Ex. ATC-227 at 31–33 (Dagenais Direct); Tr. at 79–80 (Dagenais).

support on the surrounding transmission system is a significant benefit, given that voltage stability was one of the primary drivers prompting construction of the Arrowhead-Weston Project to maintain local and regional reliability.¹³⁸

The Arrowhead Substation Alternative will also simplify and streamline the operation of the regional transmission system.¹³⁹ In modeling the Arrowhead Substation Alternative, ATC assumed that the existing phase shifting transformer (PST) and 345 kV capacitor banks at its 345/230 kV Arrowhead Substation would be removed from ATC's 345/230 kV Arrowhead Substation.¹⁴⁰ The results show that there are no adverse reliability impacts associated with retiring these facilities, since the Arrowhead Substation Alternative performs as well as (if not better than) MP's proposal in all three studies.¹⁴¹ These findings are somewhat unsurprising. The Arrowhead PST has never been used to regulate power flows from Minnesota into Wisconsin, and the technology MP is using for its upgraded converter station will provide the same voltage support that the existing 345 kV capacitor banks have historically provided, rendering them unnecessary.¹⁴² In fact, MISO has been considering removing and retiring the existing Arrowhead PST as part of its ongoing LRTP Tranche 2 planning process.¹⁴³ There is a clear and obvious benefit to

¹³⁸ See Ex. MP-122, Schedule 32 at 13 (Winter Direct); *see also In Re Joint Application of Minnesota Power Co. and Wis. Pub. Serv. Corp.*, Docket No. 05-CE-113, 2001 Wisc. PUC LEXIS 81 at **5–6, Final Decision (Oct. 30, 2001).

¹³⁹ Ex. ATC-243 at 15, 35 (Dagenais Rebuttal).

¹⁴⁰ Ex. ATC-227 at 19, 25, 28 (Dagenais Direct).

¹⁴¹ Ex. ATC-227 at 33 (Dagenais Direct).

¹⁴² Ex. ATC-227 at 10, 37 (Dagenais Direct); Ex. ATC-242, Schedule 8 (Dagenais Direct); Ex. ATC-243 at 33–37, 40–41 (Dagenais Rebuttal).

¹⁴³ Ex. ATC-243 at 41 (Dagenais Rebuttal).

simplifying the real-time operation of the transmission system by facilitating removal of this equipment.

Finally, ATC's planning analysis shows that, even without adding a second transformer to its 345/230 kV Arrowhead Substation, the Arrowhead Substation Alternative can reliably meet MP's immediate need to transfer up to 550-900 MW of power over the HVDC Line, from west-to-east.¹⁴⁴ MP is considering targeted upgrades to the HVDC Line that would increase its capacity from 550 MW to 900 MW, but those upgrades are not expected to be in place until the fourth quarter of 2028.¹⁴⁵ Until that happens, the line will be limited to its current capacity (550 MW), and ATC's proposal is more than sufficient to reliably serve the line up to that capacity, even without the addition of a second 345/230 kV transformer.¹⁴⁶

4. The Arrowhead Substation Alternative Makes Better Use Of Existing Electric Infrastructure Compared To MP's Proposal To Construct A New Substation Less Than A Mile Away

There are instances in which new transmission lines will need new substation infrastructure. This is not one of them. As discussed above, ATC's planning analysis demonstrates that its existing 345/230 kV Arrowhead Substation is more than capable of supporting the Project's interconnection to the AC transmission system. It is consistent with prudent transmission planning to utilize the existing Arrowhead Substation to

¹⁴⁴ Ex. ATC-227 at 32 (Dagenais Direct).

¹⁴⁵ Ex. ATC-227 at 32–33 (Dagenais Direct).

¹⁴⁶ Ex. ATC-227 at 32–33 (Dagenais Direct).

interconnect the Project, rather than to construct an entirely new substation less than a mile away.¹⁴⁷

To understand why, it is important to recognize the conceptual similarity between the Arrowhead Substation Alternative and MP's configuration of the Project. MP has repeatedly claimed that its proposal "maintains the existing point of interconnection" for its HVDC Line at its 230/115 kV Arrowhead Substation.¹⁴⁸ The record demonstrates otherwise. While MP considered interconnecting the Project at 230 kV through its existing substation, it affirmatively rejected that alternative because "[a]s the regional transmission system continues to develop to support the clean energy transition . . . it will become increasingly important for the HVDC system to be directly connected to the regional 345 kV network, rather than the underlying 230 kV network."¹⁴⁹ In other words, MP has affirmatively decided to *change* the Project's point-of-interconnection from the 230 kV transmission network to the 345 kV transmission network.¹⁵⁰

This is exactly the configuration that ATC has proposed with the Arrowhead Substation Alternative. The only difference is that ATC's alternative would interconnect the Project to its existing 345/230 kV Arrowhead Substation, rather than through the new

¹⁴⁷ Ex. ATC-243 at 31 (Dagenais Rebuttal).

¹⁴⁸ Ex. MP-122 at 59 (Winter Direct).

¹⁴⁹ Ex. MP-104 at § 4.3.2 (MP Application); *see also* Ex. MP-122 at 14 (Winter Direct) ("[T]he best long-term solution for the HVDC Modernization Project would be to purchase 345 kV converter transformers for the HVDC converter stations and establish a separate transformation to 230 kV at the proposed new St. Louis County 345 kV/230 kV Substation.").

¹⁵⁰ Ex. ATC-243 at 31 (Dagenais Rebuttal).

345/230 kV St. Louis County Substation that would be built less than a mile away.¹⁵¹ From this perspective, MP's preferred configuration of the Project reflects a clear and unnecessary overbuild of transmission infrastructure—at unnecessary expense to MP customers and unnecessary impacts to landowners and the environment. ATC's 345/230 kV Arrowhead Substation was designed and built with future needs in mind, so that it could accommodate exactly the kind of transmission expansion being contemplated here.¹⁵² It is nonsensical to require Minnesota customers to fund construction of an entirely new substation when ATC's existing Arrowhead Substation is more than adequate to accommodate the Project.¹⁵³

MP asserts that the new 345 kV St. Louis County Substation was MISO's idea and is needed to accommodate future transmission development that MISO is contemplating as part of the LRTP Tranche 2 planning process.¹⁵⁴ There are several issues with this argument. First, the St. Louis County Substation that MISO proposed was and always has been a conceptual proposal; MISO has never endorsed the specific iteration or location of the St. Louis County Substation that MP has offered up in this proceeding.¹⁵⁵ Second, in early March, MISO released its initial draft portfolio for LRTP Tranche 2, which does not include *any* new transmission projects in northeastern Minnesota.¹⁵⁶ This demonstrates that

¹⁵¹ Ex. ATC-243 at 11–13 (Dagenais Rebuttal).

¹⁵² Ex. ATC-218 at 5–6 (Larsen Direct).

¹⁵³ Ex. ATC-243 at 29–30 (Dagenais Rebuttal).

¹⁵⁴ *See generally*, Ex. MP-122 at 84–87 (Winter Direct).

¹⁵⁵ Ex. ATC-243 at 29–30 (Dagenais Rebuttal).

¹⁵⁶ *See* Ex. ATC-243 at 30 (Dagenais Rebuttal); Ex. ATC-262, Schedule 14 (Dagenais Rebuttal).

development of a new St. Louis County Substation is not a foregone conclusion, as MP appears to assume.¹⁵⁷ Third, even after the Project is interconnected to ATC's 345/230 kV Arrowhead Substation, there will be sufficient space within that substation to accommodate additional 345 kV transmission development that could occur in the area as part of future regional transmission planning efforts.¹⁵⁸

Finally, and perhaps most importantly, both MISO and its member transmission owners—including MP—have emphasized the need to leverage existing transmission infrastructure, to the extent feasible, when developing new regional transmission projects as part of the LRTP process.¹⁵⁹ The clean energy transition will require significant investment in new transmission assets, but this should occur in an orderly and responsible manner. Utilizing existing transmission infrastructure—when it is technically feasible and cost effective to do so—will limit the environmental, social, and financial costs and impacts of the substantial transmission buildout that will be needed to support the ongoing transformation of the grid. By leveraging ATC's existing 345/230 kV Arrowhead Substation, ATC's proposal is more consistent with this overarching principle than the MP Proposal, which would result in the construction of an entirely new and unnecessary substation less than a mile away.¹⁶⁰

¹⁵⁷ Ex. ATC-243 at 30 (Dagenais Rebuttal); Ex. ATC-262, Schedule 14 (Dagenais Rebuttal).

