OAH 5-2500-39600
MPUC E-015/CN-22-607;
E-015/TL-22-611

STATE OF MINNESOTA
OFFICE OF ADMINISTRATIVE HEARINGS

FOR THE PUBLIC UTILITIES COMMISSION

In the Matter of the Application of Minnesota Power for a Certificate of Need for the HVDC Modernization Project in Hermantown, Saint Louis County

In the Matter of the Application of Minnesota Power for a Route Permit for a High Voltage Transmission Line for the HVDC Modernization Project in Hermantown, Saint Louis County

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FINDINGS OF FACT, CONCLUSIONS OF LAW, AND RECOMMENDATION

This matter came before Administrative Law Judge Jim Mortenson based upon Minnesota Power's applications for a certificate of need and a route permit for its project to modernize the interconnection between its high voltage direct current (HVDC) electric transmission line from North Dakota and its Minnesota transmission system (the project). The Judge also presided over a contested case hearing concerning an alternative proposal for the project, an interconnection through an electric substation owned by American Transmission Company.

The Judge held joint public hearings by video conference, telephone, and in person, on March 13, 2024. The evidentiary hearing was held in St. Paul at the Public Utilities Commission facilities on March 19, 2024. The record remained open for the receipt of written public comments until March 28, 2024.

The following appearances were made:

David R. Moeller, Senior Regulatory Counsel, Minnesota Power, and Kodi J. Verhalen, Valerie T. Herring, and Peter E. Madsen, Taft Stettinius & Hollister LLP, appeared on behalf of Minnesota Power (Applicant).

Greg Merz appeared on behalf of the Minnesota Department of Commerce, Division of Energy Resources (DOC-DER) and the Minnesota Department of Commerce, Energy Environmental Review and Analysis (DOC-EERA).

Eric Swanson and Elizabeth Schmiesing, Winthrop & Weinstine, P.A., and David Zoppo, Husch Blackwell LLP, appeared on behalf of American Transmission Company LLC, by and through its corporate manager, ATC Management Inc. (collectively, ATC).

Amber S. Lee, Stoel Rives LLP, appeared on behalf of Large Power Intervenors (LPI).

Charles Sutton, Sutton Consulting, LLC, attended for the International Union of Operating Engineers Local 49 (Local 49) and North Central States Regional Council of Carpenters (NCSRCC) (collectively, the Labor Intervenors).

Michael Kaluzniak, a staff member of the Energy Facilities Permitting unit of the Minnesota Public Utilities Commission (Commission), also assisted with the proceedings.

STATEMENT OF THE ISSUES

1. Did Minnesota Power satisfy the criteria for a certificate of need for the project?

2. Did Minnesota Power satisfy the criteria for a route permit for the project?

3. Did ATC propose a more reasonable and prudent alternative to the project, which would modify Minnesota Power's design and interconnection for the proposed project?

SUMMARY OF RECOMMENDATIONS

Minnesota Power satisfied the criteria for the issuance of a certificate of need and route permit for the project, subject to the conditions and recommendations discussed below.

ATC did not propose a more reasonable and prudent alternative to the project that would necessitate a modification of Minnesota Power's design and interconnection for the project.

SUMMARY OF REPORT

Minnesota Power seeks permits to modernize the aging interconnection between its HVDC transmission line from wind generation facilities in North Dakota to its transmission system in Minnesota. As part of the project, Minnesota Power seeks to invest now in infrastructure it expects it will need in the future for additional growth and utilization of renewable energy sources. Minnesota Power expects this investment and planning will be more cost effective than making changes required to accommodate expansion of the system in the future.

The evidence demonstrates that Minnesota Power's proposed configuration of the project complies with the standards and criteria set forth in Minn. Stat. §§ 216B.243,

216E.04, Minn. R. 7849.0120, and Minn. R. 7850.4000. The proposal to include infrastructure for future growth at a lower cost long-term is also a reasonable component of the modernization of the facilities and should be approved. ATC did not show that its proposed alternative was more reasonable and prudent than Minnesota Power's configuration of the proposed facilities.

ATC did not apply for permits for its own infrastructure changes. Rather, ATC sought to utilize Minnesota Power's proposal to make changes to ATC's substation which serves as a link between its Wisconsin transmission system and its Minnesota transmission system. ATC's proposal is not entirely unfounded. The ATC proposal would improve its infrastructure for its customers in Wisconsin and would be paid for by Minnesota Power's customers. But the law for approving an alternative to another utility's proposal for a large energy facility requires more. The alternative must be "more reasonable and prudent" than the applied-for proposal.[1] ATC failed to demonstrate, by a preponderance of evidence, that its alternative is more prudent and reasonable than Minnesota Power's proposed configuration. This is demonstrated in the facts concerning the certificate of need below.[2]

The Commission is alerted to some unusual aspects of this matter. The legislature changed applicable law while this matter was pending before the Judge. Specifically, Minn. Stat. § 216B.243, subd. 3, was amended to prevent the Commission from requiring the "evaluation of alternative end points for a high-voltage transmission line qualifying as a large energy facility" except in two scenarios.[3] The first exception is that "the alternative end points are (i) consistent with end points identified in a federally registered planning authority transmission plan."[4] The second is that they are "otherwise agreed to for further evaluation by the applicant."[5] Moreover, this change was "effective the day following final enactment and applies to all pending applications."[6] The effective date was May 25, 2024. This legislation was directed at the subject proposal, and neither exception applies. ATC's alternative is not identified in a federal registered planning authority transmission plan, Minnesota Power does not agree with ATC's alternative, and Minnesota Power has not agreed to the evaluation of its proposal. Thus, the Commission must consider whether it should dismiss ATC's proposal outright.[7]

There are, however, other factors to consider before dismissing the ATC proposal without evaluation. The first is the fact that Minnesota Power did not address the ATC

[1] Minn. R. 7849.0120 (B) (2023).
[2] To the extent the Judge has included findings of fact concerning ATC's alternative in the findings regarding the Route Permit, those facts are included for context and consideration in relation to the certificate of need, consistent with law and the Commission's Order of November 29, 2023 (citing Minn. R. 7849.0120). Order Identifying Alternative Proposal for Environmental Assessment Scope, Granting Variance, and Notice and Order for Hearing at 5, 9-10 (Nov. 29, 2023).
[3] Minn. Sess. Law Ch. 127, Art. 44, Sec. 2 (2024). Other laws which may be applicable to this matter were also changed. The Judge only addresses those changes brought to his attention by parties.
[4] *Id.*
[5] *Id*
[6] *Id.*
[7] Labor Intervenors' correspondence, dated June 17, 2024 (eDocket No. 20246-207734-01), provides a description of the legislative history of the amendment.

alternative as part of its application, as required in Minn. R. 7849.0260 (2023). In September 2022, Minnesota Power discussed with ATC using ATC's substation as a new point of interconnection for the HVDC line. This was approximately two months before its initial filing with the Commission. In mid-October 2022, Minnesota Power notified ATC that it no longer wished to use the ATC substation for the interconnection and that it had a plan to build a new substation near the current adjacent substations owned by Minnesota Power and ATC.

Minn. R. 7849.0260 requires an application for a certificate of need include "a discussion of the availability of alternatives to the facility, including but not limited to" a list of common alternatives. But the ATC alternative, and why Minnesota Power determined not to pursue it, was absent from the application. How the law applies in this situation is for the Commission to consider, and it beyond the authority of the Judge to address or recommend. It is simply pointed out as it came to light during the creation of the evidentiary record.

Conversely, ATC was aware of Minnesota Power's intentions long before the applications were filed in June 2023. ATC took no initiative to pursue the use of its facilities for the project until it intervened in September 2023. After learning that Minnesota Power decided to build its own new substation in October 2022, ATC again spoke with Minnesota Power in February 2023 about using ATC's facilities for interconnection. But this was after Minnesota Power reached out to ATC about the project. ATC's next communication with Minnesota Power was not until the end of July 2023. Once again, this communication was initiated by Minnesota Power, not ATC.

Under these circumstances, and because ATC and its customers would reap benefits without paying for the cost of the improvements, the Commission has a factual basis to either: (1) find, as recommended, that the alternative is not more prudent and reasonable; or (2) apply the new law (Minn. Stat. § 243, subd. 3) in the manner recommended by Minnesota Power and dismiss any consideration of the alternative interconnection. The Judge makes no recommendation on this point, other than that the Commission should be aware and consider these factors.

All the Judge's findings of fact on the contested matter are set forth below for the benefit of the Commission if it decides to evaluate the ATC alterative. Based on those facts, the Judge concludes that ATC has not demonstrated, by a preponderance of evidence, that its Arrowhead alternative is a more prudent and reasonable alternative to the Minnesota Power proposed configuration.

Minnesota Power's proposed configuration will provide a cost-effective modernization of its aging HVDC system infrastructure, while ensuring that the customers paying for the HVDC modernization project will continue to receive the benefits of the HVDC system to the greatest extent practicable, including a potentially earlier in service date than April 2030.

The ATC alternative, however, will not provide any significant system reliability benefits for Minnesota Power customers as compared to the Minnesota Power's configuration. The ATC alternative has not been studied or evaluated in cooperation with other transmission owners or MISO. Importantly, the alternative limits opportunities for future expansion given that there would be no construction of the St. Louis County 345 kV/230 kV substation and other likely cost factors. Moreover, the ATC alternative will require equipment to maintain the required power limitation for the Wisconsin system, which is part of the permit for the ATC Arrowhead Substation. ATC's request to remove that limit in this proceeding is not appropriate because it will require a more thorough review.

The environmental benefits of the alternative, if any, are not significant compared to Minnesota Power's plan. Moreover, any expansion of the ATC Arrowhead 345 kV/230 kV substation will result in direct impacts to wetlands, which are subject to certain conservation easements.

Finally, the alternative will not be more cost effective than Minnesota Power's proposal. It may result in adverse impacts to the state and federal grant funding available for the project given ATC's unwillingness to agree to certain conditions required for the company constructing the HVDC modernization project. The alternative may prevent Minnesota Power from continuing with its application for an additional $50 million in federal grant funding through the GRIP Program round two funding opportunity that is available for Minnesota Power's proposal, but not available for the ATC alternative.

In addition, the alternative may create greater financial uncertainty for Minnesota Power customers because ATC is unwilling to commit to a cost cap or a "not-to-exceed" tax percentage on its costs to construct its portion of the alternative. ATC's plan is not capable of implementation earlier than 2030. Because Minnesota Power customers will be paying for the upgrades, they would be paying for the benefits ATC and its affiliates would receive, without the same benefits of the Minnesota Power plan.

For these reasons, the Judge recommends that the Commission approve Minnesota Power's certificate of need and route permit for the modernization project as proposed by Minnesota Power. The Judge further recommends that if the Commission considers ATC's alternative, the Commission find that the alternative is not more prudent and reasonable than Minnesota Power's proposal.

COMPLETENESS OF THE ENIVONMENTAL ASSESSMENT

Pursuant to Minn. R. 7850.3900, subp. 2 (2023):

> At the time the commission makes a final decision on the [route] permit application, the commission shall determine whether the environmental assessment [(EA)] and the record created at the public hearing address the issues identified in the scoping decision.

The Scoping Decision was made by the Commissioner of Commerce's designee on November 30, 2023, and was revised on December 27, 2023.[8]

The Commission did not request from the Judge a recommendation on the completeness of the EA. Nevertheless, such recommendations are routinely made in route permit proceedings, and the Judge respects that tradition. Therefore, the Judge notes that the evidence in the record demonstrates that the EA is complete. The EA and the record created at the public hearing and during the subsequent comment period address the issues and alternatives raised in the Scoping Decision and Revised Scoping Decision. This recommendation is based on the findings and conclusions in this Report.

Based on the evidence in the hearing record, the Judge makes the following:

FINDINGS OF FACT

I. Applicant and Other Parties

1. Minnesota Power is an investor-owned public utility headquartered in Duluth, Minnesota and regulated by the Commission. Minnesota Power supplies retail electric service to 150,000 retail customers and wholesale electric service to 14 municipalities. The company's electric territory consists of a 26,000-square-mile area located in northeastern Minnesota. Minnesota Power generates and delivers electric energy through a network of transmission and distribution lines, as well as substations throughout northeastern Minnesota. Minnesota Power's transmission network is interconnected with the regional transmission grid to promote reliability, and the company is a member of the Midcontinent Independent System Operator, Inc. (MISO) and the Midwest Reliability Organization (MRO).[9]

2. DOC-DER is authorized by rule to intervene in certificate of need proceedings.

3. DOC-EERA is statutorily obligated to conduct an environmental review of a Route Permit Application for a high-voltage transmission line and to prepare an EA for the proposed Project under the alternative permitting process.[10]

4. ATC is a multi-state transmission-only utility that is privately owned by 27 different utilities and electric cooperatives from Wisconsin, Michigan, Minnesota, and Illinois. ATC currently owns, operates, and maintains over 10,000 miles of electric transmission lines and more than 580 electric substations. ATC is also a transmission-owning member of MISO.[11]

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[8] Ex. DOC EERA-511 (EA Scoping Decision) (eDocket No. 202312-200881-01); Ex DOC EERA-514 (Revised Scoping Decision) (eDocket No. 202312-201554-02).
[9] Ex. MP-104 at 1 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[10] Minn. Stat. § 216E.04, subd. 5.
[11] ATC Petition to Intervene at 1–2 (eDocket No. 20238-198112-01).

5. LPI consists of several Large Power (LP) and Large Light & Power (LLP) customers of Minnesota Power: Blandin Paper Company; Boise Paper, Packaging Corporation of America company, formerly known as Boise, Inc.; Cleveland-Cliffs Minorca Mine Inc.; Enbridge Energy, Limited Partnership; Gerdau Ameristeel US Inc.; Hibbing Taconite Company; Northern Foundry, LLC; Sappi Cloquet, LLC; USG Interiors, Inc.; United States Steel Corporation (Keetac and Minntac Mines); and United Taconite, LLC. The customers comprising LPI operate across various industries, including the taconite mining industry and the paper and pulp industries.[12]

6. The "Labor Intervenors" consist of the Local 49 and NCSRCC. Local 49 is a labor organization that represents more than 12,000 construction workers and public employees in Minnesota, as well as additional construction workers and public employees in North Dakota and South Dakota. NCSRCC is a labor organization that represents more than 12,000 construction workers in Minnesota and additional construction workers in North Dakota, South Dakota, Iowa, Wisconsin, and Nebraska.[13]

II. Procedural Summary

7. On November 30, 2022, Minnesota Power notified the Commission that it intended to submit a Route Permit Application for the project pursuant to the alternative permitting process.[14] The Applicant also filed a Request for Exemptions from certain certificate of need application content requirements, as well as a Notice Plan Petition.[15]

8. On December 6, 2022, the Commission issued a Notice of Comment Period on Minnesota Power's Notice Plan Petition and Request for Exemptions.[16]

9. On December 12, 2022, Carol A. Overland/Legalectric, Inc. and DOC-DER filed comments on the Notice Plan Petition and Request for Exemptions.[17]

10. On January 9, 2023, Minnesota Power filed reply comments on its Notice Plan Petition and Request for Exemptions.[18]

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[12] LPI Petition to Intervene at 1–3 (eDocket No. 202311-200314-04).
[13] Labor Intervenors Petition to Intervene at 1 (eDocket No. 20241-202215-01).
[14] Ex. MP-100 (Notification of Intent to File a Route Permit Application for the HVDC Modernization Project Pursuant to the Alternative Permitting Process) (eDocket No. 202211-190994-01).
[15] Ex. MP-101 (Request for Exemptions from Certain Certificate of Need Application Content Requirements) (eDocket No. 202211-190996-01); Ex. MP-102 (Notice Plan Petition) (eDocket No. 202211-190988-01).
[16] Notice of Comment Period on Request for Exemption from Certain Certificate of Need Application Requirements and Notice Plan Approval (eDocket No. 202212-191144-01, 20236-196414-02).
[17] Legalectric Comments (eDocket No. 202212-191264-01); DOC-DER Exemption Request Comments (eDocket No. 202212-191260-01); DOC-DER Notice Plan Comments (eDocket No. 202212-191255-01).
[18] Ex. MP-103 (Reply Comments on Exemption Request and Notice Plan Petition) (eDocket No. 20231-191985-01).

11. On June 1, 2023, Minnesota Power submitted its Combined Application for a Certificate of Need and a Route Permit for its proposed configuration of the HVDC modernization project.[19]

12. On June 7, 2023, Minnesota Power submitted a Notice Plan Compliance filing, confirming that all notices required under its Notice Plan had been provided.[20]

13. On June 7, 2023, the Commission issued a Notice of Comment Period on Completeness of the Combined Application.[21]

14. On June 8, 2023, the DOC-DER filed comments related to Minnesota Power's Combined Application for a Certificate of Need. In its comments, the DOC-DER recommended that the Commission find the Application for a Certificate of Need substantially complete pending the filing of the trade secret version the Applicant's Appendix N. It also recommended that the Commission evaluate the Application for a Certificate of Need using the comment process.[22]

15. On June 9, 2023, Minnesota Power filed reply comments providing the trade secret version of Appendix N to the Combined Application.[23]

16. On June 20, 2023, LPI filed comments related to Minnesota Power's Combined Application. In its comments, LPI identified items it requested the Commission consider in its review of the Combined Application. LPI recommended that the Commission require record development on these items either in a contested case or using the comment process.[24]

17. On June 20, 2023, the DOC-EERA filed comments related to Minnesota Power's Application for a Route Permit, recommending that the Commission find the Application for a Route Permit substantially complete.[25]

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[19] Ex. MP-104 (Combined Application) (Public) (eDocket Nos. 20236-196333-01, 20236-196333-02, 20236-196333-03, 20236-196333-04, 20236-196333-05, 20236-196333-06, 20236-196333-07, 20236-196333-08, 20236-196333-09, 20236-196333-10, 20236-196333-11, 20236-196333-12, 20236-196333-15, 20236-196333-16, 20236-196346-01, 20236-196346-02, 20238-198164-02, 20238-198164-04, 20238-198164-06, 20238-198164-01, 20238-198164-03, 20238-198164-05); Ex. MP-105 (Appendix P to Combined Application) (Trade Secret) (eDocket Nos. 20236-196333-13, 20238-198164-08, 20236-196333-14, 20238-198164-07); Ex. MP-106 (Summary of Certificate of Need Filing) (20236-196328-01).

[20] Ex. MP-107 (Notice Plan Compliance Filing) (eDocket No. 20236-196328-01).

[21] Notice of Comment Period on Application Completeness (eDocket No. 20236-196414-01).

[22] DOC-DER Comments on Completeness of the Combined Application (eDocket No. 20236-196454-01).

[23] Ex. MP-108 (Cover Letter Filing Appendix N to Combined Application) (eDocket Nos. 20236-196464-04, 20236-196464-03); Ex. MP-109 (Appendix N to Combined Application)(TS) (eDocket Nos. 20236-196464-02, 20236-196464-01).

[24] LPI Comments (eDocket Nos. 20236-196686-03, 20236-196686-04).

[25] Ex. DOC EERA-500 (Comments and Recommendations) (eDocket No. 20236-196683-01).

18. On June 27, 2023, Minnesota Power submitted reply comments responding to both the LPI's and DOC-EERA's June 20, 2023 comments.[26]

19. On June 28, 2023, the DOC-EERA filed supplemental comments related to the Application for a Route Permit.[27]

20. On June 30, 2023, LPI filed supplemental comments reiterating its recommendation that the Commission require record development on the items it previously identified in its June 20, 2023 comments.[28]

21. On June 30, 2023, Minnesota Power submitted an Affidavit of Publication in compliance with Minn. R. 7829.2500, subp. 5, confirming that Minnesota Power published the required notice under the rule.[29]

22. On July 5, 2023, the Labor Intervenors filed comments recommending that the Commission find the Combined Application complete, process the Combined Application through a joint proceeding, and evaluate the Combined Application using the Commission's informal process.[30]

23. On August 4, 2023, the Commission issued a Notice of Public Information and Environmental Assessment Scoping Meeting. The Notice indicated that there would be one in-person meeting and one remote-access meeting.[31]

24. On August 8, 2023, the Commission issued an Order accepting the Combined Application as complete, authorizing joint review under the Commission's informal procedures, and requesting a full report with recommendations from an administrative law judge following a public hearing.[32]

25. On August 22, 2023, Minnesota Power submitted Affidavits of Publication for Scoping Meeting Notice, which informed that the Commission and DOC-EERA will hold public information and EA scoping meetings for the project, including information about the project, opportunities for participation in the process, and meeting times and locations.[33]

26. On August 29, 2023, an in-person public meeting was held at Solway Town Hall in Solway Township, Minnesota, and on August 30, 2023, a virtual public meeting was held, to take public comments on the scope of the EA. At the scoping meetings,

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[26] Ex. MP-110 (Reply Comments on Application Completeness) (eDocket Nos. 20236-196939-01, 20236-196939-02).
[27] Ex. DOC EERA-501 (Supplemental Comments on Completeness) (eDocket No. 20236-196967-01).
[28] LPI Supplemental Comments (eDocket Nos. 20236-197125-03, 20236-197125-04).
[29] Ex. MP-111 (Affidavit of Compliance with Minn. R. 7829.2500, subp. 5) (eDocket No. 20236-197123-01).
[30] Labor Intervenors Reply Comments (eDocket No. 20237-197221-01).
[31] Notice of Public Information and Environmental Assessment Scoping Meeting (eDocket Nos. 20238-198002-01, 20238-198002-02).
[32] Ex. PUC-700 (Order Accepting Application as Complete, Authorizing Joint Review under Informal Procedure, and Requesting Summary Proceeding) (eDocket Nos. 20238-198074-01, 20238-198074-02).
[33] Ex. MP-112 (Affidavit of Publication for Scoping Meeting Notice) (eDocket No. 20238-198411-01, 20238-198411-02).

numerous members of the public provided comments. In addition, members of the public submitted written comments to the DOC-EERA.[34]

27. From August through October 2023, several written comments were received regarding the scope of the EA. Comments were submitted by Minnesota Power, ATC, the Department of Natural Resources (DNR), the Solway Town Board of Supervisors, Chris Majerle, Dale and Nancy Vanderscheuren, and Allison Hafften.[35]

28. On September 20, 2023, Minnesota Power submitted a Request to Respond to Scoping Alternatives pursuant to Minn. R. 7850.3700, subp. 2(B), requesting that it be provided the opportunity to respond to any alternatives proposed during the scoping comment period.[36]

29. On October 5, 2023, the DOC-EERA submitted comments on the scoping process, including a summary of public comments received during the scoping process, and provided recommendations regarding alternative routes and segments to be included in the scoping process.[37]

30. On October 27, 2023, the Commission issued a Notice of Commission Meeting, scheduling the decision on the scope of the EA to be evaluated at the November 9, 2023 meeting.[38]

31. On November 29, 2023, the Commission issued an Order on the DOC-EERA's EA Scoping Decision for the Project. In the Order, the Commission determined that Minnesota Power's proposed configuration, as well as ATC's alternative, should be evaluated as part of the EA, in addition to the items raised in the DNR's comments regarding the scope of the EA and Minnesota Power's responsive commitments. The Commission also granted the DOC-EERA's request to vary Minn. R. 7850.3700, subp. 3, to allow additional time to issue the scoping decision, to discontinue the informal

[34] Ex. DOC EERA-503 (Transcripts from August 29, 2023 public hearing) (eDocket Nos. 20239-198862-01, 20239-198863-01); Ex. DOC EERA-504 (Transcripts from August 30, 2023 public hearing) (eDocket Nos. 20239-198862-02, 20239-198863-02); *see also* Ex. DOC EERA-502 (Public Meeting Handout) (eDocket Nos. 20239-198744-01, 20239-198864-01).

[35] *See* Ex. MP-114 (Minnesota Power's Written Scoping Comments) (eDocket Nos. 20239-198914-01, 20239-198914-02); Ex. MP-116, (Response to Route Alternative and Conditions Proposed to be Evaluated in the Environmental Assessment) (eDocket Nos. 20239-199286-02, 20239-199286-01); Ex. MP-117 (Supplemental Response to Route Alternative and Conditions Proposed to be Evaluated in the Environmental Assessment) (eDocket Nos. 202310-199303-02, 202310-199303-01); Ex. MP-132 (ATC EA Scoping Comments) (eDocket Nos. 20239-198974-01 and 20239-198974-02); Ex. DOC EERA-505 (Public Comment – Dale and Nancy Vanderscheuren) (eDocket No. 20239-199220-01); Ex. DOC EERA-506 (Public Comment – Solway Town Board of Supervisors) (eDocket No. 20239-199226-01); Ex. DOC EERA-507 (Public Comment – Vanderscheuren) (eDocket No. 202310-199315-01); Ex. DOC EERA-508 (Compiled Scoping Comments) (eDocket No. 202310-199399-01).

[36] Ex. MP-115 (Minnesota Power Request to Respond to Scoping Alternatives) (eDocket Nos. 20239-199053-01, 20239-199053-02).

[37] Ex. DOC EERA-509 (EERA Scoping Recommendations) (eDocket No. 202310-199409-01).

[38] Notice of Commission Meeting (eDocket Nos. 202310-199925-01, 202310-199925-04).

certificate of need process and summary proceedings, and to refer the matter to the Office of Administrative Hearings for contested case proceedings.[39]

32. On November 29, 2023, the Commission issued a Notice of Public Information and Environmental Assessment Scoping Meetings.[40]

33. On November 30, 2023, the Judge held a prehearing conference to review the status of the case and establish a procedural schedule.[41]

34. On December 1, 2023, the DOC-EERA issued its Environmental Assessment Scoping Decision, outlining the scope of the EA,[42] and an accompanying Notice of Environmental Assessment Scoping Decision.[43]

35. On December 6, 2023, the Judge issued a Prehearing Order that included the following events and deadlines:[44]

Procedural Milestone	Date
EERA Scoping Decision	Monday, December 11, 2023
Deadline for Intervention	Tuesday, January 16, 2024
All Parties file Direct Testimony	Wednesday, February 14, 2024
Combined EA/ER Issued	Thursday, February 29, 2024
Close of Discovery	Thursday, March 7, 2024
All Parties file Rebuttal Testimony, Proposed Exhibits not already filed, and subpoena requests	Monday, March 11, 2024
On-line Public Hearing	12:00 p.m., Wednesday, March 13, 2024, Streaming from Applicant Offices in Duluth, Minnesota
In-Person Public Hearing	6:00 p.m., Wednesday, March 13, 2024, at a location in or near

[39] Ex. PUC-701 (Order Identifying Alternative Proposal for Environmental Assessment Scope, Granting Variance, and Notice of and Order for Hearing) (eDocket No. 202311-200811-01).
[40] Ex. PUC-702 (Notice of Public Information and Environmental Assessment Scoping Meetings) (eDocket No. 202311-200810-01).
[41] Scheduling Order (eDocket Nos. 202311-200578-01, 202311-200578-02).
[42] Ex. DOC EERA-511 (EA Scoping Decision) (eDocket Nos. 202312-200881-01, 202312-200881-02).
[43] Ex. DOC EERA-512 (Notice of EA Scoping Decision) (eDocket No. 202312-200892-02, 202312-200892-01).
[44] Prehearing Order (eDocket Nos. 202312-201040-01, 202312-201040-02).

Procedural Milestone	Date
	Hermantown, Minnesota, to be determined by the Applicant
Evidentiary Hearing	9:30 a.m., Tuesday, March 19, 2024, at the Public Utilities Commission facilities in St. Paul, Minnesota
Public Comment Period Closes	Thursday, March 28, 2024
Transcripts of the Public and Evidentiary Hearing Available	Tuesday, April 2, 2024
EERA Responses to Comments on the EA/ER	Monday, April 15, 2024
All Parties file Initial Briefs; Applicant's Proposed Findings of Fact due	Friday, May 3, 2024
Other Parties' Reply to Proposed Findings; All Parties file Reply Briefs	Wednesday, May 22, 2024
Judge's Report	Friday, June 21, 2023
Exceptions to Judge's Report	Monday, July 1, 2024
Commission Consideration of Matter and Certificate of Need and Route Permit Issuance	Late July 2024, subject to Commission Agenda Calendar

36. On December 6, 2023, the DOC-EERA filed a Certificate of Mailing to new landowners, which notified new landowners of the EA Scoping Decision.[45]

37. On December 14, 2023, pursuant to the Commission's August 8, 2023 Order, Minnesota Power filed a Minnesota State Historic Preservation Office Letter, which provided information about the Applicant's consultation with the Minnesota State Historic Preservation Office regarding the project.[46]

[45] Ex. DOC EERA-513 (Certificate of Mailing to New Landowners) (eDocket Nos. 202312-201008-02, 202312-201008-01).
[46] Ex. MP-118 (Minnesota State Historic Preservation Office Letter) (eDocket Nos. 202312-201222-02, 202312-201222-01).