¹⁵⁸ Ex. ATC-243 at 32 (Dagenais Rebuttal).

¹⁵⁹ Ex. ATC-243 at 31–32 (Dagenais Rebuttal).

¹⁶⁰ Ex. ATC-243 at 31–32 (Dagenais Rebuttal).

5. MP's Objections To The Arrowhead Substation Alternative Are Wholly Lacking In Merit

Despite the significant advantages the Arrowhead Substation Alternative provides when compared to the MP Proposal, MP has urged the Commission to reject this alternative. MP claims that it is unclear whether the existing Arrowhead PST and 345 kV capacitor banks can be removed as part of the Arrowhead Substation Alternative and that it cannot be implemented without further study from MISO. MP also attempts to paint the Arrowhead Substation Alternative as some kind of underhanded ploy by ATC to extract benefits for Wisconsin customers at the expense of MP's ratepayers. These arguments are unsupported and out-of-touch with how the modern transmission system operates. The ALJ and Commission should not afford them any weight.

First, MP's equivocation regarding the potential need for the existing Arrowhead PST and 345 kV capacitor banks is simply not supported by the record. While the Arrowhead PST was initially installed to manage power flows and provide voltage support on the transmission system between Minnesota and Wisconsin, changes to the function and operation of the electric grid since its commissioning have rendered it obsolete.¹⁶¹ In the early 2000s, when the Arrowhead-Weston Project was initially being planned, MISO, the regional grid operator, was in its infancy and did not have functioning wholesale energy markets; as such, transmission-owning members of MISO (like ATC) were responsible for operating their transmission system.¹⁶²

¹⁶¹ Ex. ATC-243 at 33–37 (Dagenais Rebuttal); Ex. DOC DER-600, Attachment 5 (Zajicek Direct).

¹⁶² Ex. ATC-243 at 33–34 (Dagenais Rebuttal).

That is no longer the case today. By the time Arrowhead-Weston went into service in 2008, MISO had fully functioning energy markets and could manage real-time operations on the transmission system in a manner that addresses the reliability issues the Arrowhead PST was originally designed to address.¹⁶³ For this reason, the Arrowhead PST has never operated automatically to control power flows between Minnesota and Wisconsin—a fact that MP does not dispute.¹⁶⁴ Instead, the manner in which MISO operates and regulates power flows on the surrounding transmission system respects and maintains compliance with applicable system operating limits to ensure reliability.¹⁶⁵ Retiring the Arrowhead PST will have no impact on MISO’s ability to reliably operate the system, which is confirmed by ATC’s planning study, as discussed earlier.

With respect to the 345 kV capacitor banks, these have historically been used to help maintain voltage stability on the transmission system.¹⁶⁶ MP claims that these facilities would continue to “provide value” to the transmission system if the Arrowhead Substation Alternative were implemented.¹⁶⁷ This directly contradicts the assertions that MP made regarding the Project’s benefits in its application: MP admitted that the new voltage source converter (VSC) technology it is proposing for the Project “eliminates the need for additional reactive support from mechanically switched capacitors” that are external to the

¹⁶³ Ex. ATC-243 at 33–34 (Dagenais Rebuttal).

¹⁶⁴ Ex. ATC-243 at 34 (Dagenais Rebuttal); Ex. DOC DER-600, Attachment 5 (Zajicek Direct); Ex. MP-131 at 71, n.98 (Winter Rebuttal).

¹⁶⁵ Ex. ATC-243 at 34 (Dagenais Rebuttal); Ex. DOC DER-600, Attachment 5 (Zajicek Direct); Ex. MP-131 at 71, n.98 (Winter Rebuttal).

¹⁶⁶ Ex. ATC-227 at 10 (Dagenais Direct).

¹⁶⁷ *See, e.g.*, Ex. MP-131 at 64 (Winter Rebuttal).

HVDC system itself, such as the Arrowhead 345 kV capacitor banks.¹⁶⁸ MP's abrupt about-face in testimony completely undermines the credibility of its argument concerning the need for this equipment. Indeed, MP's own power flow analysis of the Arrowhead Substation Alternative provides no support for its assertion that these capacitor banks will be needed if that alternative is implemented.¹⁶⁹

Second, MP's concern that additional MISO study of the Arrowhead Substation Alternative could delay Project implementation is vastly overstated, for several reasons. To begin, MISO will need to further evaluate *both* the Arrowhead Substation Alternative *and* the MP Proposal as part of the MTEP process, which can occur on an expedited basis (i.e., within as little as 30 days) if necessary.¹⁷⁰ In other words, the need for further MISO review is not unique to the Arrowhead Substation Alternative, since the MP Proposal also needs to be fully vetted through the MTEP stakeholder process.¹⁷¹ Moreover, and as discussed earlier, MP could have avoided the need for additional study of *both* alternatives had it vetted the Project—including MP's preferred point-of-interconnection—through MISO's open and collaborative MTEP process.¹⁷² This would have given stakeholders, including ATC, the opportunity to provide comments and feedback on MP's Project, including with respect to the Arrowhead Substation Alternative.¹⁷³ Had MP done so before

¹⁶⁸ Ex. MP-104 at § 3.3.2.1 (MP Application).

¹⁶⁹ See generally Ex. ATC-227 at 41–45 (Dagenais Direct).

¹⁷⁰ See generally Ex. ATC-227 at 34–35 (Dagenais Direct); Ex. ATC-243 at 18–29 (Dagenais Rebuttal).

¹⁷¹ Ex. ATC-227 at 34–35 (Dagenais Direct); Ex. ATC-243 at 18–29 (Dagenais Rebuttal).

¹⁷² See generally Ex. ATC-243 at 18–32 (Dagenais Rebuttal).

¹⁷³ Ex. ATC-243 at 27–29 (Dagenais Rebuttal).

filing its application, the issues that ATC is raising here could have been resolved through the MTEP stakeholder review process.¹⁷⁴

In any event, there is sufficient time in the current MTEP planning cycle for MISO to review and study the Project and the Arrowhead Substation Alternative. The Project is currently listed in MTEP Appendix B as an “Other” type transmission project.¹⁷⁵ Before the Project can be moved to Appendix A and recommended for approval by the MISO Board of Directors, it must be subject to stakeholder review and feedback.¹⁷⁶ Assuming MP seeks to have the Project approved as part of MTEP Appendix A in the current study cycle, ATC and other stakeholders will have the opportunity to provide input, including concerning the Arrowhead Substation Alternative.¹⁷⁷ In other words, by the end of this planning year, MISO can review and approve for inclusion in the MTEP the Project as proposed by MP, or the Project as modified by the Arrowhead Substation Alternative.¹⁷⁸ From this perspective, the scheduling concerns that MP has raised regarding MISO’s review of the Arrowhead Substation Alternative are overstated and immaterial.

The basic premise of MP’s argument is that moving the Project’s point-of-interconnection from the St. Louis County Substation to ATC’s 345/230 kV Arrowhead Substation would result in greater amounts of power flowing from the HVDC System and into Wisconsin, to the detriment of its customers and benefit of Wisconsin.¹⁷⁹ This claim

¹⁷⁴ Ex. ATC-243 at 27–29 (Dagenais Rebuttal).

¹⁷⁵ Ex. ATC-243 at 25 (Dagenais Rebuttal).

¹⁷⁶ Ex. ATC-243 at 25 (Dagenais Rebuttal).

¹⁷⁷ Ex. ATC-243 at 27–28 (Dagenais Rebuttal).

¹⁷⁸ Ex. ATC-243 at 27–28 (Dagenais Rebuttal).

¹⁷⁹ See, e.g., Ex. MP-122 at 37–38 (Winter Direct).

that the Arrowhead Substation Alternative would somehow “siphon[] off” power delivered from the HVDC System into Wisconsin at the expense of MP’s customers does not hold water.¹⁸⁰ This parochial argument represents little more than fear mongering that is, again, completely out-of-touch with how the modern power grid operates.¹⁸¹¹⁸² First, the Arrowhead Substation Alternative *would* maintain a connection between MP’s HVDC Line and its customers. As noted earlier, ATC’s 345/230 kV Arrowhead Substation is directly connected to MP’s 230/115 kV Arrowhead Substation. Under ATC’s proposal, power would flow from the HVDC Line to ATC’s Arrowhead Substation and then into MP’s Arrowhead Substation, where it can be used to serve MP’s customers.¹⁸³ MP is simply wrong to suggest otherwise.