38. On December 27, 2023, the DOC-EERA issued its Revised Scoping Decision, revising its December 1, 2023 Scoping Decision to include a modification to the ATC alternative from that which was reviewed by the Commission on November 9, 2023.[47]

39. On January 9, 2024, the World Organization for Landowner Freedom (W.O.L.F.) petitioned to intervene.[48]

40. On January 14, 2024, the Commission filed a Sample Route Permit.[49]

41. On January 16, 2024, the Labor Intervenors petitioned to intervene.[50]

42. On January 17, 2024, ATC objected to W.O.L.F.'s intervention petition.[51]

43. On January 17, 2024, W.O.L.F. responded to ATC's objection to its intervention petition.[52]

44. On January 17, 2024, the Laborers District Council of Minnesota and North Dakota (LIUNA) petitioned to intervene.[53]

45. On January 22, 2024, the Judge denied W.O.L.F.'s petition to intervene.[54]

46. On January 22, 2024, W.O.LF. moved for reconsideration of denial of its petition to intervene.[55]

47. On January 26, 2024, the Judge granted the Labor Intervenors' petition to intervene.[56]

48. On January 27, 2024, W.O.L.F. moved for certification of its intervention petition and denial by the Judge to the Commission.[57]

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[47] Ex. DOC EERA-514 (Revised Scoping Decision) (eDocket Nos. 202312-201554-02, 202312-201554-01).
[48] W.O.L.F. Petition for Intervention (Jan. 9, 2024) (eDocket Nos. 20241-201998-04, 20241-201998-03).
[49] Ex. PUC-703 (Sample Site Permit) (eDocket No. 20241-202908-01).
[50] Labor Intervenors Petition to Intervene (Jan. 16, 2024) (eDocket Nos. 20241-202215-01, 20241-202219-01).
[51] ATC Objection to W.O.L.F. Intervention (Jan. 14, 2024) (eDocket Nos. 20241-202225-02, 20241-202225-01).
[52] W.O.L.F.'s Response to ATC Objection to Intervention (Jan. 17, 2024) (eDocket Nos. 20241-202273-02, 20241-202273-01).
[53] LIUNA's Petition for Intervention (Jan. 17, 2024) (eDocket Nos. 20241-202232-04, 20241-202232-03).
[54] Order Denying the World Organization for Landowner Freedom's Petition to Intervene as a Full Party (Jan. 22, 2024) (eDocket Nos. 20241-202442-01, 20241-202442-02).
[55] Motion for Reconsideration of Denial of Intervention of World Organization for Landowner Freedom (Jan. 22, 2024) (eDocket Nos. 20241-202501-02, 20241-202501-01).
[56] Order Granting the Labor Intervenors' Petition to Intervene as a Full Party (Jan. 26, 2024) (eDocket Nos. 20241-202712-01, 20241-202712-02).
[57] Motion for Certification of Motion for Intervention of World Organization for Landowner Freedom (Jan. 27, 2024) (eDocket Nos. 20241-202773-02, 20241-202773-01).

49. On February 6, 2024, ATC submitted a letter responding to W.O.L.F.'s request to certify its intervention petition to the Commission, recommending that the Judge deny W.O.L.F.'s request.[58]

50. On February 8, 2024, the Judge denied LIUNA's petition to intervene.[59]

51. On February 12, 2024, the Judge denied W.O.L.F.'s motion to certify to the Commission its petition to intervene.[60]

52. On February 14, 2024, the Department,[61] Minnesota Power,[62] LPI,[63] and ATC[64] each filed Direct Testimony.

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[58] ATC Letter in Response to W.O.L.F. Certification Request (Feb. 6, 2024) (eDocket Nos. 20242-203140-02, 20242-203140-01).

[59] Order Denying the LIUNA's Petition to Intervene as a Full Party (Feb. 8, 2024) (eDocket Nos. 20242-203206-01, 20242-203206-02).

[60] Order Denying the World Organization for Landowner Freedom's Motion to Certify Its Petition to Intervene (Feb. 12, 2024) (eDocket Nos. 20242-203304-02, 20242-203304-01).

[61] Ex. DOC-DER-600 (Direct Testimony and Attachment of Michael N. Zajicek) (eDocket No. 20242-203452-01) (Zajicek Direct).

[62] Ex. MP-119 (Daniel W. Gunderson Direct Testimony and Schedules) (eDocket Nos. 20242-203446-12, 20242-203446-11) ("Gunderson Direct"); Ex. MP-120 (Daniel McCourtney Direct Testimony and Schedules) (eDocket Nos. 20242-203446-10, 20242-203446-09) (McCourtney Direct); Ex. MP-121 (Christian Winter Direct Testimony and Schedules) (eDocket Nos. 20242-203446-08, 20242-203443-10, 20242-203443-08, 20242-203443-06, 20242-203446-07, 20242-203443-09, 20242-203443-07, 20242-203443-05) (Winter Direct); Ex. MP-122 (Winter Direct) (Trade Secret) (eDocket Nos. 20242-203446-06, 20242-203446-04, 20242-203446-02, 20242-203443-06, 20242-203443-10, 20242-203443-14, 20242-203443-12, 20242-203443-04, 20242-203443-02, 20242-203446-05, 20242-203446-03, 20242-203446-01, 20242-203443-13, 20242-203443-11, 20242-203443-07, 20242-203443-09, 20242-203443-03, 20242-203443-01).

[63] Ex. LPI-300 (Direct Testimony and Schedules of Kavita Maini) (eDocket No. 20242-203451-03) (Maini Direct).

[64] Ex. ATC-200 (Direct Testimony of Robert McKee) (eDocket No. 20242-203435-18) (McKee Direct); Ex. ATC-201 (Direct Testimony of Robert McKee – Schedule 1) (eDocket No. 20242-203435-20); Ex. ATC-205 (Direct Testimony of Dustin Johanek) (eDocket No. 20242-203434-10), as corrected by Ex. ATC-265 (Corrections to Johanek Testimonies) (eDocket No. 20243-204506-02) (Johanek Direct); Ex. ATC-206 (Direct Testimony of Dustin Johanek – Schedule 1) (eDocket No. 20242-203434-12); Ex. ATC-207 (Direct Testimony of Dustin Johanek – Schedule 2) (eDocket No. 20242-203434-14); Ex. ATC-208 (Direct Testimony of Dustin Johanek – Schedule 3) (eDocket Nos. 20242-203434-16, 20242-203434-18); Ex. ATC-214 (Direct Testimony of Michael Bradley) (eDocket No. 20242-203434-04) (Bradley Direct); Ex. ATC-215 (Direct Testimony of Michael Bradley – Schedule 1) (eDocket No. 20242-203434-06); Ex. ATC-216 (Direct Testimony of Michael Bradley – Schedule 2) (eDocket No. 20242-203434-08); Ex. ATC-218 (Direct Testimony of Tobin Larsen) (eDocket No. 20242-203435-06) (Larsen Direct); Ex. ATC-219 (Direct Testimony of Tobin Larsen – Schedule 1) (eDocket No. 20242-203435-08); Ex. ATC-220 (Direct Testimony of Tobin Larsen – Schedule 2) (eDocket No. 20242-203435-10); Ex. ATC-221 (Direct Testimony of Tobin Larsen – Schedule 3) (eDocket No. 20242-203435-11); Ex. ATC-222 (Direct Testimony of Tobin Larsen – Schedule 4) (eDocket No. 20242-203435-13); Ex. ATC-223 (Direct Testimony of Tobin Larsen – Schedule 5) (eDocket No. 20242-203435-16); Ex. ATC-225 (Direct Testimony of Amy Lee) (eDocket No. 20242-203434-20) (Lee Direct); Ex. ATC-227 (Direct Testimony of Thomas Dagenais) (Trade Secret) (eDocket No. 20242-203435-04) (Dagenais Direct); Ex. ATC-228 (Dagenais Direct) (eDocket No. 20242-203435-02); Ex. ATC-229 (Direct Testimony of Thomas Dagenais – Schedule 1) (Highly Confidential Trade Secret) (eDocket No. 20242-203438-02); Ex. ATC-230 (Direct Testimony of Thomas Dagenais – Schedule 1) (eDocket No. 20242-203438-04); Ex. ATC-231 (Direct Testimony of Thomas Dagenais – Schedule 2)

53. On February 21, 2024, by request from the DOC-EERA, Minnesota Power filed copies of Wetland Delineation Reports and a Vegetation Management Plan for the project.[65]

54. On February 29, 2024, the DOC-EERA filed the EA for the project.[66]

55. On March 1, 2024, the Commission issued a Notice of Public and Evidentiary Hearings, Availability of Environmental Assessment, and Comment Period. This Notice stated that public hearings on Minnesota Power's Combined Application for the project would be held virtually on March 13, 2024, at 12 p.m. and in-person on March 13, 2024, at 6 p.m. at Solway Town Hall, and that an evidentiary hearing would be held on March 19, 2024, at the Commission's offices in St. Paul, Minnesota. The Notice also stated that a written comment period would be open until March 28, 2024, at 4:30 p.m.[67] The Notice stated that written comments should focus on the following questions:

- Is the project needed and in the public interest?
- Should the Commission grant a certificate of need and route permit?

(eDocket No. 20242-203438-06); Ex. ATC-232 Direct Testimony of Thomas Dagenais – Schedule 3) (eDocket No. 20242-203438-08); Ex. ATC-233 (Direct Testimony of Thomas Dagenais – Schedule 4) (Highly Confidential Trade Secret) (eDocket Nos. 20242-203438-10, 20242-203438-12); Ex. ATC-234 (Direct Testimony of Thomas Dagenais – Schedule 4) (eDocket Nos. 20242-203438-14, 20242-203438-16); Ex. ATC-235 (Direct Testimony of Thomas Dagenais – Schedule 5) (Highly Confidential Trade Secret) (eDocket Nos. 20242-203440-02, 20242-203440-04); Ex. ATC-236 (Direct Testimony of Thomas Dagenais – Schedule 5) (eDocket Nos. 20242-203440-06, 20242-203440-08); Ex. ATC-237 (Direct Testimony of Thomas Dagenais – Schedule 6) (Highly Confidential Trade Secret) (eDocket Nos. 20242-203440-10, 20242-203440-12); Ex. ATC-238 (Direct Testimony of Thomas Dagenais – Schedule 6) (eDocket Nos. 20242-203440-14, 20242-203440-16); Ex. ATC-239 (Direct Testimony of Thomas Dagenais – Schedule 7) (Highly Confidential Trade Secret) (eDocket Nos. 20242-203441-01, 20242-203441-03); Ex. ATC-240 (Direct Testimony of Thomas Dagenais – Schedule 7) (eDocket Nos. 20242-203441-05, 20242-203441-07); Ex. ATC-241 (Direct Testimony of Thomas Dagenais – Schedule 8) (Highly Confidential Trade Secret) (eDocket No. 20242-203441-09); Ex. ATC-242 (Dagenais Direct – Schedule 8) (eDocket No. 20242-203441-11).

[65] Ex. MP-123 (Draft Vegetation Management Plan) (eDocket Nos. 20242-203665-11, 20242-203665-12); Ex. MP-124 (Jan. 2023 Wetlands and Other Waters Delineation Report) (eDocket Nos. 20242-203665-09, 20242-203665-07, 20242-203665-05, 20242-203665-03, 20242-203665-01, 20242-203663-17, 20242-203663-15, 20242-203663-13, 20242-203663-11, 20242-203665-10, 20242-203665-08, 20242-203665-06, 20242-203665-04, 20242-203665-02, 20242-203663-18, 20242-203663-16, 20242-203663-14, 20242-203663-12); Ex. MP-125 (Oct. 2023 Wetlands and Other Waters Delineation Report) (eDocket Nos. 20242-203663-09, 20242-203663-07, 20242-203663-05, 20242-203663-03, 20242-203663-01, 20242-203661-18, 20242-203661-16, 20242-203661-14, 20242-203661-12, 20242-203661-10, 20242-203661-08, 20242-203661-06, 20242-203661-04, 20242-203661-02, 20242-203663-10, 20242-203663-08, 20242-203663-06, 20242-203663-04, 20242-203663-02, 20242-203661-17, 20242-203661-15, 20242-203661-13, 20242-203661-11, 20242-203661-09, 20242-203661-07, 20242-203661-05, 20242-203661-03, 20242-203661-01).

[66] Ex. DOC EERA-515 (EA) (eDocket Nos. 20242-203954-04, 20243-204084-02); Ex. DOC EERA-516 (EA Appendices) (eDocket Nos. 20243-204084-01, 20242-203954-03).

[67] Ex. PUC-704 (Notice of Public and Evidentiary Hearings, Availability of Environmental Assessment, and Comment Period) (eDocket No. 20243-203994-01).

- What are the costs and benefits of the project?
- What are the environmental and human impacts of the project and how can these impacts be addressed and mitigated in the route permit?
- If a route permit is granted for the project, which route alternative and alignment modifications should be selected?
- If a route permit is granted for the facility, what additional conditions or requirements should be included?
- Are there other project-related issues or concerns?

56. On March 5, 2024, the DOC-EERA published a Notice in the *EQB Monitor* that it had released the EA for the project and provided dates for public hearings and a comment period.[68] The DOC-EERA also published a Notice indicating that it had provided the EA to various permitting agencies.[69]

57. On March 5, 2024, Minnesota Power submitted Public and Evidentiary Hearing Affidavits of Newspaper publication in *The Duluth News Tribune* (published on February 28, 2024), *The Proctor Journal* (published on February 29, 2024), and *The Hermantown Star* (published on February 29, 2024).[70]

58. On March 11, 2024, the Department,[71] Minnesota Power,[72] LPI,[73] and ATC[74] each filed Rebuttal Testimony.

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[68] Ex. DOC EERA-518 (EQB Monitor Notice of EA Availability, Public Hearings, and Comment Period) (eDocket No. 20242-203452-01).
[69] Ex. DOC EERA-517 (Notification – EA Provided To Permitting Agencies) (eDocket Nos. 20243-204085-01, 20243-204085-02).
[70] Ex. MP-126 (Affidavits of Publication) (eDocket Nos. 20243-204075-01, 20243-204075-02).
[71] Ex. DOC-DER-601 (Rebuttal Testimony and Attachments of Michael N. Zajicek) (eDocket No. 20243-204217-01), as corrected by Ex. DOC-DER-602 (Errata to Rebuttal Testimony and Attachments of Michael N. Zajicek) (eDocket No. 20243-204348-01) (Zajicek Rebuttal).
[72] Ex. MP-127 (Daniel W. Gunderson Rebuttal Testimony and Schedules) (eDocket Nos. 20243-204225-06, 20243-204225-05) (Gunderson Rebuttal); Ex. MP-128 (Gunderson Rebuttal) (Trade Secret) (eDocket Nos. 20243-204225-04, 20243-204225-03); Ex. MP-129 (Daniel McCourtney Rebuttal Testimony and Schedules) (eDocket Nos. 20243-204225-08, 20243-204225-07) (McCourtney Rebuttal); Ex. MP-130 (Christian Winter Rebuttal Testimony and Schedules) (eDocket Nos. 20243-204225-12, 20243-204225-11) (Winter Rebuttal); Ex. MP-131 (Winter Rebuttal) (Trade Secret) (eDocket Nos. 20243-204225-10, 20243-204225-09).
[73] Ex. LPI-301 (Rebuttal Testimony and Schedules of Kavita Maini) (eDocket No. 20243-204237-04) (Maini Rebuttal).
[74] Ex. ATC-202 (Rebuttal Testimony of Robert McKee) (Trade Secret) (eDocket No. 20243-204231-15); Ex. ATC-203 (Rebuttal Testimony of Robert McKee) (eDocket No. 20243-204231-13) (McKee Rebuttal); Ex. ATC-204 (Rebuttal Testimony of Robert McKee – Schedule 1) (eDocket No. 20243-204231-17); Ex. ATC-209 (Rebuttal Testimony of Dustin Johanek) (eDocket No. 20243-204231-03), as corrected by Ex. ATC-212 (Rebuttal Testimony of Dustin Johanek – Errata – Redline) (eDocket No. 20243-204253-01) and Ex. ATC-213 (Rebuttal Testimony of Dustin Johanek – Errata – Clean) (eDocket No. 20243-204253-03), as further corrected by Ex. ATC-265 (Corrections to Johanek Testimonies) (eDocket No. 20243-204506-

59. On March 13, 2024, at 12:00 p.m., the Judge convened a virtual public hearing on the Combined Application via WebEx from the Applicant's building in Duluth, Minnesota.[75]

60. On March 13, 2024, at 6:00 p.m. at the Solway Town Hall in Cloquet, Minnesota, the Judge convened an in-person public hearing on the Combined Application.[76]

61. On March 19, 2024, an evidentiary hearing was held at the Commission's offices in Saint Paul, Minnesota.[77] At the evidentiary hearing, the Judge modified the Prehearing Order to require that ATC also provide proposed findings of fact on Friday, May 3, 2024.[78]

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02) (Johanek Rebuttal); Ex. ATC-210 (Rebuttal Testimony of Dustin Johanek – Schedule 1) (eDocket No. 20243-204231-05); Ex. ATC-211 (Rebuttal Testimony of Dustin Johanek – Schedule 2) (eDocket No. 20243-204231-07); Ex. ATC-217 (Rebuttal Testimony of Michael Bradley) (eDocket No. 20243-204231-01) (Bradley Rebuttal); Ex. ATC-224 (Rebuttal Testimony of Tobin Larsen) (eDocket No. 20243-204231-09) (Tobin Rebuttal); Ex. ATC-226 (Rebuttal Testimony of Amy Lee) (eDocket No. 20243-204231-11) (Lee Rebuttal); Ex. ATC-243 (Rebuttal Testimony of Thomas Dagenais) (Trade Secret) (eDocket No. 20243-204233-03) (Dagenais Rebuttal); Ex. ATC-244 (Dagenais Rebuttal) (eDocket No. 20243-204233-01); Ex. ATC-245 (Rebuttal Testimony of Thomas Dagenais – Schedule 1) (eDocket No. 20243-204233-05); Ex. ATC-246 (Rebuttal Testimony of Thomas Dagenais – Schedule 1) (Trade Secret) (eDocket No. 20243-204471-01); Ex. ATC-247 (Rebuttal Testimony of Thomas Dagenais – Schedule 2) (eDocket No. 20243-204233-09); Ex. ATC-248 (Rebuttal Testimony of Thomas Dagenais – Schedule 3) (eDocket No. 20243-204233-11); Ex. ATC-249 (Rebuttal Testimony of Thomas Dagenais – Schedule 4) (eDocket No. 20243-204233-13); Ex. ATC-250 (Rebuttal Testimony of Thomas Dagenais – Schedule 5) (eDocket No. 20243-204233-15); Ex. ATC-251 (Rebuttal Testimony of Thomas Dagenais – Schedule 6) (eDocket No. 20243-204233-17); Ex. ATC-252 (Rebuttal Testimony of Thomas Dagenais – Schedule 7) (eDocket No. 20243-204233-19); Ex. ATC-253 (Rebuttal Testimony of Thomas Dagenais – Schedule 8) (Trade Secret) (eDocket No. 20243-204235-01); Ex. ATC-254 (Rebuttal Testimony of Thomas Dagenais – Schedule 8) (eDocket No. 20243-204235-03); Ex. ATC-255 (Rebuttal Testimony of Thomas Dagenais – Schedule 9) (eDocket No. 20243-204235-05); Ex. ATC-256 (Rebuttal Testimony of Thomas Dagenais – Schedule 10) (Trade Secret) (eDocket No. 20243-204235-09); Ex. ATC-257 (Rebuttal Testimony of Thomas Dagenais – Schedule 10) (eDocket No. 20243-204235-07); Ex. ATC-258 (Rebuttal Testimony of Thomas Dagenais – Schedule 11) (eDocket No. 20243-204235-11); Ex. ATC-259 (Rebuttal Testimony of Thomas Dagenais – Schedule 12) (eDocket No. 20243-204235-13); Ex. ATC-260 (Rebuttal Testimony of Thomas Dagenais – Schedule 13) (Trade Secret) (eDocket No. 20243-204236-02); Ex. ATC-261 (Rebuttal Testimony of Thomas Dagenais – Schedule 13) (eDocket No. 20243-204236-04); Ex. ATC-262 (Rebuttal Testimony of Thomas Dagenais – Schedule 14) (eDocket No. 20243-204236-06); Ex. ATC-263 (Rebuttal Testimony of Thomas Dagenais – Schedule 15) (eDocket No. 20243-204236-08).

[75] Transcript of March 13, 2024 Virtual Public Hearing (eDocket Nos. 20244-204998-02, 20244-204998-01).

[76] Transcript of March 13, 2024 Solway Public Hearing (eDocket Nos. 20244-204998-04, 20244-204998-03).

[77] Transcript of March 19, 2024 Evidentiary Hearing (eDocket Nos. 20244-204885-02, 20244-204885-01) (Evid. Hrg. Tr.).

[78] Evid. Hrg. Tr. at 161:12-20 (eDocket Nos. 20244-204885-02, 20244-204885-01).

62. By of the close of the written comment period for the EA on March 28, 2024, a number of parties and stakeholders had submitted Comments on the EA, including Minnesota Power,[79] ATC,[80] and W.O.L.F.[81]

63. On April 15, 2024, the DOC-EERA filed its response to comments received during the public hearing comment period, consistent with the Prehearing Order.[82]

III. Minnesota Power's Proposed Project

64. The Square Butte transmission line is a 465-mile, ±250 kilovolt (kV), 550 megawatt (MW) high-voltage direct-current (HVDC) transmission line between Hermantown, Minnesota and Center, North Dakota. The line was placed into service in 1977. The HVDC converter stations (also called terminals) are currently near the Center Substation in Center, where wind-generated AC is changed to DC, and the Arrowhead Substation in Hermantown, where electricity is changed back to AC and interconnected with Minnesota Power's AC transmission system.[83]

65. The HVDC modernization project involves upgrading both HVDC terminals for the HVDC line and interconnecting the upgraded HVDC terminals to the existing AC transmission system at the existing points of interconnection. This requires construction of new buildings and electrical infrastructure. In Minnesota, to connect the new HVDC terminal to the existing AC system, the project requires the construction of a new 345 kV/230 kV substation (the St. Louis County Substation) located less than one mile west of the current Arrowhead Substation. The new HVDC terminal would be connected to the St. Louis County Substation by less than one mile of 345 kV large high-voltage transmission line (LHVTL) and the new St. Louis County Substation would be connected to the existing Arrowhead Substation by two parallel 230 kV LHVTLs less than one mile in length. Additionally, a short portion of the existing ±250 kV HVDC Line in Minnesota will need to be reconfigured to terminate at the new HVDC terminal. In North Dakota, the project will consist of: an expansion of the separately proposed Nelson Lake 230 kV Substation to add a 345 kV/230 kV transformer and 345 kV line entrance; a new HVDC converter station; a new 345 kV line from the converter station to the Nelson Lake Substation; and a ±250 kV HVDC line extension from the new converter station to tie into the existing ±250 kV HVDC line.[84]

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[79] Minnesota Power Comments on EA (eDocket Nos. 20243-204225-06, 20243-204225-05).
[80] ATC Comments on EA (eDocket Nos. 20243-204747-01, 20243-204747-03, 20243-204747-02, 20243-204747-04).
[81] W.O.L.F. Comments on EA (eDocket Nos. 20243-204285-01, 20243-204285-02, 20243-204278-02, 20243-204278-01, 20243-204277-02, 20243-204277-01, 20243-204276-01, 20243-204276-02, 20243-204437-03, 20243-204437-04, 20243-204437-01, 20243-204437-02, 20243-204759-04, 20243-204759-03, 20243-204759-02, 20243-204759-01, 20243-204710-02, 20243-204710-01).
[82] DOC-EERA Hearing Comments (eDocket Nos. 20244-205360-01, 20244-205360-02, 20244-205360-03, 20244-205360-04).
[83] Ex. MP-104 at 2 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[84] Ex. MP-104 at 2, 8 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).

66. Minnesota Power's proposed configuration of the HVDC modernization project in Minnesota includes the following facilities to be wholly owned by Minnesota Power:

- A new St. Louis County HVDC/345 kV Converter Station;
- A new St. Louis County 345 kV/230 kV Substation;
- relocation of the ±250 kV HVDC line to terminate at the new St. Louis County HVDC/345 kV Converter Station;
- less than one mile of 345 kV single-circuit transmission line between the new St. Louis County HVDC/345 kV Converter Station and the new St. Louis County 345 kV/230 kV Substation;
- less than on mile of double-circuit 230 kV transmission line between the new St. Louis County 345 kV/230 kV Substation and the existing Minnesota Power Arrowhead 230 kV/115 kV Substation; and
- modifications at the existing Minnesota Power Arrowhead 230 kV/115 kV Substation to facilitate interconnection of the new proposed 230 kV transmission lines to the existing HVDC system point of interconnection.

67. In Minnesota, the Minnesota Power proposed configuration would interconnect to Minnesota Power's local 230 kV system at the Minnesota Power Arrowhead 230 kV/115 kV Substation, the same location the HVDC system connects today.[85]

68. The HVDC modernization project is needed to add assets to maintain the incorporation of renewable energy in the grid and to improve reliability of the regional transmission system. Reliability will be improved with voltage regulation, frequency response, blackstart capability, and bi-directional power transfer capability, all of which will enable continued support for the clean energy transition.[86]

IV. The Proposed Alternative

A. ATC Arrowhead Substation Alternative

1. Description of Alternative

69. ATC supports Minnesota Power's project generally and is proposing a modification to how the HVDC assets and converter station interconnect to the AC high voltage transmission system in Minnesota. Instead of connecting the HVDC line and

[85] Ex. MP-121 at 12 (Winter Direct) MP-121 at 19-22 and Direct Schedule 37 at 1-2 (Winter Direct) (eDocket Nos. 20242-203446-08, 20242-203443-10, 20242-203443-08, 20242-203443-06, 20242-203446-07, 20242-203443-09, 20242-203443-07, 20242-203443-05).
[86] Ex. MP-104 at 8 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).

upgraded converter station to a new 345-kV St. Louis County Substation, ATC proposes connecting these facilities to its existing 345/230-kV Arrowhead Substation.[87]

70. 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 Minnesota Power's proposed upgraded converter station.[88] It is directly adjacent and connected to Minnesota Power's 230/115-kV Arrowhead Substation and houses (among other equipment) a 345/230 kV transformer, a 230 kV phase-shifting transformer (PST), and several 345 kV capacitor banks.[89]

71. 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 southwest to the Weston Substation in north-central Wisconsin.[90] This Commission and the Public Service Commission of Wisconsin (PSCW) approved that project after two incidents in the late 1990s that caused reliability issues and revealed substantial weaknesses in the transmission system between Minnesota and Wisconsin.[91] Both commissions recognized that the Arrowhead-Weston transmission line and substation would improve the reliability of the regional transmission system and benefit customers in both Minnesota and Wisconsin.[92]

72. One of the main benefits of ATC's alternative proposal is the interconnection of Minnesota Power's project to the AC transmission system without the need for an entirely new substation. ATC's Arrowhead Substation is physically and technically capable of interconnecting the Minnesota Power project without expanding the existing substation footprint.[93] When the ATC Arrowhead Substation was initially developed, it was designed to be expanded when a future system need arose (such as the Minnesota Power project).[94]

73. ATC's alternative would leverage this expandability by adding a third rung to the bay in the southwest corner of the substation, leaving three open bays to

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

[88] Ex. ATC-218 at 4 (Larsen Direct).

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

[90] 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).

[91] *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).

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

[93] Ex. ATC-218 at 5–6 (Larsen Direct).

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

accommodate three additional 345 kV transmission lines.[95] Two of those three bays could be used to accommodate a new double-circuited 345 kV transmission line from Minnesota Power's updated converter station, with one bay available to accommodate additional transmission lines that may be needed in the future.[96]

2. Cost

74. ATC estimates the cost of its alternative to be approximately $42.0 million, in 2022 dollars.[97] ATC developed this cost estimate following consultations with suppliers and contractors.[98] The estimates are as follows:

Arrowhead Substation Alternative Cost Estimate Comparison ($M)[99]

	Project Component	ATC Estimate			Owner	Minnesota Power (MP) Estimate[100]		
		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 345kV Double Ckt	7.8	8.7	10.4	MP	4.7	6.7	8.7
5	Arrowhead 345kV Line Reconfiguration	Included in line 4			ATC	1	1.4	1.8
6	Arrowhead 345kV/230 kV Sub Expansion	24.0	27.7	33.2	ATC	15.4	22	28.6
7	Arrowhead 230kV 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

75. The primary driver of the cost difference between the two estimates is Minnesota Power's inclusion of the cost of a new phase shifting transformer (PST) at

[95] Ex. ATC-218 at 5–6 (Larsen Direct); *see also* Ex. ATC-220, Schedule 2 (Larsen Direct); Ex. ATC-221, Schedule 3 (Larson Direct).
[96] Ex. ATC-218 at 5–6, 8 (Larsen Direct).
[97] Tr. at 122 (Johanek).
[98] Ex. ATC-205 at 1–2, 4 (Larson Direct); Ex. ATC-206, Schedule 1 (Johanek Direct); Ex. ATC-209 at 7 (Johanek Rebuttal).
[99] 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).
[100] The Total for the MP Estimate includes rounding. *See* Ex. MP-122, Schedule 2 at 2 (Winter Direct).

ATC's Arrowhead Substation.[101] The Arrowhead PST was initially installed to help manage power flows and support voltage stability between the transmission systems in Wisconsin and Minnesota.[102] However, the significant changes in the operation of the transmission system over the last 20 years have rendered the current PST obsolete and a new PST is unnecessary, but required to meet current permit conditions for the Arrowhead-Weston line.[103] ATC has not followed proper procedure to have the permit conditions requiring the PST changed by making a formal request to the Commission.[104]

76. The ATC and Minnesota Power cost estimates for the Arrowhead Substation Alternative also differ in terms of land acquisition costs. ATC included $500,000 in land acquisition costs related to the small expansion of the right-of-way (ROW) required for 345 kV double circuit line running from the HVDC converter station to the ATC Arrowhead Substation.[105] However, it failed to include the costs for the land upon which the new converter station would be built, understating the total land acquisition costs.[106] Conversely, Minnesota Power overestimates the land acquisition costs in relation to the alternative because it includes the cost of the land for the St. Louis County Substation, which would not be necessary with the alternative.

77. No estimated operation and maintenance (O&M) costs were provided by ATC for the ATC alternative.

78. The Judge finds that neither ATC's nor Minnesota Power's estimate of the cost of the ATC alternative is accurate. Therefore, those estimates should not be relied upon by the Commission in making its determinations.

3. Route

79. ATC considered several factors when determining the proposed route for the double-circuited 345 kV line included as part of the alternative. These included: construction access; pulling locations; access points into ATC's 345/230 kV Arrowhead Substation and Minnesota Power'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.[107] ATC also considered environmental and historical concerns, such as stream crossings and the location of an existing archaeological site.[108]

80. ATC designed its proposed route to allow Minnesota Power's HVDC line to remain in-service during construction of the new double-circuited 345 kV line. The alternative also limits environmental and cultural impacts by siting the line in the existing

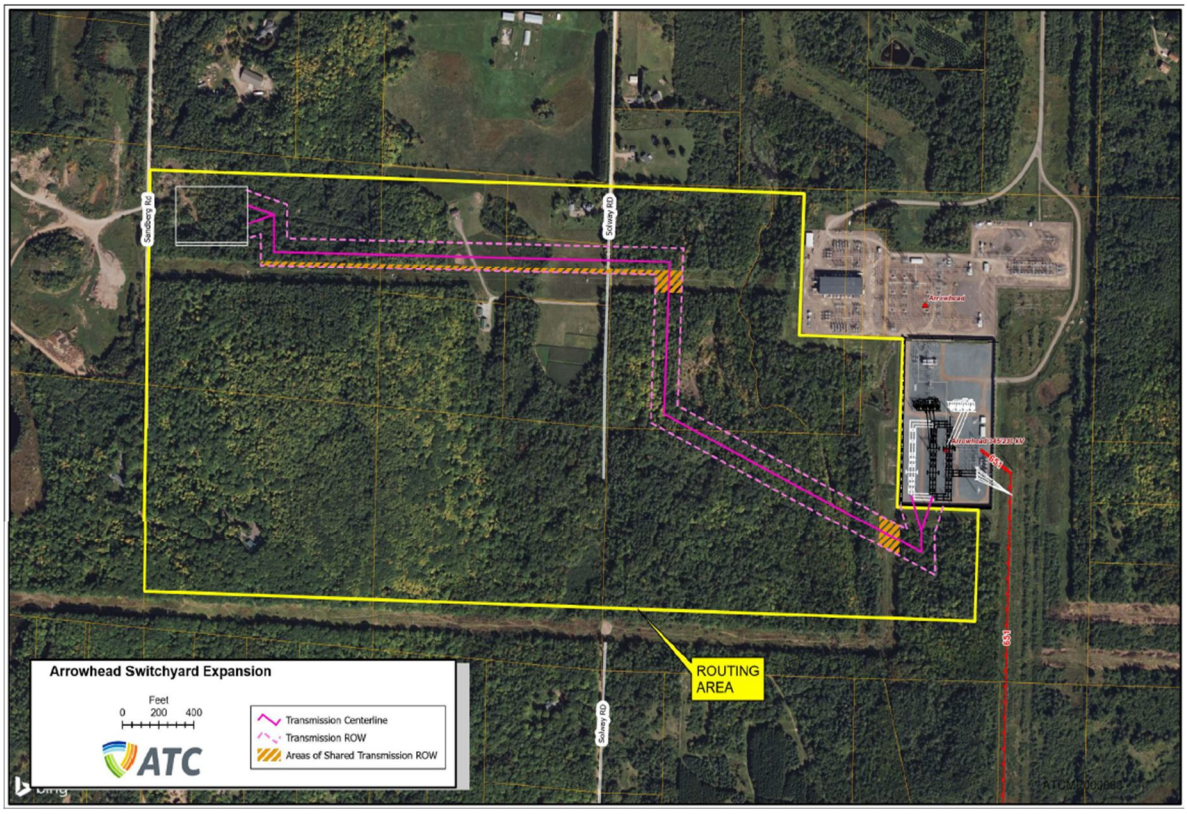
[101] Ex. ATC-209 at 8 (Johanek Rebuttal).
[102] Ex. ATC-227 at 33, 37–38 (Dagenais Direct); Ex. ATC-243 at 31–33 (Dagenais Rebuttal).
[103] Ex. ATC-227 at 33, 37–38 (Dagenais Direct); Ex. ATC-243 at 31–33 (Dagenais Rebuttal).
[104] Adding the request to remove those permit requirements in this proceeding is not the proper procedure.
[105] Tr. at 120–21 (Johanek).
[106] Tr. at 137 (Johanek).
[107] Ex. ATC-214 at 9 (Bradley Direct).
[108] Ex. ATC-214 at 9 (Bradley Direct).

ROW for the HVDC line to the maximum extent possible.[109] Specifically, the east-west segment of the alternative transmission line runs adjacent to the existing HVDC line and will share 25 feet of that line's existing ROW. This will minimize the clearing of trees and other flora as much as possible and provide enough clearance for the new line to be safely constructed while the existing transmission line remains in service.[110]

81. ATC also selected the location of the north-south segment to minimize impacts to forested wetlands, minimize waterway crossings, and avoid impacts to archaeological sites.[111] There are no houses within the proposed route for the alternative and thus no landowner relocation will be required.[112]

82. A map of the ATC alternative is provided in Figure 1, below:[113]

Figure 11: ATC (Arrowhead Substation) Alternative



83. The alternative will not require the construction of a new substation along the route, and will not require an expansion of the footprint for ATC's existing Arrowhead Substation.[114] As a result, the alternative avoids much of the aesthetic impact that would

[109] Ex. ATC-214 at 9 (Bradley Direct).
[110] Ex. ATC-214 at 9 (Bradley Direct).
[111] Ex. ATC-214 at 9–10 (Bradley Direct).
[112] Ex. ATC-214 at 10 (Bradley Direct).
[113] *See* Ex. ATC-215, Schedule 1 (Bradley Direct).
[114] Ex. ATC-214 at 10 (Bradley Direct).

occur with the Minnesota Power proposal.[115] ATC will further 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.[116]

4. Timing

84. 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).[117] Procurement of substation materials, including a second new 345/230 kV transformer, has been identified as the critical path long lead time item. ATC contacted its approved vendors and incorporated the lead times communicated by them into this schedule.[118] 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.[119]

85. ATC also discussed procurement matters with its potential suppliers and added this major equipment to the ATC material forecast sheet to increase visibility to potential vendors.[120] ATC has 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 Minnesota Power, and allowing for possible acceleration of the ISD.[121]

86. Approval of the ATC alternative will also require amendment of the ATC-Minnesota Power T-T interconnection agreement by editing Appendix A, "Points of Interconnection." This is a two-page document that describes the various facilities owned, operated, and maintained by either utility at their respective Arrowhead substations.[122] Appendix A 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.[123] The process for amending the interconnection agreement should not cause delay of the ISD of the project.[124]

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[115] Ex. ATC-214 at 10 (Bradley Direct).
[116] Ex. ATC-214 at 10 (Bradley Direct).
[117] 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.
[118] Ex. ATC-205 at 8 (Johanek Direct).
[119] Ex. ATC-227 at 32–33 (Dagenais Direct).
[120] Ex. ATC-209 at 4 (Johanek Rebuttal).
[121] Ex. ATC 209 at 4 (Johanek Rebuttal).
[122] Ex. ATC-200 at 16 (McKee Direct); Ex. ATC-202 at 17 (McKee Rebuttal).
[123] Ex. ATC-200 at 16 (McKee Direct); Ex. ATC-202 at 17 (McKee Rebuttal).
[124] Ex. ATC-200 at 16–17 (McKee Direct); Ex. ATC-202 at (McKee Rebuttal).

V. Routes Evaluated for the Project

A. Summary of Route Selection Process

87. Minnesota Power used a comprehensive siting and vetting process to identify route options for the project. Based on the applicable Minnesota Statutes and Rules, potential state, federal, and local permits or approvals necessary for the project, and the purpose and need for the project, Minnesota Power identified a proposed route[125] for consideration by the Commission.[126] To minimize impacts to humans and the environment, Minnesota Power first identified routing opportunities and constraints.[127]

88. Minnesota Power describes "opportunities" as resources or conditions that create a potential for transmission line development. They include pre-existing linear infrastructure or other features (e.g., roads, transmission lines, and public land survey divisions of land) along which project development would be particularly compatible. Opportunities, according to Minnesota Power, facilitate project development by reducing impacts on constraints. The Judge adopts this term as used by Minnesota Power.

89. Minn. R. 7850.4100 requires the Commission to consider when issuing a route permit the use or paralleling of existing rights-of-way (e.g., transportation corridors, pipelines, and electrical transmission lines), survey lines, natural division lines, and agricultural field boundaries, where practicable.[128]

90. Minnesota Power defines "constraints" as resources or conditions that could limit or prevent transmission line development. Avoiding constraints is a goal, but not necessarily a requirement, of the routing process. Constraints might include areas restricted by regulations, or areas where impacts to resources would be difficult to mitigate. Constraints can include, for example: existing land uses such as homes, religious facilities, and schools; federal, state, and locally designated environmental protection areas; sensitive habitats or areas; cultural resources such as national landmarks and archaeological sites; and public infrastructure such as airports and aeronautical and commercial telecom structures. It is important for the routing process to account for the fact that project development may affect constraints differently.[129]

91. Technical considerations also affect the routing process. These include specific engineering requirements, standards, system objectives, and opportunities for efficiency associated with construction of the project. For example, the nature of the

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[125] The term "proposed route" includes, consistent with the definitions of "route" and "HVTL" in Minnesota rules, an area wide enough to accommodate the Minnesota Power proposed configuration of the HVTLs and associated facilities, including the new segment of ±250 kV HVDC transmission line, the two new parallel segments of 230 kV LHVTL, the new segment of 345 kV LHVTL, the new St. Louis County 345 kV/230 kV Substation, and the new HVDC converter station. Ex. MP-104 at 48 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04). Minnesota Power's proposed route does not include the area necessary for the ATC alternative.

[126] Ex. MP-104 at 48 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).

[127] Ex. MP-104 at 50 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).

[128] Ex. MP-104 at 50 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).

[129] Ex. MP-104 at 50 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).

proposed project—the modernization of existing facilities—necessitates that the route be located adjacent or as close to those existing facilities as practical. Other engineering objectives may include: line entrance into the substations; minimizing the overall line length; access for construction, inspections, and maintenance; and minimizing the need for "special" structures. These technical guidelines are specific to the project and inform the technical limitations related to its design, land requirements, and reliability concerns.[130]

92. The proposed route was identified because it takes advantage of routing opportunities, such as co-location with existing transmission lines and the existing infrastructure in need of modernization, existing access routes for construction and maintenance, land available for purchase by Minnesota Power, and the minimization of impacts to resources (routing factors) identified in Minn. R. 7850.4100.[131]

B. Route Development Process

1. Identification and Development of Project Study Area

93. Minnesota Power identified a project study area that would help guide the corridor development process. The purpose of identifying a study area for the project was to establish boundaries and limits for the information gathering process (e.g., identifying environmental and land use resources, routing constraints, and routing opportunities) and the subsequent development of a proposed route for the project. The project study area was initially developed based on proximity to existing infrastructure and the proposed substation and converter station sizes. Further consideration was given to major physiographic features, jurisdictional boundaries, sensitive land uses and ownerships, existing utility corridors, and the availability of land for permanent ownership by Minnesota Power.[132]

94. Initial considerations for possible project endpoints included Ridgeview Substation, Hilltop Substation, and both Minnesota Power's and ATC's Arrowhead Substations. Within this general area major physiographic features, jurisdictional boundaries, sensitive land uses and ownerships, and existing utility corridors were defined to help refine the study area boundaries, representing the limits of reasonable or feasible transmission line corridors for the project. In subsequent evaluations, the study area was reviewed and revised to best suit routing requirements and project needs. The project study area is shown in Figure 2 below.[133]

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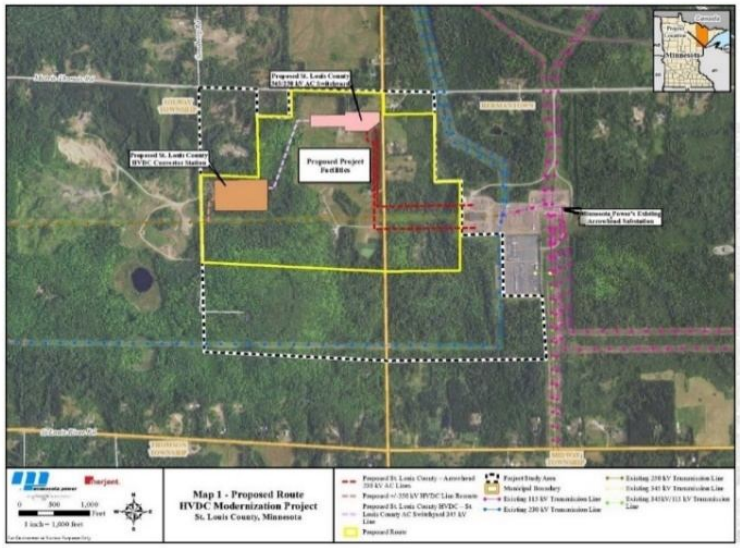
[130] Ex. MP-104 at 50 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[131] Ex. MP-104 at 51 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[132] Ex. MP-104 at 51 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[133] Ex. MP-104 at 51 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); Ex. MP-104, Appendix L, Map 1 (Combined Application) (eDocket Nos. 20236-196333-09, 20236-196333-10).

Figure 2. Project Study Area



95. Overall, Minnesota Power developed the proposed route by reviewing data, meeting with stakeholders, and performing broad environmental and engineering analyses on the project study area. In general, the project route was developed by considering the following factors: (1) existing Minnesota Power facilities to be modernized as a result of this project; (2) existing rights-of-way (transmission lines, roads, etc.); (3) availability of sufficient areas of land for purchase by Minnesota Power; (4) avoidance of densely populated areas; (5) avoidance of major environmental/natural features; (6) maximizing transmission system efficiency and reliability; and (7) minimizing the distance between project facilities and existing facilities to be modernized, and between individual project components.[134]

2. Public Participation and Stakeholder Involvement

96. The project study area was presented to the public at two open houses in November 2022 and in January 2023. In addition, individual tribal, local, state, and federal agencies were introduced to the project during the fall and winter of 2022–2023. These meetings provided information about the project to key stakeholders and allowed them to provide comments that would be used in the next steps of the routing process.[135]

C. Route Refinement and Analysis

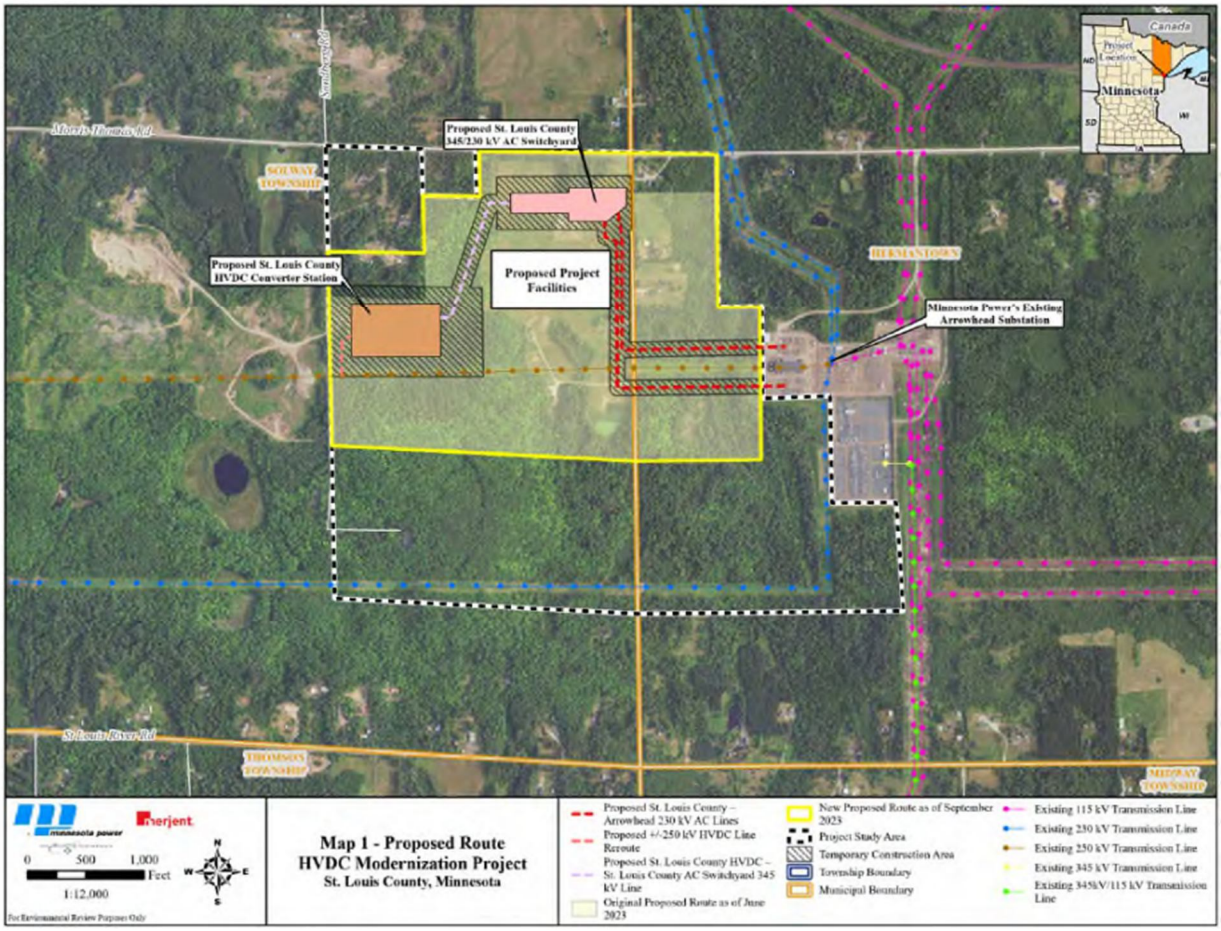
97. Based on feedback from stakeholders and the public, as well as technical guidelines, routing constraints, and routing opportunities, Minnesota Power identified in its Combined Application a single proposed route as identified in **Error! Reference source not found.** above. The proposed route maximizes the need for project proximity to existing Minnesota Power facilities near the Arrowhead Substation in need of

[134] Ex. MP-104 at 51 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[135] Ex. MP-104 at 52 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).

modernization. The proposed route will include land owned in fee by Minnesota Power to the extent possible, while avoiding routing constraints to the extent practicable.[136]

98. Minnesota Power further modified the proposed route by including additional parcels that it had acquired within the project's route width. These additional parcels are located to the north of the proposed HVDC converter station and northeast of the proposed St. Louis County Substation. Expansion of the proposed route width will afford the Applicant an additional buffer of land to use for construction and fencing as may be needed for the Project. The updated Proposed Route is shown in Figure 3below.[137]

Figure 3. Refined Proposed Route[138]



[136] Ex. MP-104 at 52 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); Ex. MP-104, Appendix L, Map 1 (Combined Application) (eDocket Nos. 20236-196333-09, 20236-196333-10).
[137] Ex. MP-114 (Minnesota Power's Written Scoping Comments) (eDocket Nos. 20239-198914-01, 20239-198914-02); Ex. MP-120 (McCourtney Direct) (eDocket Nos. 20242-203446-10, 20242-203446-09).
[138] Minnesota Power revised the proposed St. Louis County – Arrowhead 230 kV AC Lines to be double-circuit construction instead of the parallel construction shown in this Figure. Ex. MP-120 at 11-12 and Direct Schedule 1 (McCourtney Direct and Schedules) (eDocket Nos. 20242-203446-10, 20242-203446-09); Ex. MP-129 at 4-5 (eDocket Nos. 20243-204225-08, 20243-204225-07).

99. The proposed route is generally 0.5 miles wide, 0.7 miles long, parallel to the existing HVDC line, and immediately west of Minnesota Power's Arrowhead 230 kV/115 kV Substation. The width of the proposed route provides flexibility in the routing process to take advantage of practical routing opportunities and to promote the avoidance of routing constraints.[139]

100. Minnesota Power, based on continued discussions with the DNR, revised the proposed alignment for the 230 kV AC transmission line between the new St. Louis County 345 kV/230 kV Substation and the existing Minnesota Power Arrowhead 230 kV/115 kV Substation to a double-circuit configuration instead of two parallel 230 kV transmission lines. This revision to the alignment is shown in Figure 4 below:[140]

Figure 4. Revised 230 kV Alignment[141]

[139] Ex. MP-104 at 51 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); *see also* Ex. MP-104, Appendix L, Map 1 (Combined Application) (eDocket Nos. 20236-196333-09, 20236-196333-10).

[140] Ex. MP-120 at 11-12 and Direct Schedule 1 (McCourtney Direct and Schedules) (eDocket Nos. 20242-203446-10, 20242-203446-09); Ex. MP-129 at 4-5 (eDocket Nos. 20243-204225-08, 20243-204225-07).

[141] Ex. MP-129 at 3 (McCourtney Direct and Schedules) (eDocket Nos. 20243-204225-08, 20243-204225-07).

101. During the EA scoping comment period, ATC proposed its system alternative which was not contained within the proposed route.[142]

102. ATC proposes to construct and own the infrastructure to be located within the ATC Arrowhead Substation.[143]

D. Transmission Line Structures and Conductor Design

103. The proposed transmission structures for the project are anticipated to be tubular steel pole structures; however, steel lattice or wood pole structures could be used as necessary. Structure heights and span lengths are a function of span properties, topography, structure type and configuration, wire, voltage, tension, route, and other factors. The height and span lengths provided here are general values expected for the majority of structures based on similar facilities. Actual span lengths and structure heights may vary outside typical values, as necessary. Tubular steel pole structures are anticipated to be supported on concrete drilled pier foundations; however, other foundation types, including, but not limited to, helical piles and direct embedment may also be used as appropriate.[144]

104. The new ±250 kV HVDC, 230 kV, and 345 kV steel pole structures will be approximately 60 to 180 feet tall with spans of approximately 200 to 1,000 feet. Structures may be configured as double circuit or double circuit-capable as appropriate to facilitate future development consistent with planning efforts at the terminals and substations. The proposed transmission line will be designed to meet or surpass relevant state codes including the National Electric Safety Code (NESC).[145]

105. The specific conductors for the 230 kV and 345 kV transmission lines for the Minnesota Power proposed configuration have yet to be determined but will consist of aluminum conductor steel reinforced (ACSR) or possibly aluminum conductor steel supported (ACSS) wire and are likely to use bundled configurations (e.g., two sub-conductors per phase).[146] The conductors will be selected according to the near-term and long-term capacity needs of the proposed transmission lines while also considering electrical performance characteristics, such as electric and magnetic fields, audible noise, radio interference, and lifecycle operating and maintenance costs. The conductor for the

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[142] Ex. DOC EERA-516 at Appendix B at Map 4 (EA Appendices) (eDocket Nos. 20243-204084-01, 20242-203954-03).

[143] Ex. MP-121 at 19-22 and Direct Schedule 37 at 1-2 (Winter Direct) (eDocket Nos. 20242-203446-08, 20242-203443-10, 20242-203443-08, 20242-203443-06, 20242-203446-07, 20242-203443-09, 20242-203443-07, 20242-203443-05); Ex. MP-122 at 19-22 and Direct Schedule 37 at 1-2 (Winter Direct) (Trade Secret) (eDocket Nos. 20242-203446-06, 20242-203446-04, 20242-203446-02, 20242-203443-06, 20242-203443-10, 20242-203443-14, 20242-203443-12, 20242-203443-04, 20242-203443-02, 20242-203446-05, 20242-203446-03, 20242-203446-01, 20242-203443-13, 20242-203443-11, 20242-203443-07, 20242-203443-09, 20242-203443-03, 20242-203443-01).

[144] Ex. MP-104 at 10 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).

[145] Ex. MP-104 at 10 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).

[146] ATC proposed to use TP 477kcmil Haw for the 345 kV double-circuit lines necessary for the ATC alternative. Ex. ATC-214 at 7 (Direct Testimony of Michael Bradley) (eDocket No. 20242-203434-04). However, because these lines would be constructed, owned, and operated by Minnesota Power, no decision has been made on the conductor material at this time.

short segment of new ±250 kV HVDC line is anticipated to be 2839 ACSR to match the existing HVDC line conductor. This is an atypically large conductor that is necessary to facilitate the full capacity of the HVDC line. Typical transmission line construction utilizes one or two overhead ground wires (OHGW) based on structure configuration, shielding requirements, fault current rating requirements, and communication requirements. It is also not uncommon for optical ground wire (OPGW) to be installed in some or all of the OHGW positions.[147]

106. Table 1 below summarizes the key specifications of the proposed transmission structures.

Table 1. Structure Design Summary[148]

Line Type	Structure Type	Structure Material	Right-of-Way Width (feet)	Structure Height (feet)	Foundation	Foundation Diameter (feet)	Span Between Structures (feet)
230 kV	Tubular Steel Pole	Weathering Steel	130	60-180	Concrete Pier	4-12	200-1000
345 kV	Tubular Steel Pole	Weathering Steel	150	60-180	Concrete Pier	4-12	200-1000
±250 kV HVDC	Tubular Steel Pole	Weathering Steel	120	60-180	Concrete Pier	4-12	200-1000

Note: The values in the table above are typical values expected for the majority structures based on similar facilities. Actual values may vary.

E. Route Width and Right-of-Way

107. When the Commission issues a route permit, it approves a route, a route width, and an anticipated alignment within that route width:

- **Route**: The path the transmission line will follow is the route described in the Combined Application at Section 2.1.2. Under Minn. Stat. § 216E.01, subd. 8, the route may have a variable width of up to 1.25 miles.

- **Right-of-Way**: The right-of-way is the physical land area within a route that is needed to construct and operate an energy facility; usually represented as the required easement.

- **Route Width**: The area along the route within which the actual ROW will be placed. The route width is typically larger than the right-of-way to provide flexibility to address engineering, human (landowner preferences) and environmental concerns that arise after the permit has been issued.

- **Anticipated Alignment**: A representation of the location of the poles and conductors within the ROW.[149]

[147] Ex. MP-104 at 10–11 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[148] Ex. MP-104 at 10 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[149] *See* Ex. DOC EERA-515 at 4, 11–12 (EA) (eDocket Nos. 20242-203954-04, 20243-204084-02).

1. Route Width

108. Minnesota Power is requesting a route width that is wide enough to provide flexibility to design facilities, to minimize system impacts and outages, to optimize future expandability work with landowners, to address engineering concerns after a route permit has been issued, to avoid sensitive natural resources, and to manage construction constraints as practical. In addition, unlike traditional transmission line projects, Minnesota Power plans to purchase and own in fee simple all the land required for project construction and operation, in which case no ROW, as such, would be required.[150]

109. After filing its Combined Application, Minnesota Power requested inclusion of additional parcels that it had acquired within the project's route width. Expansion of the proposed route width will afford the Applicant an additional buffer of land to use for construction and fencing as may be needed for the project.[151]

2. Right-of-Way

110. The ROW is the area required for safe operation of the HVTL. It must be within the designated route and is the area from which the permittee may obtain easements to construct and operate the HVTL.[152]

111. To the extent possible, the project will not use traditional transmission line easements for rights-of-way and will, instead, construct the project on land owned by Minnesota Power. If Minnesota Power is unable to acquire all project lands in fee simple ownership, it will acquire traditional utility rights-of-way for any remaining land required to build and operate the project.[153]

112. For the purpose of traditional operation and maintenance of the transmission lines, Minnesota Power will maintain typical ROW widths for the transmission lines within the proposed route. In this case, typical ROW widths are those established by both industry standards and Minnesota Power's standard practices for maintaining transmission line rights-of-way, and generally vary between 120 and 150 feet.[154] The proposed transmission lines will be designed such that vegetation clearing will use the typical ROW widths per voltage class as indicated in Table 1 above. Additional maintained width beyond these values may be required, as needed, based on design requirements. Reduction in these ROW width values will only be considered on a case-by-case basis.[155]

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[150] Ex. MP-104 at 9 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); Ex. DOC EERA-515 at 26 (EA) (eDocket Nos. 20242-203954-04, 20243-204084-02).
[151] Ex. MP-114 (Minnesota Power's Written Scoping Comments) (eDocket Nos. 20239-198914-01, 20239-198914-02); Ex. MP-120 (McCourtney Direct) (eDocket Nos. 20242-203446-10, 20242-203446-09).
[152] Ex. DOC EERA-515 at 11 (EA) (eDocket Nos. 20242-203954-04, 20243-204084-02).
[153] Ex. MP-104 at 9–10 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); Ex. DOC EERA-515 at 26 (EA) (eDocket Nos. 20242-203954-04, 20243-204084-02).
[154] Ex. MP-104 at 10, 52 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[155] Ex. MP-104 at 10 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).