MP’s primary objection to ATC’s approach appears to be rooted in the fact that, under the Arrowhead Substation Alternative, power would flow through transmission assets MP does not own (i.e., ATC’s 345/230 kV Arrowhead Substation) before it could be delivered to MP’s customers. This is a red herring. Many utilities regularly construct or procure power from generating resources that are not directly connected to their transmission systems.¹⁸⁴ MP is no exception. For instance, through an affiliate, MP owns a 20 percent stake in the Nemadji Trail Energy Center (NTEC), an approximately 560-MW natural gas facility located in Superior, Wisconsin.¹⁸⁵ That plant will connect to the

¹⁸⁰ Ex. ATC-131 at 73 (Winter Rebuttal).

¹⁸¹ See, e.g., Ex. MP-122 at 37–38 (Winter Direct).

¹⁸² Ex. MP-122 at 16–17 (Winter Direct).

¹⁸³ Ex. ATC-243 at 13 (Dagenais Rebuttal).

¹⁸⁴ Ex. ATC-243 at 13–14 (Dagenais Rebuttal).

¹⁸⁵ Ex. ATC-243 at 13–14 (Dagenais Rebuttal).

transmission system in Superior through an ATC-owned switching station, which will in turn connect to ATC's 345 kV Arrowhead-Weston transmission line—the exact same line that terminates at ATC's 345/230 kV Arrowhead Substation in Hermantown.¹⁸⁶ MP also procures electricity from hydroelectric facilities in Canada through transmission lines in Canada that it does not own or operate.¹⁸⁷

Put differently, MP has invested in or is procuring power from generating resources to meet its customers' energy needs, even though those facilities are not directly connected to its own transmission system and energy must pass through facilities owned by third parties before reaching MP's customers. Conceptually, these arrangements are no different from the Arrowhead Substation Alternative, where energy would flow from the HVDC Line to ATC's 345/230 kV Arrowhead Substation before being delivered to MP's customers.¹⁸⁸ Again, the only difference would be that MP's HVDC converter station would be connected to the MP Arrowhead Substation via ATC's existing 345/230 kV Arrowhead Substation, rather than MP's new proposed St. Louis County Substation. There is nothing remarkable or out-of-the ordinary about this arrangement—to the contrary, it is representative of how the modern networked transmission system works. If MP is willing to procure power from NTEC or Canadian hydroelectric facilities through transmission

¹⁸⁶ Ex. ATC-243 at 13–14 (Dagenais Rebuttal); *see also* Ex. ATC-243 at 8, n.8 (Dagenais Rebuttal) (describing Arrowhead-Weston line); Ex. ATC-247, Schedule 2 (Dagenais Rebuttal) (map depicting Arrowhead Weston transmission line). Notably, MP did not raise concerns regarding NTEC's interconnection to ATC facilities in proceedings before the Commission concerning its partial acquisition of that facility. *See* MPUC Docket No. E-015/AI-17-568.

¹⁸⁷ Tr. at 41–42 (Winter).

¹⁸⁸ Ex. ATC-243 at 14 (Dagenais Rebuttal).

assets it does not own or operate, then it simply has no basis to oppose entering into a similar arrangement here for the HVDC Line.¹⁸⁹

Second, MP's claim that the Arrowhead Substation Alternative will result in power being diverted to Wisconsin customers at the expense of Minnesota ratepayers is simply wrong. This line of argument completely misunderstands how electricity is transmitted and delivered to customers on the modern transmission system. MP and ATC are members of MISO with interconnected transmission systems, and MISO is responsible for dispatching generation to serve load in a reliable and cost-effective manner.¹⁹⁰ Because of its physical properties, it is difficult to direct electricity from one specific location on the AC network to another, so it is inevitable that power will flow from one utility's transmission system to and through another utility's system.¹⁹¹ As the Supreme Court has remarked, "any electricity that enters the grid immediately becomes a part of a vast pool of energy that is constantly moving in interstate commerce."¹⁹²

The AC transmission system in Wisconsin and Minnesota is no different: once power from the HVDC Line enters the AC transmission system in Minnesota, it becomes instantaneously comingled with network flows of power that MISO dispatches from across the region, including (for example) MP's NTEC, which will be used to serve MP's customers.¹⁹³ While power may flow differently across the system under the Arrowhead

¹⁸⁹ Ex. ATC-243 at 14 (Dagenais Rebuttal).

¹⁹⁰ Ex. ATC-227 at 39 (Dagenais Direct).

¹⁹¹ Ex. ATC-227 at 39 (Dagenais Direct).

¹⁹² *New York v. FERC*, 535 U.S. at 7–8.

¹⁹³ *See, e.g.*, Ex. ATC-227 at 39–40 (Dagenais Direct); Ex. ATC-243 at 6–8, 16 (Dagenais Rebuttal).

Substation Alternative versus the MP Proposal, there will be an adequate and reliable supply of power to serve MP's customers regardless of which alternative is implemented.¹⁹⁴

Third, MP's proposed configuration of the Project completely undermines the credibility of its argument concerning the Arrowhead Substation Alternative resulting in additional power flows into Wisconsin. By MP's own admission, it designed the Project to account for the addition of potential new 345 kV transmission lines in the Project-area, including those that were being contemplated as part of MISO's LRTP process and that would connect to the Wisconsin 345 kV system.¹⁹⁵ As the company noted in its application, "[t]he new St. Louis County 345 kV/230 kV Substation will be designed with room for several future 345 kV line additions to accommodate regional transmission development"¹⁹⁶ In addition, these lines could also alter power flows between MP's HVDC System and its 230 kV transmission system. Yet MP expresses no concerns about whether, or to what extent, the potential addition of these 345 kV lines to the new St. Louis County Substation could result in power being diverted "away from Minnesota Power's customers" and onto the systems of other transmission owners.¹⁹⁷ This demonstrates that MP's position concerning the Arrowhead Substation Alternative's impact on power flows is a post-hoc, litigation-derived rationale for defending its proposed configuration of the Project, rather than a legitimate and credible concern with the Arrowhead Substation

¹⁹⁴ Ex. ATC-243 at 16 (Dagenais Rebuttal).

¹⁹⁵ See, e.g., Ex. MP-122 at 16–18, 41–51, and Schedule 21 at 4–6 (Winter Direct).

¹⁹⁶ Ex. MP-104 at § 2.1.2.4 (MP Application).

¹⁹⁷ Ex. MP-122 at 63 (Winter Direct).

Alternative. Indeed, MP did not mention or discuss this concern when it initially informed ATC in October 2022 that it was planning to move forward with the new 345 kV St. Louis County Substation.¹⁹⁸

In short, MP's argument that ATC's proposal somehow deprives MP customers of the energy benefits from the HVDC Line is simply not credible: it defies physics, the reality of how the modern transmission system operates, and MP's own justification for its proposed configuration of the Project. The Commission should not be persuaded by these hollow scare tactics.

B. The Arrowhead Substation Alternative Meets The Size, Type And Timing Requirements Of The Project

When it considers a Certificate of Need for a project, or any alternative to or modification to that project, the Commission considers the appropriateness of the size, type and timing of the project and any such alternative or modification.¹⁹⁹ The record demonstrates that both the Arrowhead Substation Alternative and the MP Proposal meet MP's size, type, and timing needs for the Project. As discussed at length above, both options would interconnect the upgraded HVDC converter station to a 345/230 kV substation and then interconnect that 345/230 kV substation to MP's 230 kV Arrowhead Substation. The difference between these two options is that the Arrowhead Substation Alternative does not require construction of a new substation, nor does it require a double circuited 230 kV transmission line from this new substation to the MP Arrowhead

¹⁹⁸ See Ex. ATC-201, Schedule 1 (McKee Direct).

¹⁹⁹ Minn. R. 7849.0120 (B) (1).

Substation. Rather, the Arrowhead Substation Alternative leverages existing assets in the form of the ATC Arrowhead Substation, which is immediately adjacent to and already interconnected with the MP Arrowhead Substation.

As to timing, while MP has indicated a desire to bring the Project on-line earlier, if possible, MP's Certificate of Need Application indicated an April 2030 in-service date (ISD) for the Project.²⁰⁰ ATC prepared a high-level schedule for construction of the Arrowhead Substation Alternative to confirm that ATC can meet this ISD.²⁰¹ As ATC witness Mr. Johanek explained, procurement for substation materials—including a second 345/230 kV transformer—has been identified as the critical path long lead time item.²⁰² However, ATC can reliably serve the Project using the existing 345/230 kV transformer at the Arrowhead Substation until the new transformer is obtained and installed.²⁰³ ATC has also discussed procurement matters with its potential suppliers and has added the necessary major equipment to the ATC material forecast sheet.²⁰⁴ Finally, ATC built an extended amount of scheduling contingency into the timeline, allowing for flexibility in completing portions of the work prior to the critical path items, allowing for coordination with MP, and allowing for acceleration of the ISD if desired.²⁰⁵

²⁰⁰ See Ex. MP-104 at §§ 2.2.1 and 2.2.3 (MP Application).

²⁰¹ Ex. ATC-205 at 8 (Johanek Direct); Ex. ATC-207, Schedule 2 (Johanek Direct); Ex. ATC-209 at 3–4 (Johanek Rebuttal). For the MP indicated in-service date, *see* Ex. MP-104 at § 2.2.1 and 2.2.3 (MP Application).

²⁰² Ex. ATC-205 at 8 (Johanek Direct).

²⁰³ Ex. ATC-227 at 32–33 (Dagenais Direct).

²⁰⁴ Ex. ATC-209 at 4 (Johanek Rebuttal).

²⁰⁵ Ex. ATC-209 at 4 (Johanek Rebuttal).

Approval of the Arrowhead Substation Alternative will also require amendment of the ATC-MP T-T interconnection agreement on file at FERC by editing Appendix A, “Points of Interconnection,” of the current agreement—a two-page document that describes the various facilities owned, operated, and maintained by either utility at their respective Arrowhead substations.²⁰⁶ This appendix would be edited to describe the facilities approved by the Commission in this proceeding, which utility is responsible for owning, operating, and maintaining those facilities, and a “one-line” diagram depicting the updated facilities.²⁰⁷ While MP raises the specter of an over year-long process to negotiate such an amendment,²⁰⁸ this is a straightforward process that should only take a few days to accomplish and would not in any way delay the ISD of the Project.²⁰⁹ In short, MP’s arguments that the Arrowhead Substation Alternative introduces undue timing risks ring hollow. To ensure that the parties place the adequate level of focus on the negotiations, ATC proposes that the Commission include a condition in its order granting the Certificate of Need, requiring MP and ATC to file the necessary revisions to the T-T interconnection agreement with FERC within 90 days of the order, or once updated on-line diagrams are available.²¹⁰

²⁰⁶ Ex. ATC-200 at 16 (McKee Direct); Ex. ATC-202 at 17 (McKee Rebuttal).

²⁰⁷ Ex. ATC-200 at 16 (McKee Direct); Ex. ATC-202 at 17 (McKee Rebuttal).

²⁰⁸ Ex. MP-119 at 28 (Gunderson Direct).

²⁰⁹ Ex. ATC-200 at 16-17 (McKee Direct); Ex. ATC-202 at 17–18 (McKee Rebuttal).

²¹⁰ Ex. ATC-202 at 18 (McKee Rebuttal).

C. The Arrowhead Substation Alternative Imposes Lower Costs On Customers Than The MP Proposal

In considering a Certificate of Need for a project, or any alternative to or modification to that project, the Commission also considers the relative costs of the various options.²¹¹ Here, the record demonstrates that the Arrowhead Substation Alternative imposes lower costs and provides additional benefits, when compared to the MP Proposal.

1. The Arrowhead Substation Alternative Will Have Lower Direct Costs Than The MP Proposal

The record establishes the best estimate of the cost of the Arrowhead Substation Alternative, developed by ATC after direct consultation with its suppliers and contractors, to be approximately \$42.0 million in 2022 dollars.²¹² ATC developed its estimate in this way to present a more representative and accurate picture of cost, as opposed to using a generic cost estimating guide.²¹³ Because MP would reimburse ATC for the portion of this alternative that would be ATC-owned, the cost of those assets also require a tax gross-up to be applied, resulting in a best estimated cost to MP of \$45.5 million for the Arrowhead Substation Alternative.²¹⁴

In contrast, MP estimates the cost of the MP Proposal to be as much as \$70 million in 2022 dollars, with a “mid-range estimate of \$55 million” and stating that this estimate “is generally based on the 2022 MISO Transmission Expansion Planning Cost Estimating

²¹¹ Minn. R. 7849.0120 (B) (2).

²¹² Tr. at 122 (Johanek)

²¹³ Ex. ATC-205 at 6 (Johanek Direct).

²¹⁴ Tr. at 130-131 (Johanek).

Guide,” not on any specific discussions with suppliers and contractors.²¹⁵ Even MP’s mid-range generic estimate suggests increased costs of over 20 percent for the MP Proposal, as compared to the Arrowhead Substation Alternative.

MP attempts to bridge the gap between the cost of the two interconnection options by adding unnecessary costs to the Arrowhead Substation Alternative and by arguing that potential federal funding for the Project could be lost if the Commission approves implementation of the Arrowhead Substation Alternative. Neither attempt to shift the narrative survives scrutiny.

First, MP attempts to add over \$33 million of unnecessary costs to the Arrowhead Substation Alternative related to a new PST at the Arrowhead Substation. However, the record demonstrates that the transmission system is operated far differently in 2024 than it was in the early 2000s, when the current PST was planned and incorporated into ATC’s Arrowhead Substation.²¹⁶ While the Arrowhead PST was initially installed to help manage power flows and support voltage stability between the transmission systems in Wisconsin and Minnesota, the significant changes in the operation of the transmission system over the last 20 years have rendered the *current* PST obsolete, meaning that a new PST is wholly unnecessary. The planning analysis that ATC submitted in this proceeding confirms as

²¹⁵ See Ex. MP-104 at § 2.2.1 (MP Application).

²¹⁶ Ex. ATC-227 at 33, 37–38 (Dagenais Direct); Ex. ATC-243 at 31–33 (Dagenais Rebuttal).

much, as discussed above. MP cannot support including these costs in the Arrowhead Substation Alternative.²¹⁷

Second, MP attempts to include the entirety of the \$10 million in land acquisition costs *it* incurred in pursuit of building the MP Proposal; in other words, MP attempts to attribute to the Arrowhead Substation Alternative the costs to acquire all necessary land rights for new 345 kV line, new St. Louis County Substation, and new 230 kV lines necessary for the MP Proposal. However, the Arrowhead Substation Alternative does not require acquisition of land rights for these facilities. ATC designed the double-circuited 345 kV transmission line for its alternative to share existing right-of-way with the existing HVDC Line to the greatest extent feasible, and all substation work needed for its alternative can take place within the existing footprint of the ATC Arrowhead Substation.²¹⁸ This means that only a limited amount of new land rights—namely, easements for new transmission line right-of-way—would be needed to construct the Arrowhead Substation Alternative if MP did not already own the land on which this alternative would be built.²¹⁹ As such, (the \$10 million in land acquisition costs that MP incurred to construct a new 345 kV line, new St. Louis County Substation, and new 230 kV line, which, again, are not required as part of the Arrowhead Substation Alternative, are not properly included in any reasonable cost estimate for the Arrowhead Substation Alternative. Therefore, the record

²¹⁷ Ex. ATC-227 at 33, 37–38 (Dagenais Direct); Ex. ATC-243 at 31–33 (Dagenais Rebuttal).

²¹⁸ Ex. AC-214 at 9–10 (Bradley Direct); Ex. ATC-218 at 5–7 (Larsen Direct).

²¹⁹ Tr. at 120–22 (Johanek)

demonstrates that implementation of the Arrowhead Substation Alternative saves millions of dollars in costs that would have ultimately be borne by MP customers.