113. The anticipated alignment is the anticipated placement of the transmission line within the route and ROW, where the transmission line is anticipated to be built; usually represented as the "centerline."[156]

114. After coordinating with landowners and completing detailed engineering plans, the Applicant will establish the final alignment for the project and designate pole placements.[157]

3. Associated Facilities

115. Substation and terminal facilities are sometimes referred to as "associated facilities" in transmission line certificate of need and route permit applications. For the proposed project, the substations and terminals are the primary and most significant facilities proposed, and the short transmission line segments are ancillary facilities for interconnecting the HVDC terminal with the substation facilities.[158]

116. For substation and terminal facilities, the project will require a new HVDC terminal and upgrades to the existing Arrowhead Substation 230 kV bus. Minnesota Power also seeks to build a new 345 kV/230 kV substation in preparation for future system growth. The HVDC terminal will convert the DC electricity into AC and will interconnect to the AC transmission system at 345 kV via a short 345 kV transmission line to the proposed new St. Louis County Substation.[159]

4. Design Options to Accommodate Future Expansion

117. Minnesota Power sees long-term significance of the HVDC line for its customers and the region. Thus, the Applicant wants to include design options in the project to accommodate future expansion. The new voltage source converter (VSC) HVDC converter stations will be designed with a flexible, scalable approach that will enable their future expansion to accommodate bulk regional transfers of renewable energy. Minnesota Power is working with the HVDC supplier to procure the most current capacity and technology for the new VSC converter stations, as well as additional expandability features to enable staged development of additional HVDC capacity to meet future regional needs.[160]

118. The 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 in conjunction with increasing capacity and utilization of the HVDC line. The new substation will also include space to accommodate a second 345 kV/230 kV transformer to facilitate expanded delivery of power to the local transmission system in northeastern Minnesota. New 345 kV and 230 kV transmission lines constructed for the project will be designed with sufficient capacity to accommodate reasonably foreseeable

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[156] Ex. DOC EERA-515 at 4, 11 (EA) (eDocket Nos. 20242-203954-04, 20243-204084-02).
[157] *See* Ex. DOC EERA-515 at 27, 28 (EA) (eDocket Nos. 20242-203954-04, 20243-204084-02).
[158] Ex. MP-104 at 8 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[159] Ex. MP-104 at 8–9 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[160] Ex. MP-104 at 11 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).

long-term needs, and Minnesota Power will consider making new transmission structures double-circuit capable where appropriate.[161]

F. Project Schedule

119. Minnesota Power anticipates starting construction of the project as soon as 2024. The project is scheduled to be in service between 2028–2030 as provided in Table 2.[162]

Table 2. Anticipated Minnesota Power Proposed Configuration of the HVDC Modernization Project Schedule

Activity	Anticipated Date
Land Acquisition Begins	Apr 2022
Secure Manufacturing Slot Reservation with Preferred Supplier	Jan 2023
Kick off technical coordination and engagement with Preferred Supplier	Mar 2023
Certificate of Need and Route Permit Application Filed	May 2023
Begin Front End Studies & Engineering Design (FEED) with Preferred Supplier	Jan 2024
Certificate of Need and Route Permit Issued	July 2024
Other Federal, State, and Local Permits Issued	July – November 2024
Order Long Lead Time Equipment for AC Substations	November 2024
Clearing Begins	January 2025
Construction of AC Interconnection Facilities Begins	May 2025
Receive Firm Proposal for HVDC converters from Preferred Supplier	Dec 2025 – Aug 2026[a]
Execute Firm EPC Contract and Give Final Notice to Proceed with HVDC Manufacturing & Delivery	Feb 2026 – Oct 2026[a]
Construction of HVDC Converter Stations Begins	Feb 2027 – Oct 2027[a]
Project In-Service	Dec 2028 – Apr 2030[a]

[a] *Date range represents potential outcomes based on supplier availability to expedite manufacturing slot reservation.*

G. Project Costs

1. Construction and Operation and Maintenance (O&M) Costs

120. The estimated cost to construct the HVDC modernization project provided by Minnesota Power is between $660 and $940 million (in 2022 dollars),[163] with the Minnesota facilities, assuming Minnesota Power's proposed configuration, estimated to cost $55 million using a mid-range estimate.[164] The total estimate for the Minnesota facilities includes land and right-of-way costs, in addition to construction, engineering, materials, permitting, and design costs for the new St Louis County 345 kV/230 kV

[161] Ex. MP-104 at 11 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[162] Ex. MP-104 at 19 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); Ex. DOC EERA-515 at 30–31 (EA) (eDocket Nos. 20242-203954-04, 20243-204084-02).
[163] Ex. DOC EERA-515 at 32 (EA) (eDocket Nos. 20242-203954-04, 20243-204084-02); *see also* Ex. MP-104 at 12–13 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[164] Ex. MP-104 at 13 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); Ex. MP-121, Rebuttal Schedule 21 (Winter Rebuttal) (eDocket Nos. 20243-204225-12, 20243-204225-11).

Substation, HVDC converter station, and the associated HVTLs. St Louis County 345 kV/230 kV Substation and HVDC converter station cost estimates do not change based on the system alternative selected, but other construction cost estimates may change based on the route selected.[165]

121. Minnesota Power has sought grants to mitigate costs associated with the HVDC modernization project, particularly those costs related to the innovative technology and forward-thinking future considerations that have been integrated into the project design. Minnesota Power has been selected for $75 million in total grant funding for the project, which will mitigate out-of-pocket costs paid by Minnesota Power for the project.[166]

122. Minnesota Power continues to evaluate any additional grant opportunities available for the project to reduce overall costs. On January 12, 2024, after filing its Combined Application, Minnesota Power submitted the HVDC Interconnection Facilities concept paper to the U.S. Department of Energy (DOE) for a second round funding opportunity of the Grid Resilience and Innovation Partnerships (GRIP) Program for fiscal years 2024 and 2025.[167] On February 29, 2024, the DOE notified the Applicant that based on this submission, it should submit a full application for up to a $50 million GRIP round two award. This award, if received, would be applied to reduce the total cost of the project.[168]

123. Once constructed, O&M costs associated with the new transmission lines will be minimal for several years since vegetation maintenance on the route corridor will occur prior to construction. The specific O&M costs for an individual transmission line varies based on the location of the line, the number of trees located along the right-of-way, the age and condition of the line, the voltage of the line, and other factors.[169]

124. Minnesota Power's O&M costs typically range from $50,000 to $100,000 annually. The converter station O&M costs are anticipated to be approximately $1 million annually. ROW maintenance costs, including inspections, are anticipated to be $1,100 per mile.[170]

2. Effect on Rates

125. The Commission's rules require an applicant to provide the annual revenue requirements to recover the costs of a proposed project. The Applicant provided this information in the Combined Application.[171] Table 3 below summarizes the range of estimated Minnesota jurisdictional revenue requirements and rate impacts by customer

[165] Ex. DOC EERA-515 at 32 (EA) (eDocket Nos. 20242-203954-04, 20243-204084-02); *see also* Ex. MP-104 at 12–13 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[166] Ex. MP-119 at 13 (Gunderson Direct) (eDocket Nos. 20242-203446-12, 20242-203446-11); Ex. MP-127 at 4 (Gunderson Rebuttal) (eDocket Nos. 20243-204225-06, 20243-204225-05).
[167] Ex. MP-119 at 13–14 (Gunderson Direct) (eDocket Nos. 20242-203446-12, 20242-203446-11).
[168] Ex. MP-127 at 6 (Gunderson Rebuttal) (eDocket Nos. 20243-204225-06, 20243-204225-05).
[169] Ex. MP-104 at 13 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[170] Ex. DOC EERA-515 at 32 (EA) (eDocket Nos. 20242-203954-04, 20243-204084-02); *see also* Ex. MP-104 at 13–14 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[171] Ex. MP-104 at 14 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).

class for the first full year following the in-service date of the project (i.e., May 1, 2030), assuming Minnesota Power's proposed configuration is approved.[172] Although Minnesota Power is working to secure an earlier in-service date, conducting the rate impact analysis requires a distinct in-service date to be chosen. Since the guaranteed latest in-service date provided by the HVDC supplier is currently in April 2030, May 1, 2030, is the date used to calculate the project's effect on rates.[173]

Table 3. Estimated Retail Customer Rate Impacts for the Minnesota Power Proposed Configuration[174]

	Minnesota Power Proposed Project Without DOE & State Awards		Minnesota Power Proposed Project With $75M DOE & State Awards		Minnesota Power Proposed Project With $125M DOE & State Awards	
For the twelve months ending	4/30/31 Mid-Range	4/30/31 Upper-Range	4/30/31 Mid-Range	4/30/31 Upper-Range	4/30/31 Mid-Range	4/30/31 Upper-Range
MN Jurisdictonal Revenue Requirements	$ 86,423,884	$ 101,860,375	$ 79,384,055	$ 94,820,546	$ 74,690,835	$ 90,127,326
Rate Class Impacts /1						
Residential (average current rate, cents/kWh)	14.894	14.894	14.894	14.894	14.894	14.894
Increase (cents/kWh) /2	1.175	1.384	1.079	1.289	1.015	1.225
Increase (%)	7.89%	9.29%	7.24%	8.65%	6.82%	8.22%
Average Impact ($ / month)	$8.32	$9.80	$7.64	$9.13	$7.19	$8.67
General Service (average current rate, cents/kWh)	14.943	14.943	14.943	14.943	14.943	14.943
Increase (cents/kWh) /2	1.175	1.384	1.079	1.289	1.015	1.225
Increase (%)	7.86%	9.26%	7.22%	8.62%	6.79%	8.20%
Average Impact ($ / month)	$32.76	$38.61	$30.09	$35.94	$28.31	$34.16
Large Light & Power (average current rate, cents/kWh)	11.960	11.960	11.960	11.960	11.960	11.960
Increase (cents/kWh) /2	1.175	1.384	1.079	1.289	1.015	1.225
Increase (%)	9.82%	11.58%	9.02%	10.78%	8.49%	10.24%
Average Impact ($ / month)	$2,883.04	$3,397.99	$2,648.19	$3,163.14	$2,491.63	$3,006.58
Large Power (average current rate, cents/kWh)	9.361	9.361	9.361	9.361	9.361	9.361
Increase (Demand & Energy Combined) (cents/kWh) /2	1.112	1.311	1.022	1.221	0.961	1.160
Increase (%)	11.88%	14.01%	10.92%	13.04%	10.27%	12.39%
Average Impact ($ / month)	$534,935	$630,482	$491,361	$586,908	$462,312	$557,858
Lighting (average current rate, cents/kWh)	31.964	31.964	31.964	31.964	31.964	31.964
Increase (cents/kWh) /2	1.175	1.384	1.079	1.289	1.015	1.225
Increase (%)	3.67%	4.33%	3.38%	4.03%	3.18%	3.83%
Average Impact ($ / month)	$1.93	$2.27	$1.77	$2.12	$1.67	$2.01

Notes:
1/ Average current rates are 2022 Final General rates based on 2023 MPUC decision (E-015/GR-21-335) without riders adjusted to include current rider rates. Current rider rates included Renewable Resources Rider rates, Transmission Cost Recovery Rider rates, Solar Adjustment rates, Conservation Program Adjustment rates, and 2022 Fuel and Purchased Energy with True-Up. Average $/month impact based on 2023 budgeted billing units.

2/ Increase shown is the rate increase of proposed HVDC Project in first year after in-serivce.

126. Minnesota Power initially prepared rate impact analyses for the ATC alternative and provided those results to ATC on February 2, 2024. In preparing rate impacts, Minnesota Power initially used the publicly available 2022 MISO Transmission Expansion Planning Cost Estimating Guide for purposes of estimating the cost of the Minnesota Power proposed configuration, the project as a whole, and the ATC alternative.[175] ATC has conceded that the Minnesota Power proposed configuration and

[172] Ex. MP-127, Rebuttal Schedule 5 at 8 (Gunderson Rebuttal) (eDocket Nos. 20243-204225-06, 20243-204225-05).
[173] Ex. MP-104 at 14 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[174] Ex. MP-127, Rebuttal Schedule 5 at 8 (Gunderson Rebuttal) (eDocket Nos. 20243-204225-06, 20243-204225-05).
[175] Ex. MP-104 at 13 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); Ex. MP-130 at Rebuttal Schedule 21 (Winter Rebuttal) (eDocket Nos. 20243-204225-12, 20243-204225-11); Ex. MP-131 at Rebuttal Schedule 21 (Winter Rebuttal) (Trade Secret) (eDocket Nos. 20243-204225-10, 20243-204225-09).

the ATC alternative are estimated to be nearly equivalent in cost. Rate impacts are anticipated to be similar to those in Table 3.[176] However, the ATC alternative would not be eligible for the additional $50 million potentially available to the Minnesota Power proposed configuration through the second round of DOE GRIP funding.[177] Additionally, the ATC alternative will require a phase-shifting transformer under current permit requirements for the ATC Arrowhead Substation. A PST would add approximately $30 million to the ATC alternative and increase rates to Minnesota Power customers accordingly.[178]

127. LPI expressed frustration in this docket related to the overall cost of the project being assigned solely to the Minnesota Power LP and LL&P customers and that the HVDC modernization project was not being allocated more broadly across the MISO region. However, the only clear way for costs to be assigned to others would be if the project meets cost allocation criteria in the MISO Tariff.[179] While the HVDC modernization project, itself, is not currently eligible for cost allocation through MISO, Minnesota Power continues to explore opportunities for cost allocation associated with the potential future expansion.[180] LPI expressed additional concerns that the ATC alternative would result in greater power flows to Wisconsin without Wisconsin ratepayers paying for this benefit.[181] The power flows into Wisconsin, if the ATC alternative is ordered by the Commission, raises equitable concerns given that Minnesota Power customers will be paying for the project.

H. Permittee

128. Minnesota Power, a public utility operating division of ALLETE, Inc., is the permittee for the project.

VI. Public, Local Government, and Federal and State Agency Participation

A. Public Outreach

129. Minnesota Power has maintained a project webpage on its website (https://www.mnpower.com/Company/Transmission.), an email address (askus@mnpower.com), and phone line (218-355-3515), to ensure members of the public could get answers questions about the project.[182]

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[176] Evid. Hrg. Tr. 139:22–140:2 (Johanek) (eDocket Nos. 20244-204885-02, 20244-204885-01).
[177] Ex. MP-127 at 7–8 (Gunderson Rebuttal) (eDocket Nos. 20243-204225-06, 20243-204225-05).
[178] Ex. MP-130 at Rebuttal Schedule 21 (Winter Rebuttal) (eDocket Nos. 20243-204225-12, 20243-204225-11); Ex. MP-131 at Rebuttal Schedule 32 (Winter Rebuttal) (Trade Secret) (eDocket Nos. 20243-204225-10, 20243-204225-09).
[179] Ex. LPI-300 at 18 (Maini Direct) (eDocket No. 20242-203451-03).
[180] Ex. MP-127 at 20 (Gunderson Rebuttal) (eDocket Nos. 20243-204225-06, 20243-204225-05); Ex. MP-130 at 8-11 (Winter Rebuttal) (eDocket Nos. 20243-204225-12, 20243-204225-11); Ex. DOC DER-602 at 7 (Zajicek Rebuttal) (eDocket Nos. 20243-204217-01, 20243-204348-01).
[181] Ex. LPI-301 at 14 (Maini Rebuttal) (eDocket No. 20243-204237-04).
[182] Ex. MP-104 at 7, 104 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).

130. Minnesota Power hosted its first open house at the Midway Township Town Hall on November 22, 2022. Landowners located within 1,320 feet (0.25 miles) of the project study area received a mailer inviting them to the open house. Staff from Minnesota Power were on site to describe the project and answer questions from attendees.[183]

131. Minnesota Power hosted additional open houses on January 11, 2023, and April 19, 2023, at the Solway Township Town Hall. Solway Township landowners received a mailer inviting them to the open house. Staff from Minnesota Power were on site to describe the project and answer questions from attendees.[184]

B. Public Comments

132. Members of the public spoke at the public information and EA scoping meetings held August 29–30, 2023 (one in-person and one virtual) and at the public hearings held March 13, 2024 (one in-person and one virtual).[185] Additionally, members of the public submitted comments in writing.[186]

1. Comments at EA Scoping Meetings

133. Six members of the public spoke during the in-person EA scoping meeting on August 29, 2023. One member of the public spoke during the virtual EA scoping meeting on August 30, 2023. These comments are summarized below.[187]

134. Allison Hafften requested that the DOC-EERA provide a thorough analysis of the Minnesota Power proposed configuration of the HVDC modernization project in the EA.[188] Ms. Hafften requested the EA evaluate potential impacts to properties and residences outside the project area, including impacts to aesthetics, increased noise, and lighting issues. Ms. Hafften also asked clarifying questions related to the rate impacts included in the Combined Application.

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[183] Ex. MP-104 at 104 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); Ex. MP-204 at Appendix K (eDocket Nos. 20236-196333-09, 20236-196333-10).
[184] Ex. MP-104 at 104 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); Ex. MP-204 at Appendix K (eDocket Nos. 20236-196333-09, 20236-196333-10).
[185] Ex. DOC EERA-503 (Transcripts from August 29, 2023 In-Person Scoping Meeting) (eDocket Nos. 20239-198862-01, 20239-198863-01); Ex. DOC EERA-504 (Transcripts from August 30, 2023 Virtual Scoping Meeting) (eDocket Nos. 20239-198862-02, 20239-198863-02); *see also* Ex. DOC EERA-502 (Public Meeting Handout) (eDocket Nos. 20239-198744-01, 20239-198864-01).
[186] *See* Ex. MP-114 (Minnesota Power's Written Scoping Comments) (eDocket Nos. 20239-198914-01, 20239-198914-02); Ex. MP-116, (Response to Route Alternative and Conditions Proposed to be Evaluated in the Environmental Assessment) (eDocket Nos. 20239-199286-02, 20239-199286-01); Ex. MP-117 (Supplemental Response to Route Alternative and Conditions Proposed to be Evaluated in the Environmental Assessment) (eDocket Nos. 202310-199303-02, 202310-199303-01); Ex. DOC EERA-505 (Public Comment – Dale and Nancy Vanderscheuren) (eDocket No. 20239-199220-01); Ex. DOC EERA-506 (Public Comment – Solway Town Board of Supervisors) (eDocket No. 20239-199226-01); Ex. DOC EERA-507 (Public Comment – Vanderscheuren) (eDocket No. 202310-199315-01); Ex. DOC EERA-508 (Compiled Scoping Comments) (eDocket No. 202310-199399-01).
[187] EA Scoping Meeting (In-Person) (eDocket No. 20239-198863-01); EA Scoping Meeting (Virtual) (eDocket No. 20239-198863-02).
[188] The ATC Arrowhead Alternative was not proposed by ATC until after the EA scoping meetings.

135. Peter Hafften expressed interest in ensuring that the vegetation to the south of the project area remain in place to preserve the rural nature of the area. Mr. Hafften also requested that noise be evaluated in the EA and sought clarification on the types of noise mitigation that might be available to the project. Mr. Hafften sought confirmation that the intent would be to maintain the access off Morris Thomas Road instead of constructing a new access road.

136. Nancy Vanderscheuren provided comments that she also provided in writing to the DOC-EERA. Ms. Vanderscheuren requested that the EA evaluate lighting and noise from the proposed project. She also requested that the EA ensure that wetland delineations are performed and that it evaluate potential aesthetic impacts of project infrastructure.

137. Patrick O'Connell thanked Minnesota Power for using organized labor on its infrastructure construction projects and intent to do the same on this project.

138. Julie O'Connor asked for additional information on the estimated operating life of the facility. She also confirmed that Minnesota Power would have an unanticipated discovery plan for the construction of the HVDC modernization project.

139. Ron Gajewski requested information on the aesthetic, noise, and lighting impacts that could potentially result from the project – specifically wondering if the improvements since the original infrastructure was installed more than 45 years ago might address some concerns.

140. Allison Hafften was the only member of the public to speak at the virtual EA scoping meeting on August 30, 2023. Ms. Hafften provided additional comments related to potential aesthetic impacts of the project and requested that mitigation measures be considered during design. She also requested additional vegetation be placed along Morris Thomas Road to minimize potential visual impacts. Ms. Hafften requested clarification on the cost recovery for the HVDC modernization project and inquired about evaluations on whether the existing infrastructure could be replaced in-kind. Finally, Ms. Hafften asked that information on the HVDC converter station building be included in the EA.

2. Comments at Public Hearings

141. Seven members of the public spoke during the public hearings held on March 13, 2024. These comments are summarized below. [189]

142. Jordan Urshan requested additional information on the proposed project, Minnesota Power's proposed configuration, and the ATC alternative.

[189] Pub. Hrg. Tr. (Mar. 13, 2024 at 12 P.M.) (eDocket Nos. 20244-204998-02, 20244-204998-01); Pub Hrg. Tr. (Mar. 13, 2024 at 6 P.M.) (eDocket Nos. 20244-204998-04, 20244-204998-03).

143. Dale Vanderscheuren expressed concerns related to noise and lighting impacts, and requested information on the proposed project and ATC alternative related to these concerns.

144. Carol Overland requested additional information related to any noise studies or reports performed for the proposed project, as well as information related to the imposition of a megavolt limitation on the proposed alternatives. Ms. Overland also requested information related to the ATC alternative and its relation to Minnesota Power's Combined Application as a whole.

145. Derek Pederson noted Minnesota Power's support for, and use of, union labor to construct portions of the proposed project.

146. Allison Hafften requested clarification on the use of a phase-shifting transformer in Minnesota Power's proposed configuration versus the ATC alternative. She also asked questions related to noise and the imposition of a megavolt limitation on the proposed alternatives.

147. Trish Crego requested information related to wetland delineations in the City of Hermantown and Solway Township, tree clearing activities that may be done, and creek setbacks that may be relevant to constructing the project.

148. Sharon Umpierre requested clarification on the roads included in the project maps provided by Minnesota Power.

3. Public Hearing Comment Period – Written Comments

149. W.O.L.F. provided written comments opposing the proposed alternative.[190] The Applicant and ATC also each submitted written comments.[191]

150. No other written comments were submitted during the Commission's written comment period on the EA, ending March 28, 2024.

[190] W.O.L.F. Comments on EA (eDocket Nos. 20243-204285-01, 20243-204285-02, 20243-204278-02, 20243-204278-01, 20243-204277-02, 20243-204277-01, 20243-204276-01, 20243-204276-02, 20243-204437-03, 20243-204437-04, 20243-204437-01, 20243-204437-02, 20243-204759-04, 20243-204759-03, 20243-204759-02, 20243-204759-01, 20243-204710-02, 20243-204710-01).

[191] Minnesota Power Comments on EA (eDocket Nos. 20243-204709-01, 20243-204709-02); ATC Comments on EA (eDocket Nos. 20243-204747-01, 20243-204747-03, 20243-204747-02, 20243-204747-04).

C. Local Government and Federal and State Agencies Outreach

1. Overview of Local Government, Tribal, Federal, and State Agency Outreach

151. As part of the pre-application process, Minnesota Power initiated outreach to federal, tribal, state, and local agencies through in-person meetings and project notification letters.[192]

152. In November 2022, Minnesota Power attended meetings with local government agencies to provide preliminary project details and a timeline of major milestones. Minnesota Power also requested input with respect to the resources under its jurisdiction as well as the identification of federal and state permits and/or approvals that may be required for the project.[193]

153. In November 2022, Minnesota Power met with the Fond du Lac Band of Lake Superior Chippewa to review the project and request input with respect to resources of interest that may be located within and near the project study area.[194]

154. On November 30, 2022, Minnesota Power sent a letter to each local government unit (LGU) within which the proposed route is located, as required by Minn. Stat. § 216E.03, subd. 3a.[195]

155. In December 2022, Minnesota Power mailed HVDC modernization project introduction letters with maps of the project study area to federal, tribal, state, and local agencies whose constituents may have an interest in the proposed project. The letter introduced the project and requested agency input regarding public and environmental resources that may be located within the project study area, or resources that could potentially be affected by the proposed project.[196]

156. Table 4 identifies agencies that were contacted by Minnesota Power through meetings or a notification email outside of the public outreach identified in the following subsections.[197]

Table 4. Agency and Tribal Contacts

Name	Date and Type of Communication
U.S. Fish and Wildlife Service	December 16, 2022, Introduction letter
U.S. Army Corps of Engineer	December 16, 2022, Introduction letter

[192] Ex. MP-104 at 101 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[193] Ex. MP-104 at 101 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[194] Ex. MP-104 at 101 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[195] Ex. MP-104 at 101 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[196] Ex. MP-104 at 101–02 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[197] Ex. MP-104 at 102 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).

Name	Date and Type of Communication
U.S. Department of Agriculture – Natural Resources Conservation Service	December 16, 2022, Introduction letter
Fond du Lac Band of Lake Superior Chippewa	November 17, 2022, In-person meeting
Tribal Historic Preservation Offices and Tribal Government Contacts	December 22, 2022
MN Dept. of Commerce – Energy Environmental Review and Analysis	November 21, 2022, Conference call; December 16, 2022, Introduction letter
MN Public Utilities Commission Staff	November 21, 2022, Conference call; December 16, 2022, Introduction letter
Minnesota Department of Natural Resources – Ecological Services	December 16, 2022, Introduction letter
Minnesota Department of Natural Resources – Lands and Minerals	December 16, 2022, Introduction letter
Minnesota Department of Natural Resources – Parks and Trails	December 16, 2022, Introduction letter
Minnesota Department of Agriculture	December 16, 2022, Introduction letter
Minnesota Pollution Control Agency	December 16, 2022, Introduction letter
Minnesota State Historic Preservation Office	December 16, 2022, Introduction letter
NRCS – Duluth Service Center	December 16, 2022, Introduction letter
St. Louis County	November 30, 2022, LGU notice letter
City of Hermantown	November 9, 2022, In-person meeting; November 30, 2022 LGU notice letter
Solway Township	November 15, 2022, In-person meeting; November 30, 2022, LGU notice letter
South St. Louis Soil and Water Conservation District	December 16, 2022, Introduction letter
State Legislators (Natalie Zeleznikar, Grant Hauschild, Pete Stauber)	November 30, 2022, LGU notice letter
Federal Legislators (Amy Klobuchar, Tina Smith)	November 30, 2022, LGU notice letter

2. Federal Agencies

a. U.S. Army Corps of Engineers

157. The United States Army Corps of Engineers (USACE) will be consulted regarding potential impacts to Waters of the United States as the Project's design

becomes better defined in relation to the delineated features identified during field surveys in 2022 and 2023.[198]

b. U.S. Fish and Wildlife Service

158. The U.S. Fish and Wildlife Service will be consulted regarding potential impacts to federally listed species as the Project's design becomes better defined.[199]

3. Tribal Nations

159. Minnesota Power met with Fond du Lac Band of Lake Superior Chippewa (FDL) Tribal Historic Preservation Office (THPO) representative Evan Schroeder on November 17, 2022. The project was introduced with a summary of the proposed activities and timeline. FDL stated there was the potential for a historic trail in the southwest corner of the project study area[200] and FDL had some general project questions.[201]

4. State Agencies

a. Minnesota Department of Commerce – Energy Environmental Review and Analysis and Minnesota Public Utilities Commission Staff

160. Minnesota Power held an informational conference call with staff members from the DOC-EERA and the Commission on November 21, 2022. Minnesota Power provided an overview of the proposed project, need, scope, the anticipated schedule for submitting a combined certificate of need and route permit application, and the construction and completion schedule. Additionally, Minnesota Power provided more detail on the bidirectional capabilities for the HVDC line as a result of the HVDC modernization project and stated that Minnesota Power would be seeking one route permit for the combined facilities.[202]

a. Minnesota Department of Natural Resources

161. The DNR participates in the Commission review process, the Minnesota Conservation Explorer (MCE) concurrence, and the Public Water Inventory (PWI) crossings. These discussions included the following:

- On behalf of Minnesota Power, Merjent, Inc. submitted a formal Natural Heritage Review Request (2022-0070) on November 11, 2022, through the MCE.

[198] Ex. MP-104 at 102 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[199] Ex. MP-104 at 103 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[200] *See* Figure 3 of these Findings of Fact.
[201] Ex. MP-104 at 103 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[202] Ex. MP-104 at 103 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).

- On behalf of Minnesota Power, Merjent submitted introduction letters on December 16, 2023.[203]

5. Local Government Units

a. City of Hermantown

162. Minnesota Power met with John Mulder, the City Administrator of the City of Hermantown, on November 9, 2022. Minnesota Power provided an overview of the proposed project and a summary of the proposed activities and timeline. The City had some general project layout and land acquisition questions.[204]

b. Solway Township

163. Minnesota Power met with the Solway Town Board Chair, Town Supervisors, Town Clerk, and Town Treasurer on November 15, 2022. Minnesota Power provided an overview of the proposed project and a summary of the proposed activities and timeline. The Township had some general project layout and noise questions.[205]

VII. Certificate of Need Criteria

164. Minn. Stat. § 216B.243 identifies the criteria the Commission must evaluate when assessing the need for a large energy facility, which includes:

> (1) the accuracy of the long-range energy demand forecasts on which the necessity for the facility is based;
>
> (2) the effect of existing or possible energy conservation programs under Minn Stat. §§ 216C.05 to 216C.30 and 216B.243 or other federal or state legislation on long-term energy demand;
>
> (3) in the case of a high-voltage transmission line, the relationship of the proposed line to regional energy needs, as presented in the transmission plan submitted under Minn. Stat. § 216B.2425;
>
> (4) promotional activities that may have given rise to the demand for this facility;
>
> (5) benefits of this facility, including its uses to protect or enhance environmental quality, and to increase reliability of energy supply in Minnesota and the region;
>
> (6) possible alternatives for satisfying the energy demand or transmission needs including but not limited to potential for increased efficiency and upgrading of existing energy generation and

[203] Ex. MP-104 at 103 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[204] Ex. MP-104 at 103 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[205] Ex. MP-104 at 104 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).

transmission facilities, load-management programs, and distributed generation;

(7) the policies, rules, and regulations of other state and federal agencies and local governments;

(8) any feasible combination of energy conservation improvements, required under Minn. Stat. § 216B.241, that can (i) replace part or all of the energy to be provided by the proposed facility, and (ii) compete with it economically;

(9) with respect to a high-voltage transmission line, 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;

(10) whether the applicant is in compliance with applicable provisions of Minn. Stat. §§ 216B.1691 and 216B.2425, subd. 7, and has filed or will file by a date certain an application for certificate of need under Minn. Stat. § 216B.243 or for certification as a priority electric transmission project under Minn. Stat. § 216B.2425 for any transmission facilities or upgrades identified under Minn. Stat. § 216B.2425, subd. 7;

(11) whether the applicant has made the demonstrations required under Minn. Stat. § 216B.243, subd. 3a; and

(12) if the applicant is proposing a nonrenewable generating plant, the applicant's assessment of the risk of environmental costs and regulation on that proposed facility over the expected useful life of the plant, including a proposed means of allocating costs associated with that risk.[206]

165. Minn. R. 7849.0120 further provides that the Commission shall grant a certificate of need if it determines that:

A. The probable result of denial would have an adverse effect upon 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, considering:

(1) the accuracy of the applicant's forecast of demand for the type of energy that would be supplied by the proposed facility;

[206] Minn. Stat. § 216B.243, subd. 3.