Last, MP argues that the Arrowhead Substation Alternative puts *potential* federal funding for portions of the Project at risk. MP argues that it has secured or is in the process of attempting to secure several sources of state and federal funding for the Project.²²⁰ MP notes that the State of Minnesota has appropriated or reserved a total of \$25 million for MP to implement the Project.²²¹ MP has also applied for or is applying for a total of \$100 million from the Department of Energy's (DOE) Grid Resilience and Innovation Partnerships (GRIP) program.²²² MP applied for \$50 million from the first round of DOE GRIP funding, which would be used to cover costs associated with upgrading the converter stations for the HVDC Line. In October 2023, the DOE notified MP that this application had been *recommended* for *negotiation* of a financial award, although a contract must still be negotiated.²²³ In January 2024, MP submitted a concept paper for an additional \$50 million from the second round of DOE GRIP funding, which would be used to cover costs associated with the Project's interconnection facilities, including the new 345 kV St. Louis County Substation and associated transmission infrastructure.²²⁴ In February 2024, DOE encouraged MP to submit a full application for the GRIP round two funding, which is due

²²⁰ Ex. MP-119 at 13–21 (Gunderson Direct).

²²¹ Ex. MP-119 at 17 (Gunderson Direct).

²²² Ex. MP-119 at 14–15 (Gunderson Direct).

²²³ Ex. MP-119 at 15 (Gunderson Direct).

²²⁴ See Ex. ATC-209 at 12-13 (Johanek Rebuttal); Ex. ATC-210, Schedule 1 (Johanek Rebuttal).

in May 2024.²²⁵ In other words, MP has not yet been awarded any money from the GRIP round one federal funding and has yet to even submit an application for the GRIP round two federal funding

Implementation of the Arrowhead Substation Alternative should not threaten any of these potential sources of funding for the Project. In fact, MP acknowledges that it “does not believe that any funding dollars for the state grants . . . would be withheld in total in the event the Commission orders the company to proceed with the ATC Arrowhead [Substation] Alternative.”²²⁶

With respect to the \$50 million in DOE GRIP round one funding, MP admits that this funding also “has a low probability of being impacted” by the Arrowhead Substation Alternative. Specifically, MP states that it does not believe that such funds, if awarded, will be “at risk or delayed” unless ATC fails to “deliver on all aspects” of the Arrowhead Substation Alternative within 60 months from the date of the award, which MP hopes to receive in the second quarter of 2024.²²⁷ As ATC witness Mr. Johanek discussed, ATC is confident that it can meet the April 2030 ISD for the Project indicated in MP’s Certificate of Need Application *and can serve the Project through the existing 345/230 kV transformer in ATC’s Arrowhead Substation prior to that time*, so can meet the 60-month timeframe

²²⁵ See Ex. ATC-209 at 13 (Johanek Rebuttal); Ex. ATC-211, Schedule 2 (Johanek Rebuttal).

²²⁶ Ex. MP-119 at 20 (Gunderson Direct).

²²⁷ Ex. MP-119 at 19–20 (Gunderson Direct).

DOE requires.²²⁸ Therefore, implementation of the Arrowhead Substation Alternative will not delay or jeopardize the DOE GRIP round one funding, should such funding be awarded.

Finally, with respect to the \$50 million in DOE GRIP round two funding, MP claims that, if it is selected for this award, it could lose out on this funding “because Minnesota Power’s DOE GRIP round two application will only support interconnection components of Minnesota Power’s Project configuration, including the St. Louis County 345 kV/230 kV Substation.”²²⁹ MP claims that the January 2024 concept paper it submitted to DOE includes “a specific project configuration” (i.e., presumably, construction of the 345 kV St. Louis County Substation), that the full application due in May 2024 “must also present the same specific project configuration,” and that it “does not believe that the DOE will provide funding for a project that differs from that submitted in the full application.”²³⁰ However, MP provides no support for these claims. MP does not cite or reference any DOE funding requirements—or even any discussions with DOE—where the agency indicated that the Project configuration presented in the concept paper must match the Project configuration presented in the full application. Likewise, while MP states that it “does not believe the DOE will provide funding for a project that differs from that submitted in the full application,”²³¹ it provides no support for this statement.

In fact, recent guidance from the DOE conclusively demonstrates that MP’s representations in this proceeding are simply wrong on this issue. In response to MP’s

²²⁸ Ex. ATC-209 at 13–14 (Johanek Rebuttal)

²²⁹ Ex. MP-119 at 21 (Gunderson Direct).

²³⁰ Ex. ATC-211, Schedule 2 at 3 (Johanek Rebuttal).

²³¹ Ex. ATC-211, Schedule 2 at 3 (Johanek Rebuttal).

claims that the Commission's selection of the Arrowhead Substation Alternative could put GRIP round two federal funding at risk, ATC sought clarification from DOE as to whether applicants such as MP could modify their project scope between submission of a concept paper and final application, or after submission of a final application. The questions that ATC submitted (as well as one other relevant question from a third party) and DOE's responses are provided verbatim in Table 2, below.²³²

²³² These questions and responses are included in the record as part of ATC's comments on the Environmental Assessment. *See* Document ID Nos: 20243-204747-01, 20243-204747-03. A copy of the DOE's responses to ATC's and various other questions that have been submitted related to the GRIP program is publicly available on the DOE's Clean Energy Infrastructure Funding Opportunity Exchange. *See* DOE: Office of the Under Secretary for Infrastructure, *Clean Energy Infrastructure Funding Opportunity Exchange* (last visited Mar. 28, 2024), available at <https://tinyurl.com/2zv4z5ev> (reference FOA number DE-FOA-0003195). While ATC submitted its questions on February 29, 2024, the DOE did not provide responses until almost three weeks later on March 22, 2024.

Table 2: DOE Responses on GRIP Funding Eligibility

Question No.	Question	Answer
241	Can the full application include transmission lines different from those in the concept paper?	Yes, applicants may update or alter proposed project technical details submitted at the Concept Paper stage, respective to the topic area's eligibility requirements.
243	<p>1. If there is a change in the scope of work for a project (e.g., a change in project location or in the voltage of facilities to be constructed) between the time a concept paper is submitted and the deadline for a full application, would the applicant still be eligible for an award?</p> <p>2. Does the scope of work described in the full application have to match the concept paper exactly for the applicant to be eligible for an award?</p> <p>3. An applicant that is a utility may be required to receive certain government approvals (e.g., from state utility boards or local zoning authorities) to proceed with its project. The applicant may not be able to receive such approvals prior to submitting a full application. If a government agency approves a project, but requires (as a condition of that approval) that the project be modified relative to how it was presented in the applicant's full application, would the applicant still be eligible for an award? In other words, if a governmental agency with jurisdiction over the project requires that it be modified in some way, will the applicant still be eligible for funding, even if the modified project differs somewhat from what was presented in the applicant's full application?</p>	<p>1. Yes, as long as it complies with the requirements of the FOA.</p> <p>2. No, as long as the revised scope meets the requirements in the FOA.</p> <p>3. This would depend on the specific circumstances and changes. The applicant should describe these kinds of requirements and any anticipated challenges/risks in the technical volume.</p>

As should be evident from DOE's responses, applicants for GRIP funding *can* modify the technical details of their projects between submission of a concept paper and a full application, so long as the project otherwise complies with the requirements in DOE's funding announcement. Similarly, applicants may be able to modify the technical details of their project even *after* a full application is submitted, so long as the potential for this

modification is addressed in the technical volume accompanying the full application. This guidance completely undermines MP's speculative (and ultimately unfounded) assertion that, to be eligible for GRIP funding, the Project must remain essentially unchanged after MP submitted its concept paper.

This brings us to one last point. Since September of last year—approximately four months before the DOE GRIP round two concept paper was due—MP has been aware of ATC's participation in this docket in support of the Arrowhead Substation Alternative. Therefore, MP has had ample opportunity to present a Project configuration in its concept paper (and the subsequent application) that would maximize its ability to obtain DOE GRIP round two funding. MP could have submitted a concept paper for DOE GRIP round two funding to cover both alternatives for interconnecting the Project to the high-voltage transmission system: the Arrowhead Substation Alternative and the MP Proposal.

For whatever reason, MP chose not to do so, declining to mention the Arrowhead Substation Alternative *at all* in its concept paper. In fact, in describing the viability of and risks associated with the Project in its concept paper, MP noted that the DOE Grant “will help ensure the project is *approved as submitted* [to the Minnesota Public Utilities Commission], without a reduction/modification in capacity or change in scope to limit expandability.”²³³ In other words, it appears that MP deliberately omitted any mention of the Arrowhead Substation Alternative in its DOE GRIP round two concept paper to effectively box the Commission in to approving the MP Proposal by presenting the

²³³ Ex. ATC-209 at 15 (Johanek Rebuttal); Ex. ATC-211, Schedule 2 at 2 (Johanek Rebuttal). (Emphasis added.)

Commission with a stark choice: approve the Project as proposed by MP or approve the Project with the Arrowhead Substation Alternative and cause ratepayers to lose out on \$50 million in federal funds. The reality is any *potential* risk associated with losing this *potential* funding due to implementation of the Arrowhead Substation Alternative is entirely of MP's own making.

2. The Arrowhead Substation Alternative Provides Additional Benefits To MP Customers Related To Power Costs

In addition to having lower overall capital costs than MP's proposed method of interconnecting the Project, the Arrowhead Substation Alternative will create a stronger regional transmission tie between Minnesota and Wisconsin, which will ultimately benefit MP and its customers. This stronger transmission tie will enable MP to import or export power depending on system needs and operating conditions, which can help maintain system reliability and create a better functioning bulk electric market that can more cost effectively meet customer demand.²³⁴ For example, during times when MP is transmitting excess energy over its HVDC Line, it can take advantage of market signals to sell that excess generation into the market, obtaining additional revenue that will allow it to offset costs to customers.²³⁵ And as noted earlier, the Arrowhead Substation Alternative results in lower overall system losses compared to MP's preferred method of interconnection, meaning MP will not need to generate as much power to serve customers, creating a negative overall cost impact.²³⁶

²³⁴ Ex. ATC-243 at 38–39 (Dagenais Rebuttal).

²³⁵ Tr. at 116–17 (Dagenais).

²³⁶ Tr. at 85 (Dagenais).

MP nonetheless claims that implementation of the Arrowhead Substation Alternative would impose millions of dollars in replacement power costs on its customers,²³⁷ but the analysis it conducted to support this assertion simply has no merit, as the methodology MP used to prepare this analysis is inherently flawed. Based on its steady state reliability analysis, MP concluded that “seven to 10 percent more of the power delivered by the HVDC System flows into Wisconsin and away from Minnesota Power’s customers.”²³⁸ MP then assumes that it would have to procure replacement power to make up “the lost energy to Wisconsin if the Commission were to order construction of the ATC Arrowhead Alternative.”²³⁹

This is simply not a valid assumption. MP’s attempt to use the results of its steady state reliability analysis to calculate replacement power costs is fundamentally wrong. While MP’s analysis may show increased electrical flows on the Arrowhead-Weston 345 kV line with the Arrowhead Substation in-service, those flows are offset by lower power flows along other, less efficient transmission lines running from Minnesota into Wisconsin—a point that MP readily concedes.²⁴⁰ In other words, while power may flow *differently* across the system depending on what alternative is implemented, neither alternative materially impacts the availability of electric supply to meet the needs of MP’s customers: in either case, there will be a sufficient supply of energy to meet the demands

²³⁷ Ex. MP-127 at 11–12 and Schedule 12 (Gunderson Rebuttal).

²³⁸ Ex. MP-122 at 63 (Winter Direct).

²³⁹ Ex. MP-127, Schedule 12 (Gunderson Rebuttal).

²⁴⁰ Tr. at 84–85, 109–10 (Dagenais); Ex. MP-131 at 73 (Winter Rebuttal).

of MP's customers.²⁴¹ MP effectively concedes this point in its rebuttal testimony, stating that it is not concerned about "energy adequacy" for its customers if the ATC Arrowhead Substation Alternative is implemented.²⁴² Indeed, MP will incur *zero* replacement power costs to MP's customers under the Arrowhead Substation Alternative.²⁴³

In short, MP's replacement power cost analysis grossly overstates the financial impact to its customers if the Arrowhead Substation Alternative is implemented.²⁴⁴ There will be an adequate supply of electric energy to meet the needs of MP's customers, regardless of which alternative the Commission selects. In fact, ATC's proposal will likely result in substantial financial *benefits* for MP's customers, since it creates a stronger regional transmission tie that reduces system losses and better enables MP to opportunistically sell excess power into Wisconsin to offset costs to its customers.²⁴⁵

D. The Arrowhead Substation Alternative Minimizes Impacts On The Natural And Human Environment When Compared To The MP Proposal

The Arrowhead Substation Alternative generally results in fewer impacts to natural and human environment that are of a lesser degree than the MP Proposal. Any comparison of the impacts from the MP Proposal to those caused by the Arrowhead Substation Alternative is dominated by the fact that the Arrowhead Substation Alternative does not require the construction of an entirely new substation, and does not require any expansion

²⁴¹ Tr. at 84–85, 109–10 (Dagenais); Ex. MP-131 at 73 (Winter Rebuttal); *see also* Ex. ATC-243 at 16, 39–40 (Dagenais Rebuttal).

²⁴² Ex. MP-131 at 73 (Winter Rebuttal).

²⁴³ Tr. at 85–86 (Dagenais).

²⁴⁴ Tr. at 85–86 (Dagenais).; *see also* Ex. DOC DER-601 at 16–17 (Zajicek Rebuttal).

²⁴⁵ Ex. ATC-243 at 38–40 (Dagenais Rebuttal); Tr. at 116–17 (Dagenais).

of the footprint of the existing ATC Arrowhead Substation.²⁴⁶ As a result, the Arrowhead Alternative Substation will impact less acreage and would result in both fewer acres disturbed during construction and less new permanent infrastructure.²⁴⁷ Department of Commerce – Energy Environmental Review and Analysis (DOC-EERA) conducted an Environmental Assessment (EA) of the MP Proposal and the Arrowhead Substation Alternative and published its findings on February 29, 2024.²⁴⁸ In that EA, DOC-EERA determined that

[t]he ATC Alternative would have less GHG emissions during construction and would cost less. Its infrastructure would also be near less residences, be less noisy during construction, not create new access points off Morris Thomas Road, and be more screened from view.²⁴⁹

DOC-EERA's EA also concluded more detailed observations and findings. Specifically, DOC-EERA determined that the new substation is the feature most likely to impact nearby residents and travelers because it would be located within 300 feet of Morris Thomas Road.²⁵⁰

Further, as DOC-EERA explained, maintaining and utilizing the HVDC Line's existing ROW as part of ATC's proposal mitigates potential impacts.²⁵¹ The Arrowhead Substation Alternative would re-use a portion of the existing right-of-way (ROW) that is

²⁴⁶ Ex. ATC-226 at 2, 5 (Lee Rebuttal).

²⁴⁷ Ex. ATC-226 at 2–3 (Lee Rebuttal); *see also* Ex. MP-120, Schedule 1 (McCourtney Direct); Ex. DOC EERA-515 at 76, Table 14 (Environmental Assessment (EA)).

²⁴⁸ Ex. DOC EERA-515 at 7 (EA).

²⁴⁹ Ex. DOC EERA-515 at 9 (EA).

²⁵⁰ Ex. DOC EERA-515 at 122 (EA).

²⁵¹ Ex. DOC EERA-515 at 42 (EA).

currently used for MP's HVDC Line.²⁵² This results in the establishment of less new ROW, and fewer ROW-related impacts.²⁵³ DOC-EERA also concluded that the Arrowhead Substation Alternative resulted in lesser impacts to aesthetics and cultural values;²⁵⁴ lesser impacts to wetlands;²⁵⁵ requires less HVTL; and would require less land overall and, therefore, relatively fewer impacts on forested land use because less tree clearing would be required.²⁵⁶ Ultimately, although impacts to the natural and socioeconomic environment are similar in some respects, the DOC-EERA determined that the Arrowhead Substation Alternative results in fewer impacts.²⁵⁷

1. Proximity To Residences

The MP Proposal includes infrastructure, such as the new substation, that is nearer to the closest residences, and is ultimately nearer to more residences than the Arrowhead Substation Alternative, as displayed in Figure 4 of the Environmental Assessment.²⁵⁸

²⁵² Ex. ATC-214 at 4 (Bradley Direct).

²⁵³ Ex. DOC EERA-515 at 113 (EA).

²⁵⁴ Ex. DOC EERA-515 at 9 (EA).