(2) the effects of the applicant's existing or expected conservation programs and state and federal conservation programs;

(3) the effects of promotional practices of the applicant that may have given rise to the increase in the energy demand, particularly promotional practices which have occurred since 1974;

(4) the ability of current facilities and planned facilities not requiring certificates of need to meet the future demand; and

(5) the effect of the proposed facility, or a suitable modification thereof, in making efficient use of resources;

B. A more reasonable and prudent alternative to the proposed facility has not been demonstrated by a preponderance of the evidence on the record, considering:

(1) the appropriateness of the size, the type, and the timing of the proposed facility compared to those of reasonable alternatives;

(2) the cost of the proposed facility and the cost of energy to be supplied by the proposed facility compared to the costs of reasonable alternatives and the cost of energy that would be supplied by reasonable alternatives;

(3) the effects of the proposed facility upon the natural and socioeconomic environments compared to the effects of reasonable alternatives; and

(4) the expected reliability of the proposed facility compared to the expected reliability of reasonable alternatives;

C. By a preponderance of the evidence on the record, the proposed facility, or a suitable modification of the facility, will provide benefits to society in a manner compatible with protecting the natural and socioeconomic environments, including human health, considering:

(1) the relationship of the proposed facility, or a suitable modification thereof, to overall state energy needs;

(2) the effects of the proposed facility, or a suitable modification thereof, upon the natural and socioeconomic environments compared to the effects of not building the facility;

(3) the effects of the proposed facility, or a suitable modification thereof, in inducing future development; and

(4) the socially beneficial uses of the output of the proposed facility, or a suitable modification thereof, including its uses to protect or enhance environmental quality; and

D. The record does not demonstrate that the design, construction, or operation of the proposed facility, or a suitable modification of the facility, will fail to comply with relevant policies, rules, and regulations of other state and federal agencies and local governments.

166. There is sufficient evidence in the record for the Judge to assess the proposed project using the criteria and factors set out above.

VIII. Application of Certificate of Need Criteria to the Proposed Project

167. No party disputes that the proposed HVDC project is necessary and no party contends that any of the criteria applicable to granting a certificate of need are not met in this case.

D. The Probable Result of Denial Would Be an Adverse Effect Upon 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

168. Minn. R. 7849.0120(A) requires consideration of several factors about the facility including, but not limited to, Applicant's forecasts, system capabilities, and conservation efforts as outlined in Minn. R. 7849.0270, Minn. R. 7849.0280, Minn. R. 7849.0290, Minn. R. 7849.0300, and Minn. R. 7849.0340.

169. Outages of the HVDC line impose costs, including congestion costs, costs to reserve transmission on another party's system, replacement energy costs, and lost production tax credits. Assuming current failure rates, the estimated outage-related costs are least $7 million per year and are likely substantially more.[207] Further, this estimate does not take into account inflation or the increasing frequency of outages, nor does it take into account the benefits from implementing updated technology as part of the modernization project, which Minnesota Power describes as substantial.

170. In addition, not implementing the modernization project would likely make it more difficult for Minnesota Power to meet Minnesota's "carbon free by 2050" mandate.[208] Currently, the HVDC line provides Minnesota with access to 600 MW of wind generation. If the line were to go out of service, Minnesota Power would likely be forced to replace the lost wind resources with more expensive, fossil-fueled generation.[209] Alternatively, if Minnesota Power were to attempt to reach its goal by investing in other carbon-free resources or transmission, this could result in other costs and delay.

[207] Ex. DOC DER 600 at 11 (Zajicek Direct).
[208] *Id*. at 12.
[209] *Id.*

171. Denial of the application would have an adverse effect on future adequacy, reliability, and efficiency of the energy supply. The following items are considered in reaching this conclusion.

1. Accuracy of the Applicant's Forecast of Demand for the Type of Energy That Would be Supplied by the Proposed Facility

172. Minn. R. 7849.0120(A)(1) requires consideration of "the accuracy of the applicant's forecast of demand for the type of energy that would be supplied by the proposed facility" when determining if denial of a certificate of need application would have an adverse effect.

173. The HVDC modernization project is intended to ensure that the HVDC system is capable of continuing to deliver the benefits of renewable resources that Minnesota Power owns in North Dakota to its customers located in Minnesota. Minnesota Power provided demand and forecast information for its system.[210]

174. The DOC-DER agrees with the need for this replacement to ensure the reliability of the electricity the HVDC line delivers in the face of increasing outages and the possible failure of the line altogether. Moreover, the DOC-DER agrees that the evidence shows Minnesota Power "provided adequate evidence that its forecast is accurate and demonstrates the need for the project."[211]

2. Effects of the Applicant's Existing or Expected Conservation Programs

175. Minn. R. 7849.0120(A)(2) is based on Minn. Stat. § 216B.243, subd. 3(2), which provides that "no proposed large energy facility shall be certified for construction unless the applicant can show that demand for electricity cannot be met for cost effectively through energy conservation and load management."

176. Minnesota Power provided information on its conservation improvement program and integrated resource plant filings.[212]

177. The DOC-DER agreed that "the Company's conservation programs do not ultimately affect the need for the project" and that Minnesota Power provided adequate information for the required statutory and rule requirements.[213]

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[210] Ex. MP-104 at Appendix N (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[211] Ex. DOC DER-600 at 13 (Zajicek Direct) (eDocket No. 20242-203452-01).
[212] Ex. MP-104 at Appendix C, Appendix E, and Appendix O (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[213] Ex. DOC DER-600 at 14 (Zajicek Direct) (eDocket No. 20242-203452-01).

3. Effects of Promotional Practices of the Applicant that May Have Given Rise to the Increase in the Energy Demand

178. Minn. R. 7849.0120(A)(3) is based on Minn. Stat. § 216B.243, subd. 3(4), which provides that the Commission shall evaluate whether applicant has undertaken promotional activities that may have given rise to the demand for this facility.

179. Minnesota Power did not conduct any promotional activities or events that have triggered the need for the HVDC modernization project. Instead, the project is needed to replace the aging HVDC system with current technology to enable and augment the renewable energy transition in Minnesota.[214]

180. The DOC-DER concluded that the project is "intended to replace facilities that have been in operation for 45 years, and not to serve new demand."[215]

4. The Ability of Current Facilities and Planned Facilities Not Requiring a Certificate of Need to Meet the Future Demand

181. Minn. R. 7849.0120(A)(4) mandates that consideration be given to whether current facilities or facilities not requiring a certificate of need could meet the future demand.

182. The HVDC modernization project is driven by the need to modernize the existing HVDC System, which is experiencing increasing outages.[216]

183. The DOC-DER found that Minnesota Power "provided significant discussion regarding the impacts of not implementing the Project" and that Minnesota Power "provided the required information."[217]

5. The Effect of the Proposed Facility, or a Suitable Modification Thereof, in Making Efficient Use of Resources

184. Minn. R. 7849.0120(A)(5) mandates that consideration be given to whether the proposed facility, or a suitable modification thereof, is making efficient use of resources.

185. Minnesota Power provided information to support that if the HVDC modernization project were not certified, Minnesota Power and its customers would experience increased congestion for its North Dakota wind resources and would likely increase replacement power costs or require the construction of alternative transmission or generation.[218]

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[214] Ex. MP-104 at 37 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[215] Ex. DOC DER-600 at 15 (Zajicek Direct) (eDocket No. 20242-203452-01).
[216] Ex. MP-104 at 3 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[217] Ex. DOC DER-600 at 15 (Zajicek Direct) (eDocket No. 20242-203452-01).
[218] Ex. MP-104 at 15-16 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).

186. The DOC-DER agreed that Minnesota Power "provided the required information regarding the efficient use of resources."[219]

187. The ATC alternative, whether an "alternative" or a "modification" under the law, would likewise make efficient use of resources, but without the long-term efficiencies anticipated by Minnesota Power's proposed configuration.[220]

6. A More Reasonable and Prudent Alternative to the Proposed Facility Has Not Been Demonstrated by a Preponderance of the Evidence on the Record, Considering Minn. R. 7849.0120(B)

188. Minnesota Power's burden of proof is met by providing evidence establishing the need and showing that its proposed configuration of the HVDC modernization project is a reasonable and prudent way to satisfy the articulated need. The burden falls on other parties to prove that any alternative they wish to sponsor is: (i) sufficiently presented in the record to be considered; and (ii) more reasonable and prudent than Minnesota Power's proposal. The Judge and the Commission "shall consider" only those alternatives for which "there exists substantial evidence on the record with respect to each of the criteria listed in part 7849.0120."[221] This rule requires opponents of the Minnesota Power proposed configuration of the project to establish existence and characteristics of a more reasonable and prudent alternative.[222]

189. Only when the proponent of an alternative demonstrates a "more reasonable and prudent alternative," will the applicant's proposal be denied certification.[223] If a party wants a particular alternative to be considered, that party must make sure that sufficient evidence is submitted to satisfy the Commission's requirement that "only those alternatives proposed before the close of the public hearing and for which there exists substantial evidence on the record with respect to each of the criteria listed in part 7849.0120" be considered.[224]

190. The ATC alternative would not obviate the need for, or replace, Minnesota Power's modernization project in its entirety. Instead, the Arrowhead alternative proposes a different route and point-of-interconnection.

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[219] Ex. DOC DER-600 at 16 (Zajicek Direct) (eDocket No. 20242-203452-01).
[220] The ATC alternative is discussed in detail under section VIII. B. 4., Different Transmission Endpoints, below.
[221] Minn. R. 7849.0110.
[222] "Under the certificate of need process established by statute and rule, and applicant bears the burden of proving the need for a proposed facility. An applicant fails to meet this burden when another party demonstrates that there is a more reasonable and prudent alternative to the facility proposed by the applicant. Minn. Stat. § 216B.243, subd. 3; Minn. R. 7851.0120, subp. 8. This regulatory scheme is simply a practical way to prevent the issuance of a certificate of need when there is a more reasonable and prudent alternative to the proposed facility without requiring the applicant to face the extraordinary difficulty of proving that there is not a more reasonable and prudent alternative." *In the Matter of the Application of the City of Hutchinson for a Certificate of Need to Construct a Large Natural Gas Pipeline*, 2003 WL 22234703 at *7 (interpreting parallel pipeline rule under Certificate of Need statute).
[223] *Id.*
[224] Minn. R. 7849.0110.

191. Minnesota Power provided extensive discussion in the record that analyzed alternatives to the HVDC modernization project. Additionally, Minnesota Power provided extensive record evidence that the Minnesota Power proposed configuration is a reasonable and prudent way to satisfy the articulated need for the project.[225] Moreover, ATC's alternative is not more reasonable and prudent. The following items are considered in reaching these conclusions.

7. Alternate Transmission Voltages and Technology

192. Minnesota Power evaluated different HVDC voltages, AC voltages, conductor configurations, and HVDC converter technologies when considering possible alternatives to the HVDC modernization project.[226]

193. The project involves replacing the converter stations at both ends of the existing HVDC line. The 465-mile HVDC line will continue to be operated on the existing structures, which were designed to operate at ±250 kV. To continue to use the HVDC line, the HVDC converter stations must be designed to the same voltage. If the HVDC transmission voltage were to be changed from ±250 kV, the entire 465-mile line would need to be rebuilt on new structures. This would significantly increase the scope and cost of the project. Therefore, alternative HVDC voltages are not a more reasonable and prudent alternative to the HVDC modernization project.[227]

194. The Minnesota Power proposed configuration of the HVDC modernization project involves interconnecting the new HVDC converter stations at 345 kV and then stepping down the voltage to 230 kV to allow for the new HVDC system to interconnect at the same point of interconnection used today: directly into the 230 kV Minnesota Power backbone system at the Minnesota Power Arrowhead 230 kV/115 kV Substation. Minnesota Power considered interconnecting the new HVDC converters directly to the 230 kV system. This would involve designing the HVDC converter transformers with a 230 kV winding on the AC system side rather than a 345 kV winding, and then building new 230 kV bays and transmission to connect to Arrowhead.

195. While this alternative would have a lower cost in the near term, the long-term cost would likely be significantly higher than developing an initial interconnection at 345 kV.[228] The northeastern Minnesota transmission system is built around a 230 kV backbone infrastructure.[229] However, as the regional transmission system continues to develop to support the clean energy transition, the region will eventually need a 345 kV backbone network. The HVDC system has long-term significance for the regional transmission system, enabling efficient and flexible long-distance transfer of high-value

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[225] Ex. MP-104 at 38-48 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); Ex. DOC DER-600 at 16-21 (Zajicek Direct) (eDocket No. 20242-203452-01); Exs. DOC DER-601 and DOC DER-602 at 3-8 (Zajicek Rebuttal) (eDocket Nos. 20243-204217-01, 20243-204348-01).
[226] Ex. MP-104 at 39-43 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[227] Ex. MP-104 at 39 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[228] Ex. MP-104 at 39 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[229] Ex. MP-121 at 6 (Winter Direct) (eDocket Nos. 20242-203446-08, 20242-203443-10, 20242-203443-08, 20242-203443-06, 20242-203446-07, 20242-203443-09, 20242-203443-07, 20242-203443-05).

and zero fuel cost renewable energy resources in North Dakota to customers throughout the MISO area. As the use and significance of this existing HVDC system evolves over the life of the proposed HVDC converter stations, it will become increasingly important for the HVDC system to be directly interconnected to the regional 345 kV network, rather than the underlying local 230 kV network. However, to move the point of interconnection from the 230 kV system to the 345 kV system later would require an expensive replacement of the converter transformers to change the winding voltage on the AC-system side. Because the HVDC converter transformers account for approximately 20 percent of the overall cost of the HVDC converter station itself, there would be a significant sunk cost at the time the transition from 230 kV to 345 kV is made in the future, when conditions warrant this interconnection. Therefore, alternative AC transmission voltages are not a more reasonable or prudent alternative to the HVDC modernization project.[230]

196. The HVDC modernization project does not include any modifications to the HVDC line beyond the short reconfiguration into the new HVDC converter station. Therefore, double-circuiting the HVDC line would not be a reasonable alternative to the HVDC modernization project as system conditions do not currently warrant modifications to the HVDC line.[231] Minnesota Power did propose to double-circuit the 230 kV AC transmission line between the new St. Louis County 345 kV/230 kV Substation and the existing Minnesota Power 230 kV/115 kV Substation to maintain the point of interconnection as it exists today. This would minimize vegetation clearing and potential impacts to the West Rocky Run Creek.[232] Minnesota Power has incorporated double-circuit construction to the extent practicable into its configuration of the project.

197. The configuration of the HVDC modernization project proposed by Minnesota Power includes AC interconnection facilities required to connect the new HVDC converter stations to the existing 230 kV backbone AC transmission system. The specific conductors for the proposed AC transmission lines have yet to be determined but will consist of ACSR or possibly ACSS wire and are likely to utilize bundled configurations (e.g., two subconductors per phase). The conductors will be selected according to the near-term and long-term capacity needs of the proposed transmission lines, while also considering electrical performance characteristics, such as electric and magnetic fields, audible noise, and radio interference, as well as the lifecycle operating and maintenance costs. The conductor for the short segment of new ±250 kV HVDC line is anticipated to be 2839 ACSR to match the existing HVDC line conductor. This conductor is necessary to facilitate the full capacity of the HVDC line, and there are limited or no feasible alternatives at this time.[233] Minnesota Power has sufficiently identified the parameters that will be used in final design to identify the final conductors for the configuration of the proposed project.

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[230] Ex. MP-104 at 39-40 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[231] Ex. MP-104 at 40 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[232] Ex. MP-129 at 5 (McCourtney Rebuttal) (eDocket Nos. 20243-204225-08, 20243-204225-07); DOC-EERA Hearing Comments at 2 (Apr. 15, 2024) (eDocket Nos. 20244-205360-01, 20244-205360-02).
[233] Ex. MP-104 at 40 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).

198. Minnesota Power considered converting the HVDC line to AC to avoid having to replace the HVDC converter stations. To do this, the entire 465-mile line would need to be rebuilt to AC transmission specifications and new substations would be needed at either end. Depending on the voltage selected for this alternative (345 kV, 500 kV, or 765 kV), large power transformers would be necessary to step down the voltage to 230 kV. Additional mid-line interconnections to the underlying system would also be required to reduce line lengths and facilitate the interconnection of new reactive support. This reactive support would be necessary because AC transmission lines consume significant amounts of reactive power proportionally to their transfer capacity and line length. In this case, an exceptionally long high-capacity AC transmission line would be required to replace the HVDC line, driving the need for substantial amounts of reactive power compensation.

199. Changing the line from HVDC to AC would also raise significant constructability concerns due to the need to remove the existing line before replacing it with the new AC transmission lines. To avoid constructability concerns, the new line could be built next to the existing HVDC line corridor, but this would create additional human settlement, socioeconomic, and environmental impacts that are well beyond the limited impacts of the proposed project.

200. Minnesota Power also looked at retiring the HVDC line and making various AC transmission network upgrades. In order to facilitate delivery of Minnesota Power's existing wind generation resources in North Dakota to northeastern Minnesota, more than 750 miles of AC transmission lines (345 kV, 230 kV, and 115 kV) would need to be constructed, with a cost more than 70 percent higher than the proposed project.[234]

201. Minnesota Power sufficiently analyzed converting the HVDC line to AC transmission or retiring the HVDC system and building out necessary AC transmission. Neither of these alternatives are a more reasonable and prudent alternative than the proposed project.

202. Minnesota Power explored different converter technologies for the HVDC converter stations. Through this analysis, Minnesota Power evaluated both 1970s-era line commutated converter (LCC) HVDC technology and current best-available voltage source converter (VSC) HVDC technology. While earlier Minnesota Power evaluation efforts focused on in-kind replacement of the existing LCC with new LCC converters retrofitted into the existing infrastructure, evolving near-term and long-term needs for renewable energy integration and robust grid-supporting transmission technologies initiated a shift in Minnesota Power's outlook for the modernization project in the early 2020s.

203. VSC HVDC technology started to eclipse LCC HVDC technology in the global market and long-term transmission needs in northeastern Minnesota began to take shape between 2020 and 2022.[235] Advantages of LCC HVDC technology compared to

[234] Ex. MP-104 at 41-43 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[235] Ex. MP-121 at 10 (Winter Direct) (eDocket Nos. 20242-203446-08, 20242-203443-10, 20242-203443-08, 20242-203443-06, 20242-203446-07, 20242-203443-09, 20242-203443-07, 20242-203443-05).

VSC technology include lower converter station operating losses (primarily due to fewer power electronics components and smaller buildings compared to VSC), faster recovery for faults on the HVDC line, and generally lower direct installed cost.

204. With respect to the advantages and disadvantages of LCC converters compared to VSC converters, and particularly considering the higher installed cost of VSC, it is important to develop a holistic comparison of the two technology options. For LCC HVDC converters to achieve similar performance attributes as VSC HVDC converters, LCC HVDC converters require additional supporting system upgrades, the cost of which tends to result in a more equal cost comparison between the two technologies, particularly in the rapidly changing operational environment created by the clean energy transition. Even then, the inherent advantages of VSC technology make it nearly impossible to develop a comprehensive alternative utilizing LCC converters.[236]

205. Accordingly, Minnesota Power's proposed use of VSC converters is reasonable and prudent for the modernization project.

8. Generation Alternatives

206. Minnesota Power evaluated several different generation alternatives to the HVDC modernization project. Minnesota Power concluded that generation was not a reasonable alternative. Any additional generation resources would require further transmission system build-out. Generation resources would also not address the need for Minnesota Power to be able to deliver power from its wind generation resources in North Dakota to its customers in Minnesota.[237]

207. The DOC-DER agreed with Minnesota Power that generation alternatives are not a reasonable or prudent alternative to the proposed project.[238] Generation is not a reasonable and prudent alternative to the HVDC modernization project.

9. No Build Alternative

208. If the HVDC modernization project is not certified by the Commission, failure rates of the existing HVDC converter station equipment will continue to increase. This will cause outages that impact the reliable and efficient delivery of Minnesota Power's North Dakota wind energy and result in direct cost impacts to Minnesota Power's customers. There will be reliability impacts to the regional transmission system as well. As these outages increase in frequency and duration, the cost and reliability impacts will continue to grow. With no viable plan to modernize the existing HVDC converters, Minnesota Power would immediately need to determine if it was prudent to invest in relatively short-term fixes to keep the HVDC line operating on a limited basis or to move on from the HVDC line entirely and begin to develop alternative AC transmission solutions. This would

[236] Ex. MP-104 at 43-45 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[237] Ex. MP-104 at 39 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[238] Ex. DOC DER-600 at 16-21 (Zajicek Direct) (eDocket No. 20242-203452-01); Exs. DOC DER-601 and DOC DER-602 at 3-8 (Zajicek Rebuttal) (eDocket Nos. 20243-204217-01, 20243-204348-01).

require purchasing replacement power for Minnesota Power's customers during any outages at a substantial cost.[239]

209. The DOC-DER agreed that the no build alternative would require more expensive AC transmission system upgrades.[240] The no build alternative is not a more reasonable and prudent alternative when compared to the proposed project.

10. Different Transmission Endpoints, Including ATC Alternative

210. Minnesota Power evaluated different transmission endpoints prior to submitting its Combined Application that included the proposed configuration of the HVDC modernization project. Minnesota Power concluded that there were no feasible endpoints other than the proposed configuration.[241] Minnesota Power evaluated and rejected interconnecting the new HVDC Converter Station in Minnesota to the ATC Arrowhead 345 kV/230 kV Substation because moving the point of interconnection for the HVDC System from the Minnesota Power Arrowhead 230 kV/115 kV Substation to the ATC Arrowhead 345 kV/230 kV Substation was an unnecessarily complex system alternative with transmission system performance impacts and project risks that were inconsistent with the purpose and need for the modernization project. Minnesota Power identified that the additional risks and complexities would have required additional studies due to extraneous power system modifications and would have introduced certain regulatory considerations, project development and timing impacts, and operations and maintenance impacts.[242]

211. Prior to rejecting an interconnection at the ATC Arrowhead 345 kV/230 kV Substation, Minnesota Power met with ATC in September 2022 and October 2022. At the time of the September 2022 meeting, Minnesota Power was actively evaluating system alternatives for the HVDC modernization project. During the meeting, ATC informed Minnesota Power that, if it wanted to connect the HVDC system to the ATC Arrowhead 345 kV/230 kV Substation, ATC would expect that a new Transmission-Transmission Interconnection Request (TTIR) would need to be filed. ATC also directed Minnesota Power to review ATC's current Interconnection Guidelines.[243] Minnesota Power and ATC disagree as to the length of time to develop and file a new TTIR.[244]

212. Minnesota Power continued its evaluation and met with ATC in October 2022. During the intervening weeks, Minnesota Power identified that connecting the HVDC system to the ATC Arrowhead 345 kV/230 kV Substation would likely result in

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[239] Ex. MP-104 at 46 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[240] Exs. DOC DER-601 and DOC DER-602 at 5 (Zajicek Rebuttal) (eDocket Nos. 20243-204217-01, 20243-204348-01).
[241] Ex. MP-104 at 40 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[242] Ex. MP-121 at 52-53 (Winter Direct) (eDocket Nos. 20242-203446-08, 20242-203443-10, 20242-203443-08, 20242-203443-06, 20242-203446-07, 20242-203443-09, 20242-203443-07, 20242-203443-05).
[243] Ex. MP-121 at 53 (Winter Direct) (eDocket Nos. 20242-203446-08, 20242-203443-10, 20242-203443-08, 20242-203443-06, 20242-203446-07, 20242-203443-09, 20242-203443-07, 20242-203443-05).
[244] Ex. MP-109 at 28 (Gunderson); Ex. ATC-200 at 16-17 (McKee Direct); Ex. ATC-202 at 17-18 (McKee Rebuttal).

unnecessary complexity. This complexity included the need to request a new TTIR on an unknown timeline, regulatory concerns about an 800 MVA power flow limitation at the ATC Arrowhead 345 kV/230 kV Substation, and the cost to the project of maintaining that power flow limitation. At the October meeting, Minnesota Power shared that internal discussions regarding the two points of interconnection were ongoing and Minnesota Power would follow up with ATC.

213. On October 14, 2022, four days after the meeting, Minnesota Power informed ATC that it would be proceeding with the Minnesota Power proposed configuration of the project.[245]

214. On September 15, 2023, as part of the EA scoping comment process in this proceeding, ATC requested that the EA study the ATC alternative.[246] The ATC alternative would require that the point of interconnection of the HVDC system into the existing AC transmission system be relocated from the Minnesota Power Arrowhead 230 kV/115 kV Substation to the ATC Arrowhead 345 kV/230 kV Substation. The ATC alternative would include: the construction of the HVDC converter station in Minnesota; the addition of a second HVDC/345 kV transformer at the HVDC converter station; construction of a double-circuit 345 kV transmission line between the HVDC converter station and the ATC Arrowhead 345 kV/230 kV Substation; installation of a 345 kV/230 kV transformer at the ATC Arrowhead 345 kV/230 kV Substation; removal of the existing phase-shifting transformer at the ATC Arrowhead 345 kV/230 kV Substation; removal of the capacitor banks at the ATC Arrowhead 345 kV/230 kV Substation; and reconfiguration work at the 230 kV bus inside the Minnesota Power Arrowhead 230 kV/115 kV Substation.[247] Under its proposal, ATC would construct, own, and operate the facilities to be located within the ATC Arrowhead 345 kV/230 kV Substation. Minnesota Power would construct, own, and operate all other HVDC modernization project facilities.[248]

215. Moving the point of interconnection between the HVDC system and the AC transmission system from the Minnesota Power Arrowhead 230 kV/115 kV Substation to the ATC Arrowhead 345 kV/230 kV Substation materially benefits ATC's regional 345 kV transmission in Wisconsin in at least three ways that are not observed with Minnesota Power's proposed configuration of the project. First, additional power would flow from the HVDC system into Wisconsin and away from Minnesota Power's customers. Second, it would remove the grid support of the HVDC system from Minnesota Power's 230 kV local transmission system. Third, it would reduce the impedance between Minnesota Power's 230 kV local transmission system and ATC's 345 kV regional transmission system, further increasing power flow into Wisconsin while removing the ability to control and limit such

[245] Ex. MP-121 at 55-56 (Winter Direct) (eDocket Nos. 20242-203446-08, 20242-203443-10, 20242-203443-08, 20242-203443-06, 20242-203446-07, 20242-203443-09, 20242-203443-07, 20242-203443-05).
[246] Ex. MP-132 (ATC EA Scoping Comment Letter) (eDocket Nos. 20239-198974-01 and 20239-198974-02).
[247] Ex. MP-121 at 58 (Winter Direct) (eDocket Nos. 20242-203446-08, 20242-203443-10, 20242-203443-08, 20242-203443-06, 20242-203446-07, 20242-203443-09, 20242-203443-07, 20242-203443-05).
[248] Ex. MP-130 at Rebuttal Schedule 21 (Winter Rebuttal) (eDocket Nos. 20243-204225-12, 20243-204225-11).

power flows. Each of these benefits to ATC is at the detriment to Minnesota Power's customers, even though Minnesota Power customers will pay the full cost of the Project.[249]

216. Minnesota Power demonstrated that the ATC alternative would result in additional power flow, potentially in the range of seven to ten percent (seven to ten MW per 100 MW of electricity delivered to northeastern Minnesota via the HVDC system), to the ATC transmission system in Wisconsin. This transfer of benefits would be at the detriment of Minnesota Power's customers and would be paid for entirely by Minnesota Power customers. Minnesota Power's study results show this additional power flow into Wisconsin "results in approximately 1 MW less of electrical losses compared to" the Minnesota Power proposed configuration.[250] This 1 MW loss occurs within a broad area of the MISO grid, consisting of thousands of MW of load served by multiple utilities. The losses are only a tiny fraction of a percentage of the total energy requirements in northeastern Minnesota.[251] Thus, this savings on electrical losses assumed by ATC does not make up for the approximately seven to ten percent of HVDC system delivered power that would flow into Wisconsin and away from Minnesota Power customers if the ATC alternative were implemented. While Minnesota Power customers will pay for the HVDC modernization project, the ATC alternative would transfer benefits away from Minnesota Power customers and to ATC's Wisconsin transmission system.

217. Minnesota Power demonstrated that the ATC alternative would remove Minnesota Power's grid-supporting VSC HVDC converter station from its point of interconnection on Minnesota Power's backbone 230 kV network, where Minnesota Power has identified a need for system strength and voltage support to serve its customers. Any grid support from the VSC HVDC converter station would be provided to ATC's proposed point of interconnection on ATC's regional 345 kV network if the Commission orders construction of the ATC alternative. The result would be improving reliability and transfer capability for the Wisconsin transmission system at the expense of Minnesota Power's customers.

218. ATC has confirmed that construction of the ATC alternative would provide reactive support from the VSC HVDC converter stations which would enable them to remove existing capacitor banks that currently provide reactive support at ATC's Arrowhead 345 kV/230 kV Substation.[252] If the Commission orders construction of the ATC alternative, the additional grid support from the VSC HVDC converters would also provide significant benefit to the regional transmission interface, enhancing ATC's ability to facilitate regional transfers into Wisconsin on its 345 kV system.[253] While Minnesota

[249] Ex. MP-121 at 37 and Direct Schedule (Winter Direct) (eDocket Nos. 20242-203446-08, 20242-203443-10, 20242-203443-08, 20242-203443-06, 20242-203446-07, 20242-203443-09, 20242-203443-07, 20242-203443-05); Ex. MP-130 at 17 and 21 (Winter Rebuttal) (eDocket Nos. 20243-204225-12, 20243-204225-11).
[250] Ex. ATC-244 at 12-13 and Table 1 (Dagenais Rebuttal) (eDocket No. 20243-204233-01).
[251] Ex. ATC-244 at 13 at Table 1 (Dagenais Direct) (eDocket No. 20242-203435-02).
[252] Ex. ATC-244 at 10 (Dagenais Direct) (eDocket No. 20242-203435-02).
[253] Ex. MP-121 at 38-39 (Winter Direct) (eDocket Nos. 20242-203446-08, 20242-203443-10, 20242-203443-08, 20242-203443-06, 20242-203446-07, 20242-203443-09, 20242-203443-07, 20242-203443-05).