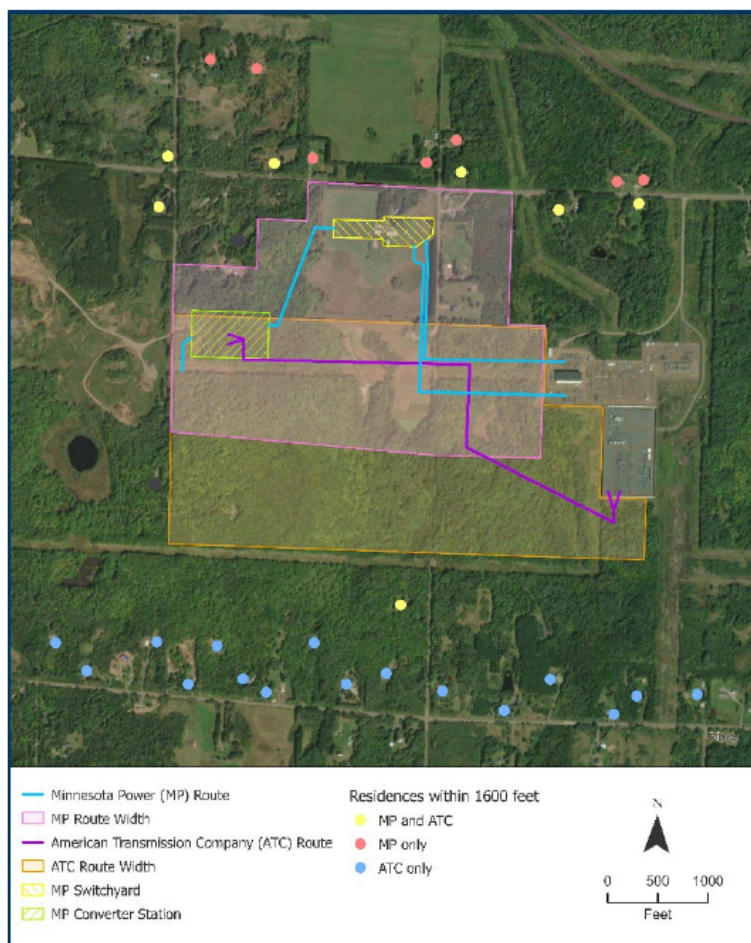
²⁵⁵ Ex. DOC EERA-515 at 114 (EA); Response to Substantive Comments on the Environmental Assessment, Department of Commerce, Energy Environmental Review and Analysis Unit at 2 (Apr. 15, 2024).

²⁵⁶ Ex. DOC EERA-515 at 42, 76, 113 (EA).

²⁵⁷ Ex. DOC EERA-515 at 128–29 (EA).

²⁵⁸ Ex. DOC EERA-515 at 45, Figure 4 (EA).

Figure 4: Residences in the Local Vicinity



The proximity of infrastructure to residences impacts various natural and socioeconomic environmental criteria, such as noise, aesthetics, and cultural values.²⁵⁹ MP witness Mr. McCourtney claimed that the proposed HVTL for the Arrowhead Substation Alternative would be located closer to local residences to the south of the Project Study Area than the HVTL contemplated by the MP Proposal.²⁶⁰ This, however, is an inapt comparison of the two proposed route alignments,²⁶¹ because it focuses on residences in only one cardinal

²⁵⁹ See Ex. DOC EERA-515 at 37, 45 (EA).

²⁶⁰ Ex. MP-120 at 16–18 (McCourtney Direct).

²⁶¹ Ex. ATC-226 at 3 (Lee Rebuttal).

direction and ignores that the MP Project is considerably closer to residences overall, and to Morris Thomas Road, as indicated above in Figure 4.²⁶² DOC-EERA determined this proximity had the potential for greater impacts to cultural values and noise.²⁶³

2. Aesthetics And Cultural Values

Impacts to aesthetics and cultural values are often intertwined, such that visual aesthetic impacts can affect the “rural character” or “sense of place” within and near a project area.²⁶⁴ For nearby residents that place high value on these factors, DOC-EERA determined that the MP Proposal will have moderate impacts to cultural values, due in part to the proximity and visibility of the new substation to Morris Thomas Road that will introduce new industrial structures and lighting that are visible on the otherwise rural forested space, and that may thus affect the rural character of the surrounding area.²⁶⁵ In comparison, the Arrowhead Substation Alternative will have minimal impacts, as the infrastructure involved and clearing required is generally sited further away from residents and less visible.²⁶⁶ DOC-EERA noted that the Arrowhead Substation Alternative would have less impact on aesthetics because the new substation is not required, less new ROW would need to be established, and fewer residences are located near the south of the project area.²⁶⁷ Further, DOC-EERA explained that the Arrowhead Substation is already well

²⁶² Ex. DOC EERA-515 at 9 and 45, Figure 4 (EA).

²⁶³ Ex. DOC EERA-515 at 37, 45 (EA).

²⁶⁴ Ex. DOC EERA-515 at 37 (EA).

²⁶⁵ Ex. DOC EERA-515 at 37, 112 (EA).

²⁶⁶ Ex. DOC EERA-515 at 37 and 127, Table 24 (EA).

²⁶⁷ Ex. DOC EERA-515 at 113 (EA).

screened by the forested landscape.²⁶⁸ Due to DOC-EERA's determination that the Arrowhead Substation Alternative's impacts to cultural values were minimal, the EA did not impose any mitigation.²⁶⁹

3. Noise

DOC-EERA determined that although the noise created by construction activities are anticipated to be moderate for both projects, the Arrowhead Substation Alternative will produce less noise during construction.²⁷⁰ Again, this is due to the construction of new substation that is within 500 feet of the nearest residence—the closest of any residence to any proposed construction activity in either the MP Proposal or the Arrowhead Substation Alternative.²⁷¹ Construction activities required for the new substation include site tree clearing, grading, ground grid installation, and control house construction.²⁷² Thus, construction of the new substation would exceed state L10²⁷³ noise standards at a residence within less than 800 feet using the most conservative estimate.²⁷⁴

With respect to operational noise, although MP committed to perform a noise study during the in-person public meeting,²⁷⁵ MP has not completed a full noise study and will

²⁶⁸ Ex. DOC EERA-515 at 112 (EA).

²⁶⁹ Ex. DOC EERA-515 at 38 (EA).

²⁷⁰ Ex. DOC EERA-515 at 9, 42–43 (EA).

²⁷¹ Ex. DOC EERA-515 at 45 (EA).

²⁷² Ex. ATC-205 at 9–10 (Johanek Direct).

²⁷³ Noise standards are expressed as a range of permissible dBA over a one-hour period. Ex. DOC EERA-515 at 43 (EA). L10 noise standards may be exceeded 10 percent of the time, or six minutes per hour. Ex. DOC EERA-515 at 43 (EA).

²⁷⁴ Ex. DOC EERA-515 at 45 (EA).

²⁷⁵ Ex. DOC EERA-503 at 30 (Oral Public Comments 8.29.23 Public Meeting).

not do so until the final project configuration is known.²⁷⁶ MP has only undertaken a cursory noise study consisting solely of drawing a 50 A-weighted decibel (dBA)²⁷⁷ line around project features.²⁷⁸ Simply put, MP's contribution to the record does not provide sufficient information to determine the differences in operations-related noise generation between the MP Proposal and the Arrowhead Substation Alternative.

E. Regardless Of Whether It Authorizes Construction Of The Arrowhead Substation Alternative, The Commission Should Remove The 800 MVA Limit That The Minnesota Environmental Quality Board (EQB) Put In Place In 2001

When construction of ATC's 345/230 kV Arrowhead Substation was initially authorized in 2001 as part of the Arrowhead-Weston 345 kV Transmission Project, the EQB (which had jurisdiction over that project at that time) imposed the following condition in its order granting the project an exemption from the Minnesota Power Plant Siting Act:

Minnesota Power shall apply to the [EQB] . . . to make any changes in the Arrowhead substation that would allow Minnesota Power to increase the capability of the substation to transmit power over the [Arrowhead-Weston] transmission line beyond 800 MVA.²⁷⁹

In 2005, the Minnesota legislature transferred all authority over siting issues from the EQB to the Commission,²⁸⁰ meaning this limitation is now the subject of Commission authority to continue or remove.