Power customers will pay for the HVDC Modernization Project, the ATC alternative would transfer benefits away from Minnesota Power customers and to ATC's Wisconsin transmission system.

219. Minnesota Power demonstrated that the addition of a second 345 kV/230 kV transformer and the bypass of the existing 230 kV phase-shifting transformer at the ATC Arrowhead Substation, as proposed for the ATC alternative, would greatly reduce the impedance between the Minnesota Power 230 kV system and the ATC Wisconsin 345 kV network. Reducing the impedance of this interface would make it a more attractive path for power to flow, drawing more power into Wisconsin through the Minnesota Power 230 kV network.[254] When combined with the increased amount of power flowing from the HVDC line into Wisconsin due to interconnecting it at the ATC Arrowhead 345 kV Substation (as discussed above), the changes implemented for the ATC alternative would substantively increase and enhance ATC's ability to import power from northeastern Minnesota into Wisconsin through the ATC Arrowhead 345 kV/230 kV Substation.

220. At the same time, the removal of the phase-shifting transformer (and no installation of a new one) would eliminate the ability to control and limit power flows through the ATC Arrowhead 345 kV/230 kV Substation. This combination of impacts from the ATC alternative would also lead to ATC exceeding the 800 MVA condition placed on the ATC Arrowhead 345 kV/230 kV Substation by the Minnesota Environmental Quality Board (MEQB).[255] While Minnesota Power customers will pay for the HVDC modernization project, the ATC alternative would transfer benefits away from Minnesota Power customers and to ATC's Wisconsin transmission system.

221. The ATC estimate will increase when the tax gross-up is applied to the ATC alternative cost estimate.[256]

222. The ATC alternative would remove an existing PST at the substation and install a standard transformer for the new 345 kV interconnection with the HVDC system.[257] The PST ensures that power flows do not exceed 801 MVA at the ATC Arrowhead 345 kV/230 kV Substation. The ATC alternative would not be capable of implementation without the Commission removing an 800 MVA limitation that exists for the ATC Arrowhead 345 kV/230 kV Substation.

223. In March 2001, the MEQB issued an order granting a permitting exemption to Minnesota Power for the construction of the Arrowhead – Weston 345 kV transmission

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[254] Evid. Hrg. Tr. at 53:9-54:27 and 57:13-49:5 (Winter) (eDocket Nos. 20244-204885-02, 20244-204885-01).

[255] Ex. MP-121 at Section IV.B (Winter Direct) (eDocket Nos. 20242-203446-08, 20242-203443-10, 20242-203443-08, 20242-203443-06, 20242-203446-07, 20242-203443-09, 20242-203443-07, 20242-203443-05); Ex. MP-130 at 19-20 and 25 (Winter Rebuttal) (eDocket Nos. 20243-204225-12, 20243-204225-11).

[256] Ex. MP-130 at 39 and Rebuttal Schedule 24 (Winter Rebuttal) (eDocket Nos. 20243-204225-12, 20243-204225-11); Ex. ATC-265 (Corrections to Johanek Testimonies) (eDocket No. 20243-204506-02). Both parties provided flawed cost estimates, so they are not included here.

[257] Ex. MP-121 at Direct Schedule 1 (Winter Direct) (eDocket Nos. 20242-203446-08, 20242-203443-10, 20242-203443-08, 20242-203443-06, 20242-203446-07, 20242-203443-09, 20242-203443-07, 20242-203443-05).

line and the ATC Arrowhead Substation.[258] In that order, the MEQB included a condition that the ATC Arrowhead 345 kV/230 kV Substation could not be used to "transmit power . . . beyond 800 MVA."[259]

224. The decision by the MEQB to limit power flow at the ATC Arrowhead 345 kV/230 kV Substation was the result of a discussion by the MEQB commissioners related to power flow concerns from the western states to those states east of Minnesota, as well as the impact of that increased power generation on mercury levels in Minnesota's environment.[260]

225. During deliberations on granting the permitting exemption, the MEQB commissioners and staff referenced a memorandum prepared by one of the other commissioners who was unable to attend the deliberations.[261] That memorandum stated concerns about the proposed west-to-east power flow and suggested an 800 MVA limitation on power flow for the ATC Arrowhead 345 kV/230 kV Substation.[262]

226. The MEQB commissioners at the hearing unanimously approved amending the administrative law judge's report to impose a power flow limitation of 800 MVA.[263] This condition on the ATC Arrowhead 345 kV/230 kV Substation limiting the power flow to 800 MVA remains in place today.[264]

227. ATC has not initiated a proceeding with the Commission requesting removal of the 800 MVA limitation on the ATC Arrowhead 345 kV/230 kV Substation.[265] To

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[258] Minnesota Power obtained the initial permitting exemption as it was acting as the construction manager for the Minnesota portion of the ATC Arrowhead – Weston 345 kV transmission line (including the ATC Arrowhead 345 kV/230 kV Substation). While the permitting exemption was in the name of Minnesota Power when it was issued in 2001, the permissions and conditions were transferred to ATC in 2005 in MPUC Docket No E015/M-04-2020. Minnesota Power was the construction manager for the Minnesota Portion of the Arrowhead – Weston 345 kV Project.

[259] Ex. MP-121 at 67 and Direct Schedule 31 (Winter Direct) (eDocket Nos. 20242-203446-08, 20242-203443-10, 20242-203443-08, 20242-203443-06, 20242-203446-07, 20242-203443-09, 20242-203443-07, 20242-203443-05).

[260] Ex. MP-121 at 68 and Direct Schedule 33 (Winter Direct) (eDocket Nos. 20242-203446-08, 20242-203443-10, 20242-203443-08, 20242-203443-06, 20242-203446-07, 20242-203443-09, 20242-203443-07, 20242-203443-05).

[261] Ex. MP-121 at 68-69 and Direct Schedules 33 and 34 (Winter Direct) (eDocket Nos. 20242-203446-08, 20242-203443-10, 20242-203443-08, 20242-203443-06, 20242-203446-07, 20242-203443-09, 20242-203443-07, 20242-203443-05).

[262] Ex. MP-121 at Direct Schedule 34 (Winter Direct) (eDocket Nos. 20242-203446-08, 20242-203443-10, 20242-203443-08, 20242-203443-06, 20242-203446-07, 20242-203443-09, 20242-203443-07, 20242-203443-05).

[263] Ex. MP-121 at Direct Schedule 33 at 87 (Winter Direct) (eDocket Nos. 20242-203446-08, 20242-203443-10, 20242-203443-08, 20242-203443-06, 20242-203446-07, 20242-203443-09, 20242-203443-07, 20242-203443-05).

[264] Exs. DOC DER-601 and DOC DER-602 at 9 (Zajicek Rebuttal) (eDocket Nos. 20243-204217-01, 20243-204348-01) ("To interconnect the HVDC Modernization Project at ATC's Arrowhead 345 kV Substation [which would be necessary for implementation of the ATC alternative], the 801 MVA limit would have to be reexamined and lifted.").

[265] Ex. ATC-244 at 48 (Dagenais Rebuttal) (eDocket No. 20243-204233-01); Evid. Hrg. Tr. at 111:3-112:13 (Dagenais) (eDocket Nos. 20244-204885-02, 20244-204885-01).

maintain the 800 MVA limitation, ATC would need to keep the existing PST at the substation and install a new 345 kV PST at an addition cost of at approximately $31 million to implement the ATC alternative.[266]

228. The reasons for the inclusion of the 800 MVA limitation and the related PST are beyond the scope of this proceeding. Thus, consideration of that limitation requires a proper request by ATC to reexamine the limitation.

229. Minnesota Power has secured an in-service date for its proposed configuration for the HVDC modernization project of April 2030.[267] However, Minnesota Power stated in the Combined Application that the 2030 in-service date is three years later than the originally-desired in-service date.[268] This delay was because the HVDC supplier could only guarantee Minnesota Power an April 2030 in-service date due to its own supply and manufacturing limitations when considered alongside the number of equipment requests it already has with earlier confirmed in-service dates. Because of this, Minnesota Power has continued to accelerate study and design work necessary to proceed with the project quickly if the HVDC supplier can achieve an earlier in-service date.[269]

230. On March 1, 2024, the HVDC supplier notified Minnesota Power that it would like to discuss moving to an earlier guaranteed in-service date.[270] The actions Minnesota Power has taken to date would allow it to be ready to move forward with a guaranteed in-service date from the HVDC supplier as early as 2028.[271]

231. ATC has only provided evidence on this record that it could achieve the April 2030 in-service date for the ATC alternative.[272] To vacate the System Impact Studies completed for Minnesota Power's proposed configuration and complete the requisite study work before the ATC alternative could be implemented, MISO confirmed that MISO's transmission service request process would need to "start again."[273] MISO estimated that the process could take 300 days.[274] This is consistent with Minnesota Power's estimate for the additional study review by MISO.[275] Based on this information,

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[266] Ex. MP-130 at Rebuttal Schedule 24 (Winter Rebuttal) (eDocket Nos. 20243-204225-12, 20243-204225-11).
[267] Ex. MP-104 at 12 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[268] Ex. MP-104 at 17 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[269] Ex. MP-104 at 17-18 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[270] Ex. MP-131 at 40 and Rebuttal Schedule 25 (Winter Rebuttal)(TS) (eDocket Nos. 20243-204225-10, 20243-204225-09).
[271] Ex. MP-130 at 15 and 40 (Winter Rebuttal) (eDocket Nos. 20243-204225-12, 20243-204225-11).
[272] Ex. ATC-205 at 9 (Johanek Direct) (eDocket No. 20242-203434-10); Ex. ATC-207 (Johanek Direct Schedule 2) (eDocket No. eDocket No. 20242-203434-14).
[273] Exs. DOC DER-601 and DOC DER-602 at Schedule MZ-R-11 at 1 (Zajicek Rebuttal) (eDocket Nos. 20243-204217-01, 20243-204348-01).
[274] Exs. DOC DER-601 and DOC DER-602 at Schedule MZ-R-11 at 1 (Zajicek Rebuttal) (eDocket Nos. 20243-204217-01, 20243-204348-01).
[275] Ex. MP-121 at 33-34 (Winter Direct) (eDocket Nos. 20242-203446-08, 20242-203443-10, 20242-203443-08, 20242-203443-06, 20242-203446-07, 20242-203443-09, 20242-203443-07, 20242-203443-05).

the DOC-DER concluded that "achieving an in-service date earlier than 2030 is unlikely."[276]

232. The MISO process timing does not account for the additional time that will be necessary to develop the studies required by the HVDC supplier.[277] Minnesota Power worked with the HVDC owners' engineer to assess additional studies that would be necessary to implement the ATC alternative. The result of those conversations indicates that the ATC alternative would not be able to achieve the necessary timing milestones to deliver an April 2030 in-service date.[278]

233. The ATC alternative would not be able to achieve the desired earlier in-service date that would be available in the Minnesota Power proposal. Further, based on coordination with the HVDC supplier related to pre-design study work, Minnesota Power has shown that the requisite additional study work could not be completed by ATC for the HVDC supplier to continue to guarantee a 2030 in-service date.

234. The DOC-EERA evaluated the potential impacts to the natural and socioeconomic environments for Minnesota Power's proposed configuration and the ATC alternative in the EA developed for the HVDC modernization project.[279] The DOC-EERA's analysis indicated that potential impacts to the natural and socioeconomic environments are anticipated to be minimal with a couple of exceptions.[280] The DOC-EERA anticipates that the following elements have the potential for moderate impacts: (1) aesthetics, surface water, and topography for both Minnesota Power's proposed configuration and the ATC alternative; and (2) cultural values for those who place a high value on the rural nature of the project area for Minnesota Power's proposed configuration.[281]

235. The DOC-EERA clarified that, "[o]n whole, impacts are anticipated to be moderate for both options. However, the ATC alternative infrastructure and subsequent clearing is farther away from residents."[282]

236. Finally, the DOC-EERA differentiated the two system alternatives related to impacts to the West Rocky Run Creek. Both Minnesota Power's proposed configuration and the ATC alternative will require crossings of the creek that are near where the current ROW is cleared. However, the Minnesota Power change will result in vegetation regrowth,

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[276] Exs. DOC DER-601 and DOC DER-602 at 29-30 (Zajicek Rebuttal) (eDocket Nos. 20243-204217-01, 20243-204348-01).
[277] Ex. MP-121 at 34 (Winter Direct) (eDocket Nos. 20242-203446-08, 20242-203443-10, 20242-203443-08, 20242-203443-06, 20242-203446-07, 20242-203443-09, 20242-203443-07, 20242-203443-05).
[278] Ex. MP-130 at Rebuttal Schedule 27 (Winter Rebuttal) (eDocket Nos. 20243-204225-12, 20243-204225-11) (showing that an October 1, 2026 study completion date is necessary for the HVDC supplier to achieve an April 2030 in-service date, but that the HVDC supplier does not believe the requisite studies for the ATC alternative could be completed until September 17, 2027).
[279] Ex. DOC EERA-515 (EA) (eDocket Nos. 20242-203954-04, 20243-204084-02); DOC-EERA Hearing Comments (Apr. 15, 2024) (eDocket Nos. 20244-205360-01, 20244-205360-02).
[280] Ex. DOC EERA-515 at Table 23 and Table 24 (EA) (eDocket Nos. 20242-203954-04, 20243-204084-02).
[281] Ex. DOC EERA-515 at Table 23 and Table 24 (EA) (eDocket Nos. 20242-203954-04, 20243-204084-02).
[282] Ex. DOC EERA-515 at Table 24 (EA) (eDocket Nos. 20242-203954-04, 20243-204084-02).

whereas the ATC alternative will result in the ROW remaining cleared "which could exacerbate warming impacts."[283] Thus, the ATC alternative does not provide significant environmental benefits when compared to Minnesota Power's proposal.

11. Appropriateness of the Size, Type, and Timing of the Proposed Facility Compared to Those of Reasonable Alternatives

237. Minn. R. 7849.0120(B)(1) requires that the size, type, and timing of the proposed facilities be evaluated relative to reasonable alternatives. "Size" refers to the quantity of power transfers that a particular alternative enables and whether it is sufficient to meet the identified need. "Type" refers to the transformer nominal rating, rated capacity, surge impedance loading, and nature (AC or DC) of the power transported. Timing refers to the in-service date for the proposed facilities.[284]

238. Minnesota Power considered different voltages for both the HVDC portions of the project, as well as AC voltages for interconnection into the existing area AC transmission system.[285]

239. In northeastern Minnesota, the 230 kV AC transmission system forms the current "backbone" of Minnesota Power's local northeastern Minnesota transmission system.[286] Minnesota Power demonstrated that it is important to maintain the point of interconnection for the new HVDC converter station at the existing HVDC point of interconnection - the 230 kV system at the Minnesota Power Arrowhead 230 kV Substation - to ensure the project does not create unintended consequences to other parts of the regional AC transmission system.[287]

240. The Applicant sought to ensure that the HVDC converter stations would be sized appropriately to allow for future system flexibility.[288] This flexibility is important given that the transformers at the HVDC converter stations account for 20 percent of the

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[283] Ex. DOC EERA-515 at 88-89 (EA) (eDocket Nos. 20242-203954-04, 20243-204084-02); Minnesota Power modified the Minnesota Power Proposed Configuration at West Rocky Run Creek from two parallel 230 kV lines as proposed in the Application to a double-circuit crossing in this location along with removal of the existing HVDC Line and allowing the right-of-way to revegetate in this area in response to feedback from the MnDNR. Ex. MP-120 at 11-12 (McCourtney Direct) (eDocket Nos. 20242-203446-10, 20242-203446-09); Ex. MP-129 at 3-6 (McCourtney Rebuttal) (eDocket Nos. 20243-204225-08, 20243-204225-07); Minnesota Power Comments on the EA (Mar. 28, 2024)(eDocket Nos. 20243-204709-01, 20243-204709-02); DOC-EERA Hearing Comments at 2-3 (Apr. 15, 2024) (eDocket Nos. 20244-205360-01, 20244-205360-02).

[284] *In the Matter of the Application of ITC Midwest LLC for a Route Permit for the Minnesota – Iowa 345 kV Transmission Line Project in Jackson, Martin and Faribault Counties*, Docket No. ET6675/TL-12-1337, ORDER GRANTING ROUTE PERMIT at 2 incorporating by reference ALJ FINDINGS OF FACT, CONCLUSIONS OF LAW, AND RECOMMENDATIONS at Finding 247 (Nov. 25, 2014).

[285] Ex. MP-104 at 38-48 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).

[286] Ex. MP-121 at 5 (Winter Direct) (eDocket Nos. 20242-203446-08, 20242-203443-10, 20242-203443-08, 20242-203443-06, 20242-203446-07, 20242-203443-09, 20242-203443-07, 20242-203443-05).

[287] Ex. MP-121 at 16-17 (Winter Direct) (eDocket Nos. 20242-203446-08, 20242-203443-10, 20242-203443-08, 20242-203443-06, 20242-203446-07, 20242-203443-09, 20242-203443-07, 20242-203443-05).

[288] Ex. MP-121 at 16 (Winter Direct) (eDocket Nos. 20242-203446-08, 20242-203443-10, 20242-203443-08, 20242-203443-06, 20242-203446-07, 20242-203443-09, 20242-203443-07, 20242-203443-05).

converter station cost.[289] Additionally, MISO Long-Range Transmission Planning has indicated the potential need for 345 kV transmission system expansion in northeastern Minnesota that coincides with the transition to renewable energy in Minnesota.[290]

241. Minn. Stat. § 216E.04, subd. 9(b) provides that the Commission "may order the construction of high-voltage transmission line facilities that are capable of expansion in transmission capacity through multiple circuiting or design modifications." The Commission has ordered such expandability previously when considering large investment transmission line projects.[291]

242. Minnesota Power has incorporated expandability into its proposed configuration of the project to create optionality and flexibility for the HVDC system's capacity to be increased by 350 MW (to 900 MW) for the transmission service requests held by Minnesota Power for the benefit of its customers, with potential future modifications to the existing HVDC line, which would be increased another 600 MW (to 1500 MW) if the HVDC line is rebuilt.[292] Neither of these increases are included in this proceeding.[293] The incorporation of these expandability and flexibility features into Minnesota Power's proposed configuration accounts for approximately $100 million of the $800 million project cost.[294]

243. LPI expressed concerned that "the costs associated with the expandability beyond fulfilling the size capability needed for Minnesota Power's customers should be subject to cost sharing and assigned to those that benefit."[295]

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[289] Ex. MP-104 at 39-40 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[290] Ex. MP-121 at 17-18 (Winter Direct) (eDocket Nos. 20242-203446-08, 20242-203443-10, 20242-203443-08, 20242-203443-06, 20242-203446-07, 20242-203443-09, 20242-203443-07, 20242-203443-05).
[291] *In the Matter of the Application of Great River Energy, Northern States Power Company (d/b/a Xcel Energy) and Others for Certificates of Need for the CapX 345-kV Transmission Projects*; Docket No. ET2/E002, *et al.*/CN-06-1115, ORDER GRANTING CERTIFICATES OF NEED WITH CONDITIONS at Order Point 3 (May 22, 2009) (Commission ordered construction of the Upsized Alternative, which leveraged the needed 345 kV transmission structures by ordering that they be constructed to 345 kV/345 kV double-circuit compatible, with the second circuit positions available for future needs. Fifteen years later, projects are currently being planned or evaluated to install the second circuit on the majority of these lines, including some which are part of the MISO LRTP).
[292] The Judge takes notice that on May 8, 2024, the Federal Energy Regulatory Commission (FERC) accepted for filing the facilities construction agreements (FCAs) executed between Minnesota Power and MISO for the 350 MW of transmission service requests in FERC Docket No. Docket No. ER24-1440-000. The FCAs were not protested by any person after FERC issued the required federal notice. ATC objected to the inclusion of this fact, arguing that it did not have the opportunity to challenge the underlying facts of the FCAs and that it is not relevant. The Judge finds, however, that the only fact noted here is what occurred, not the substance of what occurred. Moreover, while the fact is not directly relevant to the outcome of this case, it is noted in this footnote to the finding of fact about Minnesota Power's design for expandability because that is a significant function of how Minnesota Power and MISO proceed, and so relevant to that limited extent.
[293] Ex. MP-130 at 5-6 (Winter Rebuttal) (eDocket Nos. 20243-204225-12, 20243-204225-11).
[294] Ex. MP-127 at 18 (Gunderson Rebuttal) (eDocket Nos. 20243-204225-06, 20243-204225-05).
[295] Ex. LPI-301 at 12 (Maini Rebuttal) (eDocket No. 20243-204237-04).

244. To be eligible for cost allocation, the HVDC modernization project would need to meet the cost allocation criteria outlined in the MISO Tariff to be classified as a multi-value project or a market efficiency project, which generally focus on regional and market benefits. The HVDC modernization project is essential for Minnesota Power customers to replace aging assets and to continue to deliver low-cost renewable energy to its customers. Thus, it has not yet been determined by MISO whether Minnesota Power's proposal meets the criteria for regional cost allocation.[296]

245. While Minnesota Power has an immediate need for 550 MW of the capacity on the HVDC system, securing the additional 350 MW in capacity ensures a continued benefit for Minnesota Power customers.[297] If Minnesota Power has a resource need for the 350 MW of capacity, it will hold that priority on the HVDC system.[298] If Minnesota Power does not have a resource need for the 350 MW of capacity when the project is placed in service, Minnesota Power can assign all or part of its rights to this capacity on a limited basis, which will lead to a financial benefit to Minnesota Power customers.[299]

246. Further, if MISO identifies that an increase in capacity of the HVDC system is above what is needed for Minnesota Power customers, MISO could determine that costs necessary to effectuate those increases could be subject to cost allocation.[300] Therefore, while the HVDC modernization project, itself, is not eligible for cost allocation through MISO, Minnesota Power continues to explore opportunities for cost allocation associated with the potential future expansion.[301]

247. In an effort to offset the $100 million incremental cost for this expandability and flexibility, Minnesota Power has obtained state and federal grant funding in the amount of $75 million for the necessary equipment.[302] Based on a concept paper submitted by Minnesota Power in January 2024, the United States Department of Energy (DOE) invited the Applicant to submit a full application for another $50 million through the DOE Grid Resilience and Innovation Partnership (GRIP) Program round two funding opportunity. The grant funding is based on Minnesota Power's proposed configuration of the project.[303] Minnesota Power is working on this grant application and continues to

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[296] Ex. MP-127 at 18 (Gunderson Rebuttal) (eDocket Nos. 20243-204225-06, 20243-204225-05).
[297] Ex. MP-127 at 21, Rebuttal Schedule 9, and Rebuttal Schedule 10 (Gunderson Rebuttal) (eDocket Nos. 20243-204225-06, 20243-204225-05).
[298] Ex. MP-127 at 21 (Gunderson Rebuttal) (eDocket Nos. 20243-204225-06, 20243-204225-05).
[299] Ex. MP-127 at 21, Rebuttal Schedule 9, and Rebuttal Schedule 10 (Gunderson Rebuttal) (eDocket Nos. 20243-204225-06, 20243-204225-05).
[300] Ex. MP-127 at 18-19, Rebuttal Schedule 7, and Rebuttal Schedule 8 (Gunderson Rebuttal) (eDocket Nos. 20243-204225-06, 20243-204225-05).
[301] Ex. MP-127 at 20 (Gunderson Rebuttal) (eDocket Nos. 20243-204225-06, 20243-204225-05); Ex. MP-130 at 8-11 (Winter Rebuttal) (eDocket Nos. 20243-204225-12, 20243-204225-11); Ex. DOC DER-600 at 7 (Zajicek Rebuttal) (eDocket Nos. 20243-204217-01, 20243-204348-01).
[302] Ex. MP-127 at 20 (Gunderson Rebuttal) (eDocket Nos. 20243-204225-06, 20243-204225-05); Ex. MP-130 at 10 (Winter Rebuttal) (eDocket Nos. 20243-204225-12, 20243-204225-11).
[303] Ex. MP-127 at 6-7 (Gunderson Rebuttal) (eDocket Nos. 20243-204225-06, 20243-204225-05). This potential funding is specific to the implementation of the St. Louis County 345 kV/230 kV Substation and is not available to the ATC alternative. Ex. MP-127 at 6 (Gunderson Rebuttal) (eDocket Nos. 20243-204225-06, 20243-204225-05).

evaluate whether there are other opportunities available to defray some of the overall cost of the project for Minnesota Power's customers.

248. If the option for future expandability is removed from the project, the cost of the overall project would decrease by approximately $100 million.[304] However, with this $100 million reduction, Minnesota Power would also lose the applicable grant funding (up to $75 million and possibly more) and face higher costs for expansion in the future.[305] Moreover, while the HVDC modernization project, itself, is not eligible for cost allocation through MISO, Minnesota Power continues to explore opportunities for cost allocation associated with the potential future expansion.[306]

249. The ATC alternative does not require construction of a new substation and, therefore, does not require a 230 kV double-circuit transmission line. The ATC Arrowhead Substation is immediately adjacent to, and already interconnected with, the Minnesota Power Arrowhead Substation.[307]

250. Minnesota Power's proposed configuration of the HVDC modernization project appropriately incorporates future optionality and expandability opportunities.

251. Minnesota Power evaluated other AC transmission solutions at various voltages.[308] All of these alternatives were determined to either not meet the needs of the modernization project or were economically not viable alternatives.[309]

252. The HVDC modernization project is expected to be in service no later than April 2030. Minnesota Power is actively working with the HVDC supplier to determine if this can be moved to as early as 2028. Minnesota Power's proposed configuration is positioned so that Minnesota Power can take advantage of an earlier in-service date, if practicable.[310]

253. No party disputed the need for the HVDC modernization project by April 2030. If the project were brought on-line earlier, ATC stated that it can reliably serve the project using the existing 345/230 kV transformer at its Arrowhead Substation until the new transformer is obtained and installed.[311] ATC has built an extended amount of scheduling contingency into the timeline, allowing for flexibility in completing portions of

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[304] Ex. MP-130 at 10 (Winter Rebuttal) (eDocket Nos. 20243-204225-12, 20243-204225-11); Ex. MP-127 at Rebuttal Schedule 10 (Gunderson Rebuttal) (eDocket Nos. 20243-204225-06, 20243-204225-05).
[305] Ex. MP-130 at 10 (Winter Rebuttal) (eDocket Nos. 20243-204225-12, 20243-204225-11); Ex. MP-127 at Rebuttal Schedule 10 (Gunderson Rebuttal) (eDocket Nos. 20243-204225-06, 20243-204225-05).
[306] Ex. MP-127 at 20 (Gunderson Rebuttal) (eDocket Nos. 20243-204225-06, 20243-204225-05); Ex. MP-130 at 8-11 (Winter Rebuttal) (eDocket Nos. 20243-204225-12, 20243-204225-11); Exs. DOC DER-601 and DOC DER-602 at 7 (Zajicek Rebuttal) (eDocket Nos. 20243-204217-01, 20243-204348-01).
[307] Ex. ATC-200 at 4 (McKee Direct).
[308] Ex. MP-104 at 38-48 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[309] Ex. MP-104 at 38-48 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); Ex. DOC DER-600 at 16-21 (Zajicek Direct) (eDocket No. 20242-203452-01); Exs. DOC DER-601 and DOC DER-602 at 3-8 (Zajicek Rebuttal) (eDocket Nos. 20243-204217-01, 20243-204348-01).
[310] Ex. MP-104 at 17-18 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); MP-130 at 15 and 40 (Winter Rebuttal) (eDocket Nos. 20243-204225-12, 20243-204225-11).
[311] Ex. ATC-227 at 32–33 (Dagenais Direct).

the work prior to the critical path items (the new 345/230 kV transformer), allowing for coordination with Minnesota Power and for acceleration of the in-service date, if desired.[312]

254. Approval of the ATC alternative will require amendment of the ATC-Minnesota Power T-T interconnection agreement on file at FERC by editing Appendix A, "Points of Interconnection."[313] The agreement is a two-page document that describes the various facilities owned, operated, and maintained by the utilities at their respective Arrowhead substations.[314] 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.[315]

255. Minnesota Power believes that negotiating this amendment could be over a year-long process.[316] ATC believes the process should only take a few days.[317] ATC proposes that, if the Commission grants the certificate of need, it include a condition in its order requiring Minnesota Power and ATC to file the necessary revisions to the transmission-to-transmission interconnection agreement with FERC within 90 days of the order or once updated one-line diagrams are available.[318] Regardless of the length of the delay this process will cause, it will likely cause a delay stretching into months, which works against the ATC proposal.

256. The size, type, and timing of Minnesota Power's proposed configuration for the modernization project is more appropriate than the ATC alternative.

12. The Cost of the Proposed Facility and the Cost of the Energy to be Supplied by the Proposed Facility Compared to the Costs of Reasonable Alternatives and the Cost of Energy that Would be Supplied by Reasonable Alternatives

257. For purposes of this factor, the Judge considers that the mid-range estimate for the entire HVDC modernization project with Minnesota Power's proposed configuration is approximately $800 million.[319] The estimate for the Minnesota interconnection facilities in near Hermantown is $65 million.[320] The estimate for the ATC alternative is approximately $90 million, including the PST.[321] ATC's cost should not include the land acquisition cost for the St. Louis County Substation, as that would not be

[312] Ex. ATC 209 at 4 (Johanek Rebuttal).
[313] Ex. ATC-200 at 16 (McKee Direct); Ex. ATC-202 at 17 (McKee Rebuttal).
[314] Ex. ATC-200 at 16 (McKee Direct); Ex. ATC-202 at 17 (McKee Rebuttal).
[315] Ex. ATC-200 at 16 (McKee Direct); Ex. ATC-202 at 17 (McKee Rebuttal).
[316] Ex. MP-109 at 28 (Gunderson).
[317] Ex. ATC-200 at 16-17 (McKee Direct); Ex. ATC-202 at (McKee Rebuttal).
[318] Ex. ATC-202 at 18 (McKee Rebuttal).
[319] Ex. MP-104 at 12 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[320] Ex. MP-130 at Schedule 24.
[321] *Id.* ATC underestimated land acquisition costs because it failed to include the cost of land for the HVDC converter station.

necessary to build. The cost of the new PST should be included for the ATC alternative estimate because that equipment is currently required under ATC's facility permit.[322]

258. Minnesota Power provided analysis of various wire and non-wire alternatives to the modernization project. Each alternative either does not meet the stated needs of the project or is not cost-effective when compared to the proposed configuration. Several of the alternatives exceeded $1 billion, reaching as high as $1.4 billion.[323]

259. Generally, the immediate cost factor weighs in favor of Minnesota Power's proposed configuration, unless the PST is removed from the ATC system configuration. But the cost consideration should include Minnesota Power's prudent planning for expansion, which, while not precisely measurable, is reasonably expected to be higher if the ATC alternative is adopted.

13. The Effects of the Proposed Facility Upon the Natural and Socioeconomic Environments Compared to the Effects of Reasonable Alternatives

260. The DOC-EERA prepared an EA for the HVDC modernization project that evaluated the natural and socioeconomic effects of Minnesota Power's proposed configuration and alternatives.[324]

261. The DOC-EERA anticipates that the following elements have the potential for moderate impacts: (1) aesthetics, surface water, and topography (for both Minnesota Power's proposed configuration and the ATC alternative); and (2) cultural values for those who place a high value on the rural nature of the project area.[325]

262. The DOC-EERA affirmed that it believes potential impacts to human settlement are anticipated to be minimal for the project.[326] The DOC-EERA clarified that, "[o]n whole, impacts are anticipated to be moderate for both options. However, the ATC alternative infrastructure and subsequent clearing is farther away from residents."[327]

263. Finally, the DOC-EERA differentiated the two system alternatives with respect to impacts on West Rocky Run Creek. Both options will require crossings of the creek in the current ROW used. The Minnesota Power option will allow regrowth of the

[322] Without the PST, the estimated cost for the ATC alternative is lower than Minnesota Power's configuration, at approximately $61 million.
[323] Ex. MP-104 at 38-48 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); Ex. DOC DER-600 at 16-21 (Zajicek Direct) (eDocket No. 20242-203452-01); Exs. DOC DER-601 and DOC DER-602 at 3-8 (Zajicek Rebuttal) (eDocket Nos. 20243-204217-01, 20243-204348-01).
[324] Ex. DOC ERRA-515 (EA) (eDocket Nos. 20242-203954-04, 20243-204084-02).
[325] Ex. DOC EERA-515 at Table 23 and Table 24 (EA) (eDocket Nos. 20242-203954-04, 20243-204084-02).
[326] DOC-EERA Hearing Comments (Apr. 15, 2024) (eDocket Nos. 20244-205360-01, 20244-205360-02).
[327] Ex. DOC EERA-515 at Table 24 (EA) (eDocket Nos. 20242-203954-04, 20243-204084-02).

former ROW, whereas the ROW "will remain cleared near the ATC alternative's new crossing, which could exacerbate warming impacts."[328]

264. In response to the DOC-EERA identifying these differences, Minnesota Power proposed several additional mitigation measures related to impacts associated with aesthetics and cultural resources. Specifically, to mitigate the impacts on residents in the area being able to see portions of the St. Louis County 345 kV/230 kV Substation from or near Morris Thomas Road, Minnesota Power has proposed to maintain the existing vegetation buffer.[329] Minnesota Power has also committed to using neutral colors for the facade of the HVDC converter station so that it will better blend with the landscape.[330] In addition, to address comments received during the public hearings, Minnesota Power committed to completing a noise study once final project design is sufficiently complete and to filing that study as a compliance filing before starting construction on the project.[331]

265. Minnesota Power developed its proposed configuration of the HVDC modernization project so that the system is well positioned for potential future expansion of 345 kV or 230 kV in the area. This configuration was carefully selected to minimize the amount of new transmission construction and potential environmental impacts.[332] Should additional transmission be necessary in northeastern Minnesota, the St. Louis County 345 kV/230 kV Substation design will have room for certain expansions.

266. The ATC alternative would not provide this flexibility for future expansion. The ATC Arrowhead 345 kV/230 kV Substation cannot be expanded to the west because of its proximity to West Rocky Run Creek. It cannot be expanded to the south due to limited physical space and existing wetland. It cannot be expanded to the north because of the adjacent Minnesota Power Arrowhead 230 kV/115 kV Substation. And, it cannot be expanded to the east because of extensive existing transmission lines and wetlands that were mitigated under a federal program in the 2000s, which carries deed restrictions

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[328] Ex. DOC EERA-515 at 88-89 (EA) (eDocket Nos. 20242-203954-04, 20243-204084-02); Minnesota Power modified the Minnesota Power Proposed Configuration at West Rocky Run Creek from two parallel 230 kV lines as proposed in the Application to a double-circuit crossing in this location along with removal of the existing HVDC Line and allowing the right-of-way to revegetate in this area. Ex. MP-120 at 11-12 (McCourtney Direct) (eDocket Nos. 20242-203446-10, 20242-203446-09); Ex. MP-129 at 3-6 (McCourtney Rebuttal) (eDocket Nos. 20243-204225-08, 20243-204225-07); Minnesota Power Comments on the EA (Mar. 28, 2024) (eDocket Nos. 20243-204709-01, 20243-204709-02).

[329] Ex. MP-129 at 3 (McCourtney Rebuttal) (eDocket Nos. 20243-204225-08, 20243-204225-07); Minnesota Power Comments on the EA at 1-2 (Mar. 28, 2024) (eDocket Nos. 20243-204225-06, 20243-204225-05).

[330] Minnesota Power Comments on the EA at 2 (Mar. 28, 2024) (eDocket Nos. 20243-204225-06, 20243-204225-05); DOC-EERA Hearing Comments at 2 and 5 (Apr. 15, 2024) (eDocket Nos. 20244-205360-01, 20244-205360-02).

[331] Minnesota Power Comments on the EA at 2-3 (Mar. 28, 2024) (eDocket Nos. 20243-204225-06, 20243-204225-05); DOC-EERA Hearing Comments at 2 and 5 (Apr. 15, 2024) (eDocket Nos. 20244-205360-01, 20244-205360-02).

[332] Ex. MP-104 at 40 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); Ex. MP-121 at 74 (Winter Direct)) (eDocket Nos. 20242-203446-08, 20242-203443-10, 20242-203443-08, 20242-203443-06, 20242-203446-07, 20242-203443-09, 20242-203443-07, 20242-203443-05).

that prevent development.[333] These expandability limitations of the ATC Arrowhead 345 kV/230 kV Substation prevent likely future expansion. These facts contribute to the ATC alternative being a less reasonable or prudent alternative when compared to the Minnesota Power configuration.

267. Constructing the HVDC modernization project is anticipated to bring socioeconomic benefits to the state. In Minnesota, approximately 150 to 175 workers will be needed for construction of the project. Additionally, approximately $14.5 million in annual property tax revenue is estimated to be generated from the project. The DOC-EERA concluded that "socioeconomic impacts are anticipated to be positive" and "no additional mitigation is proposed.[334]

268. The ATC alternative will not result in a new substation being constructed. Instead, the necessary substation will be constructed on land that is already developed. Thus, the change to a substation will be different, but not significant.

269. In sum, the socio-economic benefits and impact on the environment will be more positive if the Minnesota Power configuration is adopted because it supports the continued transition to carbon-free electrical power. In addition, it will not require as costly or as significant changes to the landscape than the ATC alternative when demand for electricity in northeast Minnesota grows in the future.

14. The Expected Reliability of the Proposed Facility Compared to the Expected Reliability of Reasonable Alternatives

270. The HVDC modernization project will replace infrastructure that is currently operating well beyond its original operating life. Not replacing the equipment will lead to continued and likely increasing outages of the HVDC line. These costs are conservatively estimated at approximately $493 million, ignoring inflation. In addition, not replacing the equipment will likely increase the costs of congestion and replacement power. Moreover, the proposed project is necessary for Minnesota Power to meet Minnesota's carbon-free mandate.[335]

271. The ATC alternative will rely on a historically reliable 345/230 kV transformer and will include an additional parallel transformer.[336] This will ensure high reliability if the ATC alternative is selected. The studies ATC relies on in its assertions about regional voltage support are not useful here, however, because they do not account for the continued use of the PST and capacitor banks.[337]

272. Overall, the reliability consideration is equal between the Minnesota Power configuration and the ATC alternative.

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[333] Ex. MP-120 at 19 and Direct Schedule 2 (McCourtney Direct) (eDocket Nos. 20242-203446-10, 20242-203446-09).
[334] Ex. DOC EERA-515 at 57-58 (EA) (eDocket Nos. 20242-203954-04, 20243-204084-02).
[335] Ex. DOC DER-600 at 20-22 (Zajicek Direct) (eDocket No. 20242-203452-01).
[336] Ex. ATC-227 at 13–14 (Dagenais Direct); Ex. MP-131, Schedule 35 (Winter Rebuttal).
[337] Ex. ATC-227 at 19, 25, 28 (Dagenais Direct).

15. Conclusion Regarding Minn. R. 7849.0120(B)

273. There is no alternative that is more reasonable and prudent to Minnesota Power's proposed configuration of the HVDC modernization project that satisfies all the requirements of Minn. R. 7849.0110 and Minn. R. 7849.0120.

E. The Proposed Facility, or a Suitable Modification of the Facility, Will Provide Benefits to Society in a Manner Compatible With Protecting the Natural and Socioeconomic Environments, Including Human Health

274. Minn. R. 7849.0120(C) requires that a preponderance of the evidence demonstrate that the proposed facility, or a suitable modification of the facility, will provide benefits to society in a manner compatible with protecting the natural and socioeconomic environments, including human health. The following factors must be considered in making the determination of whether the applicant's burden has been met.

1. The Relationship of the Proposed Facility, or Suitable Modification Thereof, to Overall State Energy Needs

275. Minn. R. 7849.0120(C)(1) requires an assessment of the relationship of the project to overall energy needs of Minnesota.

276. The project will enable the direct delivery of Minnesota Power's wind generation resources in North Dakota to its customers in Minnesota.[338] The project will modernize the HVDC converter station equipment and position the HVDC line and Minnesota Power for the transition to a carbon-free future for Minnesota while maximizing the benefit for Minnesota Power customers.[339] Not implementing the HVDC modernization project would make it unlikely that Minnesota Power could meet Minnesota's carbon free electricity requirement by 2040.[340]

277. Minnesota Power has demonstrated that the project, and Minnesota Power's proposed configuration, will advance Minnesota's state energy needs.

2. The Effects of the Proposed Facility, or a Suitable Modification Thereof, Upon the Natural and Socioeconomic Environments Compared to the Effects of Not Building the Facility

278. Minn. R. 7849.0120(C)(2) requires an assessment of the project's potential natural and socioeconomic environment impacts when compared to the no build alternative.

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[338] Ex. MP-121 at 8 (Winter Direct) (eDocket Nos. 20242-203446-08, 20242-203443-10, 20242-203443-08, 20242-203443-06, 20242-203446-07, 20242-203443-09, 20242-203443-07, 20242-203443-05).
[339] Ex. MP-121 at 8-9 (Winter Direct) (eDocket Nos. 20242-203446-08, 20242-203443-10, 20242-203443-08, 20242-203443-06, 20242-203446-07, 20242-203443-09, 20242-203443-07, 20242-203443-05).
[340] Ex. MP-104 at 16 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); *see* Minn. Stat. § 216b.1691, subd. 2(g); Minn. Stat. § 216H.02.

279. The project is needed to replace aging infrastructure that has been operating since 1977.[341]

280. Not building the HVDC modernization project will lead to continued and likely increasing outages of the HVDC line. These costs are conservatively estimated at approximately $493 million, ignoring inflation and the likely increases to the costs of congestion and replacement power. Also, the project is necessary for Minnesota Power to meet Minnesota's carbon-free mandate.[342] Without the project, curtailments associated with HVDC system outages could lead to Minnesota Power not meeting the state 100 percent carbon free goal by 2040.[343] In 2022, nearly 10 percent of the annual energy unavailable due to forced outages was because of HVDC converter equipment failures. The rate of these failures is anticipated to increase without the project.[344]

281. The ATC alternative is anticipated to allow for greater power flows to Wisconsin.[345] Because Minnesota Power's proposed configuration does not change the point of interconnection between the HVDC system and the existing AC transmission system, these changes to power flows would not be anticipated.[346] The ATC alternative is not a reasonable or prudent modification to the project due to this transfer of power from Minnesota to Wisconsin.

3. The Effects of the Proposed Facility, or a Suitable Modification Thereof, in Inducing Future Development

282. Minn. R. 7849.0120(C)(3) concerns assessing the effects of the proposed facility in inducing future development.

283. The HVDC modernization project will not induce future development. Minnesota Power's proposed configuration of the project will, however, ensure that Minnesota Power customers will continue to receive the greatest level of benefits practicable in the delivery of low-cost wind resources from North Dakota to Minnesota.

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[341] Ex. MP-121 at 8 (Winter Direct) (eDocket Nos. 20242-203446-08, 20242-203443-10, 20242-203443-08, 20242-203443-06, 20242-203446-07, 20242-203443-09, 20242-203443-07, 20242-203443-05).
[342] Ex. DOC DER-600 at 20-22 (Zajicek Direct) (eDocket No. 20242-203452-01).
[343] Ex. MP-104 at 16 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[344] Ex. MP-104 at 16 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[345] Ex. MP-121 at 38 (Winter Direct) (eDocket Nos. 20242-203446-08, 20242-203443-10, 20242-203443-08, 20242-203443-06, 20242-203446-07, 20242-203443-09, 20242-203443-07, 20242-203443-05); Exs. DOC DER-601 and DOC DER-602 at 16 (Zajicek Rebuttal) (eDocket Nos. 20243-204217-01, 20243-204348-01).
[346] Ex. MP-121 at 38 (Winter Direct) (eDocket Nos. 20242-203446-08, 20242-203443-10, 20242-203443-08, 20242-203443-06, 20242-203446-07, 20242-203443-09, 20242-203443-07, 20242-203443-05).

4. The Socially Beneficial Uses of the Output of the Proposed Facility, or a Suitable Modification Thereof, Including Its Uses to Protect or Enhance Environmental Quality

284. Minn. R. 7849.0120(C)(4) provides that the socially beneficial uses of the output of the HVDC Modernization Project, including its uses to protect or enhance environmental quality, shall be assessed before certification.

285. The HVDC Modernization Project will enable the direct delivery of Minnesota Power's wind generation resources in North Dakota to its customers in Minnesota. The HVDC System has operated reliably for nearly 47 years but is facing increasing outages due primarily to equipment failures at the HVDC converter stations.[347] The HVDC modernization project will modernize the HVDC converter station equipment and position the HVDC line and Minnesota Power for the transition to a carbon-free future for Minnesota while maximizing the benefit for Minnesota Power customers.[348]

5. Conclusion Regarding Minn. R. 7849.0120(C)

286. Minnesota Power has satisfied Minn. R. 7849.0120(C) for its proposed configuration of the HVDC modernization project.

F. The Record Does Not Demonstrate that the Design, Construction, or Operation of the Proposed Facility, or a Suitable Modification of the Facility, will Fail to Comply with Relevant Policies, Rules, and Regulations of Other State and Federal Agencies and Local Governments

287. Minn. R. 7849.0120(D) requires an evaluation of the HVDC modernization project to ensure that it will comply with relevant policies, rules, and regulations of state and federal agencies and local governments.

288. There is no evidence in the record demonstrating that the design, construction, or operation of the proposed project will fail to comply with relevant policies, rules, and regulations of any governments or agencies.

289. Minnesota Power has committed that it will comply with all applicable state and federal rules and regulations, as well as those of local governments.[349] Additionally, Minnesota Power modified the design of its proposed configuration to respond to agency concerns related to the proposed crossing of West Rocky Run Creek, where the existing HVDC line is located.[350] Finally, Minnesota Power has committed to additional mitigation

[347] Ex. MP-121 at 8 (Winter Direct) (eDocket Nos. 20242-203446-08, 20242-203443-10, 20242-203443-08, 20242-203443-06, 20242-203446-07, 20242-203443-09, 20242-203443-07, 20242-203443-05).
[348] Ex. MP-121 at 8-9 (Winter Direct) (eDocket Nos. 20242-203446-08, 20242-203443-10, 20242-203443-08, 20242-203443-06, 20242-203446-07, 20242-203443-09, 20242-203443-07, 20242-203443-05).
[349] Ex. MP-104 at 104-108 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[350] Ex. MP-129 at 4-5 (McCourtney Rebuttal) (eDocket Nos. 20243-204225-08, 20243-204225-07).

measures and conditions to minimize impacts on the natural environment and human settlement.[351]

290. The ATC alternative includes requests to remove conditions placed on the ATC Arrowhead 345 kV/230 kV Substation by the MEQB to limit power flows to 800 MVA.[352] ATC could seek Commission approval to remove this limitation in an appropriate and separate proceeding. If the ATC alternative were approved as requested by ATC, it would fail to comply the applicable permit condition.

G. Conclusion on Minn. R. 7849.0120 Criteria

291. Based on the evidence in the record, Minnesota Power's proposed configuration for the project satisfies the criteria of Minn. R. 7849.0120.

IX. Route Permit Criteria

292. The Power Plant Siting Act (PPSA), Minn. Stat. Ch. 216E, requires that route permit determinations "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."[353]

293. Under the PPSA, the Commission and the Judge must be guided by the following responsibilities, procedures, and considerations:

> (1) evaluation of research and investigations relating to the effects on land, water and air resources of large electric power facilities and the effects of water and air discharges and electric and magnetic fields resulting from such facilities on public health and welfare, vegetation, animals, materials and aesthetic values, including baseline studies, predictive modeling, and evaluation of new or improved methods for minimizing adverse impacts of water and air discharges and other matters pertaining to the effects of power plants on the water and air environment;
>
> (2) environmental evaluation of sites and routes proposed for future development and expansion and their relationship to the land, water, air and human resources of the state;

[351] Minnesota Power Comments on the EA (Mar. 28, 2024) (eDocket Nos. 20243-204225-06, 20243-204225-05); DOC-EERA Hearing Comments at 3 (Apr. 15, 2024) (eDocket Nos. 20244-205360-01, 20244-205360-02).
[352] Exs. DOC DER-601 and DOC DER-602 at 9 (Zajicek Rebuttal) (eDocket Nos. 20243-204217-01, 20243-204348-01) ("To interconnect the HVDC Modernization Project at ATC's Arrowhead 345 kV Substation [which would be necessary for implementation of the ATC Arrowhead Alternative], the 801 MVA limit would have to be reexamined and lifted.").
[353] Minn. Stat. § 216E.03, subd. 7.

(3) evaluation of the effects of new electric power generation and transmission technologies and systems related to power plants designed to minimize adverse environmental effects;

(4) evaluation of the potential for beneficial uses of waste energy from proposed large electric power generating plants;

(5) analysis of the direct and indirect economic impact of proposed sites and routes including, but not limited to, productive agricultural land lost or impaired;

(6) evaluation of adverse direct and indirect environmental effects that cannot be avoided should the proposed site and route be accepted;

(7) evaluation of alternatives to the applicant's proposed site or route proposed pursuant to subdivisions 1 and 2;

(8) evaluation of potential routes that would use or parallel existing railroad and highway rights-of-way;

(9) evaluation of governmental survey lines and other natural division lines of agricultural land so as to minimize interference with agricultural operations;

(10) evaluation of the future needs for additional high-voltage transmission lines in the same general area as any proposed route, and the advisability of ordering the construction of structures capable of expansion in transmission capacity through multiple circuiting or design modifications;

(11) evaluation of irreversible and irretrievable commitments of resources should the proposed site or route be approved;

(12) when appropriate, consideration of problems raised by other state and federal agencies and local entities;

(13) evaluation of the benefits of the proposed facility with respect to (i) the protection and enhancement of environmental quality, and (ii) the reliability of state and regional energy supplies;

(14) evaluation of the proposed facility's impact on socioeconomic factors; and

(15) evaluation of the proposed facility's employment and economic impacts in the vicinity of the facility site and throughout Minnesota, including the quantity and quality of construction and permanent jobs and their compensation levels. The commission must consider a facility's local employment and economic impacts, and may reject or

place conditions on a site or route permit based on the local employment and economic impacts.[354]

294. Also, Minn. Stat. § 216E.03, subd. 7(e), provides that the Commission:

> must make specific findings that it has considered locating a route for a high-voltage transmission line on an existing high-voltage transmission route and the use of parallel existing highway right-of-way and, to the extent those are not used for the route, the commission must state the reasons.

295. In addition to the PPSA, the Commission and the Judge are governed by Minn. R. 7850.4100, which mandates consideration of the following factors when determining whether to issue a route permit for a high-voltage transmission line:

A. effects on human settlement, including, but not limited to, displacement, noise, aesthetics, cultural values, recreation, and public services;

B. effects on public health and safety;

C. effects on land-based economies, including, but not limited to, agriculture, forestry, tourism, and mining;

D. effects on archaeological and historic resources;

E. effects on the natural environment, including effects on air and water quality resources and flora and fauna;

F. effects on rare and unique natural resources;

G. application of design options that maximize energy efficiencies, mitigate adverse environmental effects, and could accommodate expansion of transmission or generating capacity;

H. use or paralleling of existing rights-of-way, survey lines, natural division lines, and agricultural field boundaries;

I. use of existing large electric power generating plant sites;

J. use of existing transportation, pipeline, and electrical transmission systems or rights-of-way;

K. electrical system reliability;

[354] Minn. Stat. § 216E.03, subd. 7.

L. costs of constructing, operating, and maintaining the facility which are dependent on design and route;

M. adverse human and natural environmental effects which cannot be avoided; and

N. irreversible and irretrievable commitments of resources.

296. There is sufficient evidence in the record for the Judge to assess the Applicant's proposed route using the criteria and factors set out above.

X. Overview of the Project Area

297. Hermantown and Solway Township are the two residential communities surrounding the proposed project, which is located in St. Louis County, Minnesota, within the North Shore Highlands Subsection of the Northern Superior Uplands section of the Laurentian Mixed Forest Province, as defined by the DNR Ecological Classification System. The North Shore Highlands Subsection is located adjacent to Lake Superior and parallels the Highland Moraine associated with the lake, 20 to 25 miles inland. Lake Superior is the main feature in this region and moderates the climate throughout the year. Pre-settlement vegetation in this area included primarily pine, fir, and aspen-birch forest, along with conifer bogs and swamps. Today's landscape is still dominated by forest. Forest management, recreation, and tourism are the dominant economic activities.[355]

298. The environmental setting within several miles of the project study area includes forested areas, pockets of open agricultural land, rural residential development, and hydrologic features, including streams, wetlands, and small ponds. Many of the streams in this area run directly from the highland to Lake Superior. The terrain is gently rolling to steep hills.[356]

299. Existing ROW associated with transmission lines and roads are prevalent within the proposed project area.[357]

XI. Application of Route Permit Criteria to the Project

300. The DOC-EERA evaluated anticipated impacts of the project, including Minnesota Power's proposed configuration and the ATC alternative, under the routing factors. The DOC-EERA found that, for most routing factors, anticipated impacts are similar for both options.[358]

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[355] Ex. MP-104 at 65 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[356] Ex. MP-104 at 65 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); Ex. EERA-515 at 37 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[357] Ex. MP-104 at 65 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[358] Ex. DOC EERA-515 at 125-127 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).

301. The DOC-EERA, however, found that the anticipated impacts under the routing factors differed between Minnesota Power's configuration and the ATC alternative with respect to aesthetics, cultural values, and project costs.[359]

302. Overall, the record shows that the HVDC modernization project satisfies the routing criteria. For impacts that the EA determined would be moderate, the Applicant proposed meaningful mitigation measures to address and limit negative impacts of the project, which the DOC-EERA agreed could be beneficial.

A. Effects on Human Settlement

303. Minn. R. 7850.4100(A) requires consideration of the proposed route's effects on human settlement, including displacement, noise created during construction and by operation of the project, and impacts to aesthetics, cultural values, recreation, and public services.

1. Displacement

304. Displacement of, or impacts to, occupied residences or business properties due to the project is anticipated to be negligible.[360]

305. Residences are located along most of the roads within and adjacent to the project study area. The residential character of the area is low density and rural/suburban, with houses and other nonresidential structures on large, wooded lots. No significant impacts are anticipated to residences near the proposed route.[361]

306. To the extent possible, the project will be constructed on land owned by Minnesota Power. In that case, the project will not use traditional transmission line easements for ROW. No additional residences or businesses are expected to be removed for either the proposed project or the ATC alternative to facilitate construction and operation. Minnesota Power has acquired all parcels within its proposed configuration as of January 30, 2024. The proposed configuration also covers the route width for the ATC alternative.[362]

2. Noise

307. Noise is generally considered to be unwanted sound that may be an annoyance, loud, or disruptive to hearing. It may be comprised of a variety of sounds of different intensities across the entire frequency spectrum. Noise is measured in units of decibels on the A-weighted scale (dBA). Because human hearing is not equally sensitive to all frequencies of sound, the most noticeable frequencies of sound are given more weight in most measurement schemes. The A-weighted decibel scale corresponds to the

[359] Ex. DOC EERA-515 at 128 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[360] Ex. DOC EERA-515 at 103 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02); Ex. MP-104 at 66 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[361] Ex. MP-104 at 66 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[362] Ex. DOC EERA-515 at 103 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).

sensitivity range for human hearing. A noise level change of 3 dBA is barely perceptible to human hearing. A 5-dBA change in noise level, however, is clearly noticeable. A 10-dBA change in noise level is perceived as doubling noise loudness.[363]

308. Potential noise impacts from the project are associated with both construction and operation. The primary noise receptors within the local vicinity are residences and farmsteads.[364]

309. The main source of noise during construction will derive from heavy construction equipment operation and increased vehicle traffic due to the transporting materials to and from the site.[365]

310. Distinct noise impacts during construction are anticipated to vary between minimal to significant depending on the activity, duration, and equipment being used. Construction noise impacts will be temporary, localized, limited to daytime hours, and intermittent. The noise from construction activities would dissipate with distance and be audible at varying decibels, depending on the distance from the equipment to the receptor.[366]

311. While construction noise will be temporary, localized, limited to daytime hours, and intermittent, customer schedules or other factors may cause construction to occur outside of daytime hours or on weekends. Heavy equipment will also be equipped with sound attenuation devices such as mufflers to minimize the daytime noise levels.[367]

312. The Commission could require construction timing restrictions, such as, limiting the duration of certain construction activities, to mitigate impacts to state noise standards.[368] Section 5.3.5 of the Draft Route Permit Template requires the permittee to limit construction and maintenance activities to daytime hours to the extent practicable. Minnesota Power will work with local governments if construction becomes necessary outside of these hours. Construction noise impacts can be reduced through sound control devices on vehicles and equipment, for example, mufflers; and running vehicles and equipment only when necessary.[369]

313. Proper design and construction of the transmission line in accordance with industry standards will help ensure that noise impacts from its use are minimized. During operation, permittees are required to comply with noise standards established under Minn. R. 7030.010-.0080. Other mitigation could incorporate screens or berms that muffle

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[363] Ex. MP-104 at 67 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); Ex. DOC EERA-515 at 43 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[364] Ex. MP-104 at 69 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); Ex. DOC EERA-515 at 44 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[365] Ex. MP-104 at 69 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[366] Ex. DOC EERA-515 at 44-45 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[367] Ex. DOC EERA-515 at 47 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[368] Ex. DOC EERA-515 at 130 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[369] Ex. DOC EERA-515 at 47 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02); Ex. DOC EERA-516, Appendix C (Draft Route Permit) (eDocket Nos. 20242-203954-03, 20242-203954-04).

noise leaving the project property or include a natural buffer that the Applicant could dedicate to upholding at a certain distance agreeable to nearby residences.[370]

314. Minnesota Power will undertake an additional noise study once final design of the project is complete and will submit the noise study as a compliance filing prior to commencing construction, such that the Commission can further evaluate noise mitigation measures.[371] The DOC-EERA recommended that this commitment be included as a special permit condition.[372]

315. The main source of audible noise during operation of the project will be the HVDC converter station. Noise contributions from the HVDC converter station are highly dependent on the layout of buildings and equipment within the fence. The most significant sources of noise within the HVDC converter station are the converter transformers with integrated cooling fans, followed by the outdoor components of the valve cooling system, smoothing reactors, and other electrical equipment. Noise emissions from indoor equipment are not expected to propagate outside the building envelope. Transformer noise is nearly constant and is present whenever the transformer is energized. Variations in transformer noise may occur due to the operation of cooling pumps and fans at higher loading levels.