²⁷⁶ ATC Comments to EA at 1 (Mar. 28, 2024) (eDocket No. 20243-204747-01).

²⁷⁷ Noise is measured in units of decibels on a logarithmic scale. The A-weighted decibel scale is used to duplicate the sensitivity of the human ear. Ex. DOC EERA-515 at 43 (EA).

²⁷⁸ See Ex. MP-129, Schedule 4 (McCourtney Rebuttal).

²⁷⁹ Ex. MP-122, Schedule 31 at 5 (Winter Direct).

²⁸⁰ Minnesota Session Laws 2005 (Regular Session), Chapter 97, Article 3, viewable at <https://www.revisor.mn.gov/laws/2005/0/97/#laws.3.3.0>.

The Arrowhead Substation Alternative would result in a second 345/230 kV, 800 MVA transformer being installed at ATC's 345/230 kV Arrowhead Substation, meaning the two transformers would have a combined summer normal rating of approximately 1600 MVA.²⁸¹ As such, electrical flows through the substation and on the Arrowhead-Weston line could exceed 800 MVA.²⁸² MP claims that this presents some kind of impediment to approving the Arrowhead Substation Alternative,²⁸³ but there is an obvious solution: the Commission should remove the limit altogether, regardless of whether it approves ATC or MP's proposed point-of-interconnection for the Project.²⁸⁴ The existing 800 MVA limit serves no legitimate basis and, in any event, clearly violates the Dormant Commerce Clause; as such, the Commission has no jurisdiction to enforce it in the first instance.

ATC understood the 800 MVA limit as a proxy for mitigating potential noise impacts from its 345/230 kV Arrowhead Substation, whereas MP claims that it was the product of EQB concerns related to power flow and bulk power transfers from North Dakota to Wisconsin.²⁸⁵ Regardless of the reason this limit was initially imposed, there is no reasonable engineering basis for it to remain in place. To the extent that sound was a factor, ATC recently installed a 24-foot concrete wall around the perimeter of the

²⁸¹ Ex. ATC-227 at 38 (Dagenais Direct).

²⁸² Ex. ATC-227 at 38 (Dagenais Direct).

²⁸³ Ex. MP-122 at 67–69 (Winter Direct).

²⁸⁴ See Ex. ATC-243 at 48 (Dagenais Rebuttal); Tr. at 111 (Dagenais); Minn. Stat. § 216B.25 (noting that the Commission may, “at any time, on its own motion or upon motion of an interested party,” amend “any order fixing rates, tolls, charges, or schedules, or any other order made by the commission . . . for the taking of further evidence or for any other reason”).

²⁸⁵ Ex. ATC-227 at 38–39 (Dagenais Direct); Ex. ATC-243 at 45–47 (Dagenais Rebuttal); Ex. MP-122 at 67–69 (Winter Direct).

substation and would retire its existing Arrowhead PST as part of the Arrowhead Substation Alternative, which will help mitigate noise in the future.²⁸⁶ If this alternative is implemented, noise studies can be conducted during detailed project design to determine whether applicable limits may be exceeded and identify potential mitigation measures, to the extent necessary and feasible.²⁸⁷

To the extent that bulk power flows were the animating concern around this limit, there is no legitimate basis for leaving it in place. The materials from the administrative record for the EQB proceeding MP provided indicate that the agency was concerned with the possibility that the Arrowhead-Weston line could be used for bulk sales of electricity from out-of-state power plants, which could lead to more in-state pollution.²⁸⁸ However, over the last 15 years, there has been a rapid increase in the retirement of coal-fired generation and a significant increase in the amount of renewable generation coming online. Market forces, climate change concerns, and state renewable portfolio standards make it unlikely that any new coal generation will be constructed in the future.²⁸⁹ In any event, these concerns over air quality are wholly unrelated to maintaining system reliability or efficient operation of the bulk electric system: the only effect the existing limit has is to restrain the amount of electricity that can be transmitted across the Arrowhead-Weston line, from Minnesota into Wisconsin.²⁹⁰ There is no reason for it to remain in place.

²⁸⁶ Ex. ATC-227 at 38–39 (Dagenais Direct); Ex. ATC-218 at 8 (Larsen Direct).

²⁸⁷ Ex. ATC-227 at 38–39 (Dagenais Direct); Ex. ATC-218 at 8 (Larsen Direct).

²⁸⁸ Ex. ATC-243 at 46 (Dagenais Rebuttal).

²⁸⁹ Ex. ATC-243 at 46–47 (Dagenais Rebuttal).

²⁹⁰ Ex. ATC-243 at 46–47 (Dagenais Rebuttal).

More importantly, the 800 MVA limit clearly violates the Dormant Commerce Clause and intrudes upon the Federal Energy Regulatory Commission's (FERC) exclusive authority to regulate the transmission of electricity in interstate commerce. The United States Constitution gives Congress exclusive authority to regulate interstate commerce.²⁹¹ Almost 100 years ago, the Supreme Court interpreted the Commerce Clause to prohibit states from regulating the interstate transmission and sale of electricity.²⁹² Congress subsequently passed the Federal Power Act, giving FERC (previously the Federal Power Commission) exclusive authority over (among other things) "the transmission of electric energy in interstate commerce," "the sale of electric energy at wholesale in interstate commerce," and "all facilities for such transmission or sale of electric energy."²⁹³ The Supreme Court has since acknowledged that "transmissions on the interconnected national grids constitute transmissions in interstate commerce" that are subject to FERC's exclusive jurisdiction.²⁹⁴

²⁹¹ U.S. Const., art. I, § 8, cl. 3.

²⁹² See *Public Utilities Comm'n of R.I. v. Attleboro Steam & Elec. Co.*, 273 U.S. 83 (1927).

²⁹³ 16 U.S.C. § 824(b)(1). Energy is considered "transmitted in interstate commerce" if it is "transmitted from a State and consumed at any point outside thereof." 16 U.S.C. § 824(c).

²⁹⁴ *New York v. FERC*, 535 U.S. 1, 16 (2002); see also *Federal Power Comm'n v. Florida Power & Light Co.*, 404 U.S. 453, 458 (1972) (noting that direct power exchanges between utilities in two states are subject to FERC's exclusive jurisdiction); *Jersey Central Power & Light Co. v. Fed. Power Comm'n*, 319 U.S. 61, 68–73 (1943) (transmission facilities used to transmit electric energy in interstate commerce are subject to FERC's exclusive jurisdiction under the FPA); *Promoting Wholesale Competition Through Open Access Non-Discriminatory Transmission Services; Recovery of Stranded Costs by Public Utilities and Transmitting Utilities* (Order No. 888), 61 Fed. Reg. 21,540, 21,726 (May 10, 1996) (reciting Supreme Court case law and noting that "[FERC's] jurisdiction generally extends to transmission facilities that transmit electric energy in interstate commerce").

Here, there is no dispute that ATC's 345/230 kV Arrowhead Substation and transmission line are used to transfer electric energy between Minnesota and Wisconsin—i.e., in interstate commerce.²⁹⁵ Indeed, one of MP's primary objections to the Arrowhead Substation Alternative is its claim that this option would facilitate additional energy transfers between Minnesota and Wisconsin along the Arrowhead-Weston transmission line.²⁹⁶ These facilities are clearly used for transmitting electric energy in interstate commerce. As such, the state of Minnesota has no authority to limit electrical flows along these facilities—which, again, is the only ultimate purpose of the 800 MVA limit.²⁹⁷ The Commission should therefore remove the 800 MVA limit, regardless of which alternative it selects for interconnecting the Project to the AC transmission system in this proceeding.

CONCLUSION

When compared to the MP Proposal, implementation of the Arrowhead Substation Alternative as part of the HVDC Modernization Project will make more efficient use of existing transmission assets, save millions of dollars, impose fewer impacts on the human and natural environments, and provide reliability and other benefits for customers in Minnesota and the region. Therefore, ATC respectfully requests that the Commission grant MP a Certificate of Need and Route Permit for the Project that incorporates the Arrowhead Substation Alternative.

²⁹⁵ See, e.g., Ex. ATC-243 at 8–10 (Dagenais Rebuttal).

²⁹⁶ See, e.g., Ex. MP-122 at 63–34 (Winter Direct).

²⁹⁷ Ex. ATC-243 at 47 (Dagenais Rebuttal).

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