316. In addition to transformers, valve cooling system components, smoothing reactors, and other outdoor electrical equipment may contribute to audible noise. Valve cooling system noise will vary with the operation of the HVDC system, generally producing more noise at higher transfer levels where cooling requirements become more significant. Noise from other electrical equipment, including smoothing reactors, will generally be constant and present whenever the equipment is energized.[373]

317. The HVDC converter station will be designed to ensure that it does not exceed noise standards at the nearest receptor locations (estimated to be approximately 1,500 feet from the converter station) during operation. Initial engineering estimates determined operation of the HVDC converter station would comply with the most stringent standard.[374]

318. Transmission lines can cause audible noise due to corona discharge from the conductors. This noise, which resembles a crackling sound, is typically only within the threshold of human hearing during rainy or foggy conditions and is generally

[370] Ex. DOC EERA-515 at 48 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[371] Minnesota Power's Comments on EA at 2-3 (Mar. 28, 2024) (eDocket Nos. 20243-204709-01, 20243-204709-02).
[372] DOC-EERA Hearing Comments at 5 (Apr. 15, 2024) (eDocket Nos. 20244-205360-01, 20244-205360-02).
[373] Ex. MP-104 at 69 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); Ex. DOC EERA-515 at 44–45 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[374] Ex. MP-104 at 70 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); Ex. DOC EERA-515 at 46 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).

imperceptible due to background noise. During dry weather, audible noise from transmission lines is barely perceptible.[375]

319. As indicated in Table 5 below, the most stringent noise standard is the nighttime L_{50} limit for the land use category that includes residential areas (NAC-1). The NAC-1 nighttime limit is 50 dBA.[376]

Table 5. Noise Calculations for the Proposed Project[377]

Structure Type	Line Voltage	Edge of Right-of-Way L_{50} Noise (dBA)
230 kV Single-Circuit H-Frame	253 kV	35.49
230 kV Single-Circuit H-Frames (2x Parallel)	253 kV	36.93
230 kV Double-Circuit	253 kV	41.54
345 kV Single-Circuit Monopole	380 kV	50.17

320. The calculated L_{50} values at the edge of ROW for the project demonstrate that the audible noise associated with the project will be within the most stringent limitations outside the ROW and areas immediately adjacent to it.[378]

3. Aesthetics

321. Aesthetics refers to the visual quality of an area as perceived by the viewer and forms the impression a viewer has of an area. Aesthetics are unique to the human subject or population, meaning that their relative value, held individually or communally, depends upon several factors that may include perception, and the strength of values, history, and memory, held either individually or communally, resulting in potentially varied and unique responses.

322. Impacts to aesthetic changes are expected to be equally diverse, depending upon individual perception of impact, degree of aesthetic change, strength of commitment to the unimpacted aesthetic, and acceptance of the proposed project. This means that how an individual values aesthetics and reacts to their change, especially perceived impacts to a viewshed, can vary greatly.[379]

323. Viewer sensitivity is understood as an individual's interest or concern for the quality of a viewshed and varies depending upon the activity viewers are engaged in, their values and expectations related to the viewshed, and their level of concern for potential

[375] Ex. MP-104 at 69 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); Ex. DOC EERA-515 at 47 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[376] Ex. MP-104 at 70 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); Ex. DOC EERA-515 at 47 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[377] Ex. MP-104 at 70 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); Ex. DOC EERA-515 at 47 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[378] Ex. MP-104 at 70 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); Ex. DOC EERA-515 at 47 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[379] Ex. DOC EERA-515 at 109-10 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).

changes to the viewshed. High viewer sensitivity is generally associated with individuals engaged in recreational activities; traveling to scenic sites for pleasure and to or from recreational, protected, natural, cultural, or historic areas; or experiencing viewsheds from resorts, road-side pull-outs, or residences. Residents have a higher sensitivity to potential aesthetic impacts than temporary observers. Low viewer sensitivity is generally associated with individuals commuting, working, or passing through an area.

324. Viewer exposure refers to variables associated with observing a viewshed, and can include the number of viewers, frequency and duration of views, and view location. Viewer exposure would typically be highest for views experienced by high numbers of people, frequently, and for long periods. These variables, as well as other factors, such as viewing angle or time of day, all affect the aesthetic impact.[380]

325. Presently, the project area is characterized by low density, rural residential land use, with houses and other nonresidential structures on large, wooded lots. Property acquired by Minnesota Power within the route width that have homesteads will be abandoned after acquisition in the project area. This means that Minnesota Power will seal the wells, remove the homes and other buildings on the property, and fill in any basements that may be present.

326. The project will introduce 40 acres of new terminal facilities and HVTLs to connect those facilities to each other and the existing electrical grid on the landscape. These features will create aesthetic impacts.[381]

327. ROW clearing and substation and converter station construction will have the most visual impacts in areas close to roads and residential areas. Minnesota Power identified a proposed route that contains existing utility infrastructure. The project will be constructed in an area containing forest, cropland, and rural residential development, along with existing ROW for the ±250 kV HVDC line. The ROW will be maintained for the existing ±250 kV HVDC line, but additional tree clearing may be necessary during construction.[382]

328. To the extent these impacts can be quantified depends on the presence of several on-the-ground factors linked to the concepts of viewer quality, sensitivity, and exposure. These factors include:

- Views valued by the public at large, for example, scenic overlooks or scenic byways;

- Locations where relatively more people are present, for example, schools, churches, and residences; or

[380] Ex. DOC EERA-515 at 110 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[381] Ex. DOC EERA-515 at 110 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[382] Ex. MP-104 at 72 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).

- Locations where people recreate or otherwise enjoy leisure activities.[383]

329. The project represents the expansion of an existing use in and adjacent to the proposed route; that is, utility infrastructure including several transmission lines and the Arrowhead Stations. Aesthetic impacts will primarily be caused by the removal of trees for project construction and the additional infrastructure on the landscape. To limit the aesthetic impacts that may be caused by the project, Minnesota Power will maintain existing trees when practical to serve as a physical and visual barrier to the new project facilities.[384]

330. For the HVDC modernization project, a new HVDC converter station and St. Louis County 345 kV/230 kV Substation will be constructed. However, under the ATC alternative, the St. Louis County 345 kV/230 kV Substation would not be constructed. The St. Louis County 345 kV/230 kV Substation is the most likely feature to impact nearby residents and travelers as it is proposed to be within 300 feet of Morris Thomas Road. While the St. Louis County 345 kV/230 kV Substation will also be within 1,500 of the existing Arrowhead Substation and other existing transmission line infrastructure, Arrowhead Substation is well screened by the forested landscape. Thus, the St. Louis County 345 kV/230 kV Substation will introduce new industrial structures that are visible on the otherwise rural forested space. The HVDC converter station and new substation will be fenced, graveled, and accessible via a total of three access roads, and parking lots.

331. New transmission lines will create new visual impacts that may be visible from adjacent roads or nearby residents. A portion of the new transmission line construction is proposed to be adjacent to existing transmission lines. While new transmission lines and cleared rights-of-way will introduce new impacts, the proposed route is already near an existing substation and several transmission lines (*see* EA, Appendix B, Map 1). Impacts are not minimal. However, the proposed project will be constructed on wooded property parcels separated from the existing substations by a wooded area. The proposed transmission lines will be designed such that vegetation clearing will use the typical right-of-way widths per voltage class (see Table 6 below) with a maximum of 150 feet wide. Additional maintained width beyond these values may be required as needed based on design requirements.[385]

[383] Ex. DOC EERA-515 at 110 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[384] Ex. MP-104 at 72 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); Ex. DOC EERA-515 at 110 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[385] Ex. DOC EERA-515 at 111-12 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02); Ex. DOC EERA-516, Appendix B (Map 1) (eDocket Nos. 20242-203954-03, 20242-203954-04).

Table 6. Structure Design Summary[386]

Line Type	Structure Type	Right-of-Way Width (feet)	Structure Height (feet)	Foundation Diameter (feet)	Span Between Structures (feet)
230 kV	Tubular Steel Pole[265]	130	60-180	4-12	200-1000
345 kV	Tubular Steel Pole	150	60-180	4-12	200-1000
±250 kV HVDC	Tubular Steel Pole	120	60-180	4-12	200-1000

Note: *The values in the table above are typical values expected for the majority of structures based on similar facilities. Actual values may vary. All line types would be made of weathering steel with concrete pier foundations.*

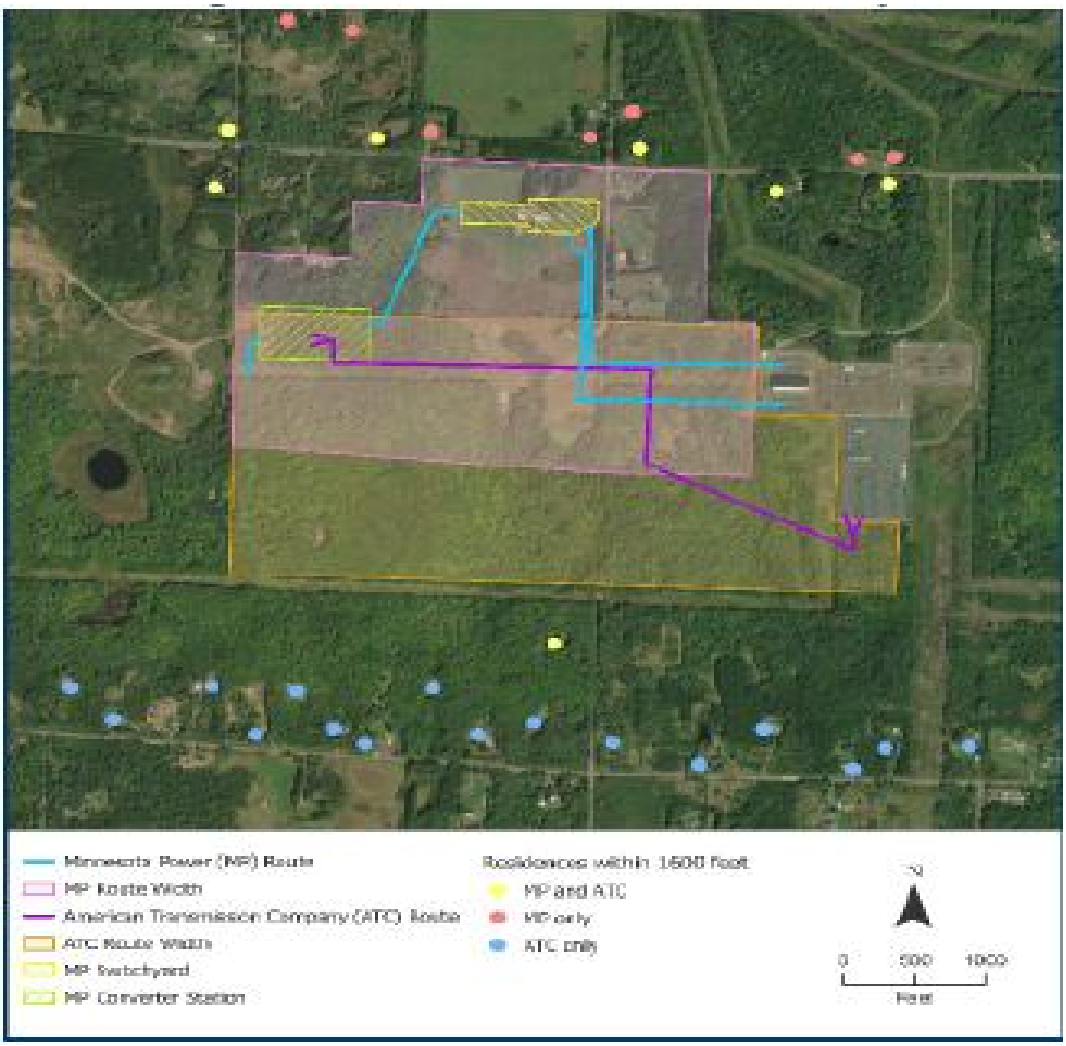
332. As discussed in more detail below regarding impacts to the natural environment, Minnesota Power is proposing to double-circuit its 230 kV line between the proposed St. Louis County 345 kV/230 kV Substation and Minnesota Power's 230 kV/115 kV Arrowhead Substation to reduce the crossings of the West Rocky Run Creek from two to one. The final ROW width at West Rocky Run Creek would be 130 feet to accommodate the double-circuit 230 kV transmission line.[387]

333. There are no scenic overlooks or scenic byways near the project. The closest scenic byway is the Skyline Parkway, over five miles east of the project near Duluth, Minnesota. Impacts to this scenic byway are not expected to occur, however, there is potential for recreationalists engaged in a scenic drive to be in the local vicinity of the project.[388]

334. There are no schools, hospitals, nursing or boarding homes, childcare centers, or churches within the local vicinity of any route segment. There are 14 residences not owned (or with signed purchase agreements) by Minnesota Power within the local vicinity of the proposed project. There are 23 residences in the ATC alternative, as shown in Figure 2 below. Because this count is by distance, overlap exists in these estimates as shown by the yellow circles in Figure 2. Minnesota Power may continue to purchase nearby properties, which would change these counts since the release of the EA.[389]

[386] Ex. DOC EERA-515 at 113 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[387] Ex. MP-129 at 4-5 (McCourtney Rebuttal) (eDocket Nos. 20243-204225-08, 20243-204225-07).
[388] Ex. DOC EERA-515 at 110-11 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[389] Ex. DOC EERA-515 at 111 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).

Figure 2. Residences in Local Vicinity[390]



335. Impacts to recreational activities and other scenic views are anticipated to be similar for both the proposed project and the ATC alternative. The only recreational area within the project area and local vicinity is West Rocky Run, a trout stream that is inaccessible to the public within the proposed route as Minnesota Power's and ATC's properties near their substations are adjacent to the stream. All proposed facilities would be constructed on privately owned lands and therefore no public recreation would be affected within the project area. There are no wildlife management areas, trout or muskie lakes, state trails, public water accesses, designated wildlife lakes, or state lands in the local vicinity. There are two state aquatic management areas over a mile away from the proposed route. Because the area is heavily forested, it is unlikely that recreationalists over a mile from the project will be able to view it once constructed.[391]

[390] Ex. DOC EERA-515 at 111 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[391] Ex. DOC EERA-515 at 111 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).

336. In addition to residents and recreational users, travelers along nearby roads may also experience visual impacts from the project. Annual average daily traffic counts (AADT) indicate that traffic levels are highest on State Highway 2 with 5,600 AADT. The project will not be visible from State Highway 2. The most potential for visual impacts will be along Morris Thomas Road with between 750 and 1,100 AADT. The EA notes that this assessment is consistent with visual sensitivity classifications prepared for the area in 1990.[392]

337. Screening, which is the use of terrain and vegetation to obstruct the visibility of recently built infrastructure or lighting, helps to limit clear views of these developments. These features are also important when determining and abating potential aesthetic impacts.[393] Minnesota Power committed to maintaining the existing vegetation buffer between the proposed St. Louis County 345 kV/230 kV Substation and Morris Thomas Road and selecting a neutral color for the HVDC Converter Station in Minnesota.[394]

338. Routing the new transmission lines with existing infrastructure rights-of-way can mitigate potential impacts because the new built feature would be an incremental increase consistent with previous human modification. The proposed project uses no existing ROW, thereby creating new impacts.[395]

339. Impacts can also be mitigated by limiting vegetation clearing to only what is necessary for the safe construction and operation of the HVTL. Commission route permits require permittees to minimize vegetation removal when constructing an HVTL. Adverse impacts can be further mitigated by ensuring that damage to natural landscapes during construction is minimized, and, to the extent that it does not interfere with safe operation of the transmission line, planting lower growing woody vegetation in a transition area near the edge of the right-of-way in wooded areas.[396]

340. Impacts from the converter station and St. Louis County 345 kV/230 kV Substation can be minimized by choosing a site where the facility is consistent with the existing landscape, not immediately adjacent to homes, and shielded from view by terrain or existing vegetation. This could incorporate a natural buffer that the Applicant could dedicate to upholding at a certain distance agreeable to nearby residences. Techniques could include vegetation screening, berms, or fencing should the existing landscape lack appropriate screening. Choosing to utilize existing access points instead of building new ones off Morris Thomas Road would further mitigate impacts.[397]

341. As mitigation to potential aesthetic impacts of the project, Minnesota Power will maintain the existing vegetation buffer between the proposed St. Louis County 345 kV/230 kV Substation and the Morris Thomas Road. By maintaining this existing

[392] Ex. DOC EERA-515 at 111-12 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[393] Ex. DOC EERA-515 at 110 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[394] DOC-EERA Hearing Comments at 2 (Apr. 15, 2024) (eDocket Nos. 20244-205360-01, 20244-205360-02).
[395] Ex. DOC EERA-515 at 113 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[396] Ex. DOC EERA-515 at 113-14 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[397] Ex. DOC EERA-515 at 114 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).

vegetation, the potential visual impacts of the new St. Louis County 345 kV/230 kV Substation from Morris Thomas Road will be minimized.[398] This should be included as a special permit condition.[399]

342. Minnesota Power has committed to installing shielded or downward facing lighting at their facilities to minimize impacts to wildlife, the night sky, and nearby residents. Minnesota Power also stated in the Combined Application that it will place emphasis on preserving the natural landscape whenever practical and implement construction and operation practices to prevent any unnecessary disturbance of the natural surroundings in the vicinity of the work.[400]

343. Other potential mitigation measures may include selecting color coatings for the converter station and St. Louis County 345 kV/230 kV Substation buildings that blend into the landscape, such as brown or green; utilizing a slated privacy fence or other decorative fence; placing structures the maximum feasible distance from roads and residents; maintaining the surrounding forested landscape to the extent possible; or planting a border of trees along Morris Thomas Road that may include a commitment to uphold the natural buffer for the duration of the project.[401]

344. Minnesota Power committed to selecting a neutral color for the HVDC converter station that would better blend with the landscape, which will further mitigate aesthetic impacts of the project.[402] This commitment should be included as a special permit condition.[403]

345. The DOC-EERA agreed that the Company's proposed mitigation measures to limit visual impacts of the project could reduce potential impacts of the project.[404]

4. Socioeconomic

346. Impacts to socioeconomics at a local and regional level would be minor due to the short-term timeframe of construction of the proposed project. During construction, increased revenue may occur in local businesses from purchases made by utility personnel and contractors.[405]

347. The project is not expected to disrupt local communities or businesses. Positive economic impacts include short-term increased expenditures, for example, food and fuel, at local businesses during construction, which would generate local sales tax.

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[398] Ex. MP-129 at 3 (McCourtney Rebuttal) (eDocket Nos. 20243-204225-08, 20243-204225-07).
[399] DOC-EERA Hearing Comments (Apr. 15, 2024) (eDocket Nos. 20244-205360-01, 20244-205360-02).
[400] Ex. DOC EERA-515 at 114 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[401] Ex. DOC EERA-515 at 114 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[402] Minnesota Power's Comments on EA at 2-3 (Mar. 28, 2024) (eDocket Nos. 20243-204709-01, 20243-204709-02).
[403] DOC-EERA Hearing Comments (Apr. 15, 2024) (eDocket Nos. 20244-205360-01, 20244-205360-02).
[404] DOC-EERA Hearing Comments at 2 (Apr. 15, 2024) (eDocket Nos. 20244-205360-01, 20244-205360-02).
[405] Ex. MP-104 at 74 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); Ex. DOC EERA-515 at 57-58 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).

The Applicant indicates that labor will be procured from local employment resources and construction materials will be purchased from local vendors where practicable. These purchases could include fill, gravel, rock, concrete, rebar, fuel, and miscellaneous electrical equipment.[406]

348. Minn. Stat. § 216E.03, subd. 10(c), requires recipients of route permits from the Commission, including the recipient's construction contractors and subcontractors, pay no less than the prevailing wage rate.[407] This is also a positive socioeconomic impact.

349. Long-term societal benefits of the proposed project include increased property tax revenue of approximately $14.5 million for Minnesota counties (i.e., Wilkin, Ottertail, Becker, Hubbard, Wadena, Cass, Crow Wing, Aitkin, and St. Louis counties) in which the HVDC system is located. In addition, the project will permit the continued delivery of clean, reliable electric service to local customers, which supports the local economy.[408]

350. Because socioeconomic impacts are anticipated to be beneficial to the local communities, no mitigation is proposed.[409]

5. Environmental Justice

351. Environmental justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.

352. Data for the project area does not define it as an environmental justice area under Minn. Stat. § 216B.1691, subd. 1(e), based on the population residing in surrounding census tracts.[410]

353. Because an environmental justice area or a meaningfully greater low-income or minority population does not reside in the project area, the project will not have disproportionately high and adverse human health or environmental effects on low-income, minority, or tribal populations. Mitigation is, therefore, unnecessary.[411]

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[406] Ex. MP-104 at 75 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); Ex. DOC EERA-515 at 58 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[407] Ex. DOC EERA-515 at 58 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[408] Ex. MP-104 at 74 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); Ex. DOC EERA-515 at 58 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[409] Ex. DOC EERA-515 at 58 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[410] Ex. MP-104 at 72–74 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); Ex. DOC EERA-515 at 39–40 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[411] Ex. MP-104 at 75 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); Ex. DOC EERA-515 at 40 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).

6. Zoning and Land Use

354. Current land use within the project area is mainly forested, agricultural, and rural residential with the existing HVDC line corridor. The area includes existing transmission line infrastructure rights-of-way, and the Arrowhead Substations are adjacent to the eastern boundary of the project area. The majority of land cover is forested land, with some cropland and developed land, leaving a small amount of grassland.[412]

355. The project area is within the boundary of both the City of Hermantown and Solway Township zoning ordinances. Solway Township zoning is managed by St. Louis County. Within Hermantown, the project area is zoned rural/suburban, S1. The Solway Township portion of the project area is zoned residential, RES-3.[413]

356. The existence of a power line easement restricts certain activities on a property, which might interfere with the underlying zoning designation by restricting the underlying property owner's development. Easements are conditions in a property title and are independent of zoning. Minnesota Power owns all property within the route width for the proposed project and in the ATC alternative. Impacts to zoning designations or county ordinances are not expected to occur because this is not a densely populated area.[414]

357. Constructing the HVTLs is not anticipated to wholly transform existing land use and cover. For example, planting agricultural crops or using the ROW for grazing land is generally not precluded. However, constructing the HVTLs will permanently change the ROW into a transmission corridor, so for areas that are currently forested, the underlying land use will permanently change. Anything that is currently rural residential or a developed area, will be abandoned. In such case Minnesota Power will seal wells, remove buildings on the property, and fill in any basements that may be present. The converter station and St. Louis County 345 kV/230 kV Substation will permanently change the underlying land use from forested and rural residential areas to an industrial use. Changes in the underlying land use and cover are unavoidable.[415]

358. Potential current and future land use impacts can be mitigated by selecting routes and alignments that are compatible, to the extent possible, with current and future land use and zoning. Maintaining and utilizing the existing ROW to a greater extent, such as with the ATC alternative, mitigates more potential impacts. ATC anticipates that the centerline for its proposed HVTL would be offset from the existing HVDC line by approximately 110 feet,. Thus, the HVTL would share approximately 25 feet of the existing HVDC line ROW. The ATC alternative also requires less HVTL and no St. Louis

[412] Ex. DOC EERA-515 at 41 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02); Ex. DOC EERA-516, Appendix B (Map 6) (eDocket Nos. 20242-203954-03, 20242-203954-04).
[413] Ex. DOC EERA-515 at 41 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[414] Ex. DOC EERA-515 at 42 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[415] Ex. DOC EERA-515 at 42 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).

County 345 kV/230 kV Substation. Accordingly, the ATC alternative would require relatively less tree clearing.[416]

359. Generally, in accordance with Minn. Stat. § 216E.10, subd. 1, after the Commission approves a route, local zoning, building, and land use regulations are preempted Therefore, no mitigation is proposed.[417]

7. Cultural Values

360. Cultural values are shared community beliefs or attitudes that define what is collectively important to the group. These values provide a framework for both individual and communal thought and action. The project study area is rural in nature with an economy based on tourism, recreation, and logging. Mining, manufacturing, shipping, and service industries are concentrated in Duluth and its surrounding communities to the east.[418]

361. Tourism is primarily a factor of natural amenities, including lakes, rivers, and state and national forests, which attract local and regional recreational users. These amenities are important to the identity of the area and provide opportunities for recreational activities such as fishing, hunting, hiking, and snowmobiling. The regional iron mining industry of the Iron Range is a historically important economic factor and is still valued today in the project vicinity. Like the mining industry, logging and manufacture of wood products, including paper, lumber, and household goods, have been valued industries for generations of area residents.[419]

362. Construction and operation of the project under either proposal is not anticipated to impact or alter the work life and leisure pursuits of residents or visitors in the project area or affect land use in such a way as to impact the underlying culture or community unity of the area. At the same time, the development of the project may change the character of the area, at least where it is visible. The value residents place on the character of the landscape within which they live is subjective, meaning its relative value depends upon the perception and philosophical or psychological responses unique to individuals. Because of this, construction of the project might, for some residents, change their perception of the area's character, thus potentially eroding their sense of place. The tension between infrastructure projects and rural character creates real tradeoffs.[420]

363. Having been under private ownership without prior provision for public recreational or economic opportunities, the designated construction land is set to be transferred to Minnesota Power. Thus, no recreational or economic opportunities will be

[416] Ex. DOC EERA-515 at 42 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[417] Ex. DOC EERA-515 at 42 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[418] Ex. MP-104 at 75 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); Ex. DOC EERA-515 at 38 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[419] Ex. MP-104 at 75 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[420] Ex. DOC EERA-515 at 38 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).

removed that previously existed and impact cultural values in the area.[421] The area is rural in nature with an economy based on tourism, recreation, and logging and is anticipated to remain so after construction. The area is already used for electric system infrastructure, including an existing HVDC line, an HVDC terminal, the Arrowhead Substations, and associated facilities. No commercial logging or mining currently happens on lands within the project area.[422]

364. Impacts are anticipated to be minimal for the proposed project area generally, and moderate for nearby residents. Nearby residents may feel a rural sense of place where outdoor activities and pursuits are enjoyed, common to the culture of this area. Minnesota Power has stated that the finished appearance of the buildings will typically look like metal-clad industrial buildings. New transmission buildings or features that may be visible from neighboring properties or roadways, most likely the St. Louis County 345 kV/230 kV Substation near Morris Thomas Road included in the proposed project, may affect the rural character of the surrounding area.[423]

365. Any impacts of the project can be minimized by employing mitigation measures similar to those proposed for aesthetic impacts.[424]

8. Recreation

366. Multiple recreational opportunities exist in the local vicinity including bird watching, biking, fishing, camping, hunting, canoeing/kayaking, hiking, skiing, and snowmobiling. Activities in the local vicinity are associated with trails and rivers rather than designated outdoor recreation areas. There are three recreational areas within one mile of the proposed route. There are three recreational areas within one mile of the proposed route.[425]

367. One perennial designated trout stream is located on the east side of the proposed route. The stream is surrounded by private land within the proposed route. A DNR Forestry parcel, designated as “Other Forest Land,” is located 0.25 miles west of the proposed route. A recreational snowmobile trail is located approximately one mile north-northeast of the proposed route, within the City of Hermantown.[426]

368. The Midway River Aquatic Management Area (AMA) is approximately 0.8 miles east of the project and is part of an AMA made up of six subunits, located on

[421] Ex. MP-104 at 75 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); Ex. DOC EERA-515 at 38 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[422] Ex. MP-104 at 75 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[423] Ex. DOC EERA-515 at 38 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[424] Ex. DOC EERA-515 at 38-39 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[425] Ex. MP-104 at 76 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); Ex. DOC EERA-515 at 51 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[426] Ex. MP-104 at 76 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); Ex. MP-104 at Map 4b (Combined Application Appendix L) (eDocket No. 20236-196333-09, 20236-196333-10); Ex. DOC EERA-515 at 51 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).

private property, and acquired specifically to allow angling access. All other uses require landowner permission. Midway River is a DNR designated Trout Stream.[427]

369. Impacts to recreational activities and other scenic views are anticipated to be similar for both the proposed project and the ATC alternative. The only recreational area within the project area and local vicinity is West Rocky Run, a trout stream that is inaccessible to the public within the proposed route as Minnesota Power's and ATC's properties near their substations are adjacent to the stream. All proposed facilities would be constructed on privately owned lands and therefore no public recreation would be affected within. There are otherwise no wildlife management areas, trout or muskie lakes, state trails, public water access, designated wildlife lakes, or state lands in the local vicinity. There are two state aquatic management areas over a mile away from the proposed route.[428]

370. Construction of the project is not anticipated to disrupt nearby recreational activities. Minnesota Power and its construction contractor will use signs informing the public of construction in the area and any restricted access to transportation routes during construction. [429]

371. New built features will be introduced to the landscape, and construction equipment and vehicle traffic will affect aesthetics. No structures will be placed in or near publicly accessible recreation areas, thus, they will not be visible. Recreationalists using the area generally for hiking or fishing, for example, may see the infrastructure in certain places, however, given the forested nature of the area, visibility is limited with some distance from the project. Recreationalists most likely to be impacted are neighboring properties not owned by Minnesota Power that use the surrounding area for outdoor activities. Neither the proposed project nor the ATC alternative would impact any planned use of the Minnesota Power rights-of-way for a multi-use trail.[430]

372. The Applicant will coordinate with the DNR, U.S. Fish and Wildlife Service (USFWS), Hermantown Parks and Recreation Department, and Solway Township to avoid and minimize impacts to nearby natural resources and trout streams. Because the portion of the designated trout stream in the proposed route is surrounded by land privately owned by Minnesota Power, and for safety purposes related to operation of the project and other existing utility infrastructure, no public angling will be allowed.[431]

373. Overall, no impacts to recreation are anticipated during construction or operation of the project.[432]

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[427] Ex. MP-104 at 76 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); Ex. DOC EERA-515 at 51 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[428] Ex. DOC EERA-515 at 51-52 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[429] Ex. MP-104 at 76 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[430] Ex. DOC EERA-515 at 52 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[431] Ex. MP-104 at 76 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[432] Ex. MP-104 at 76 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); Ex. DOC EERA-515 at 52 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).

9. Public Service and Infrastructure

374. Public services are services provided by a governmental or regulated private entity for public health, safety, and welfare. Large energy projects can impact public services, such as buried utilities or roads. These impacts are usually temporary; for example, road congestion associated with material deliveries.[433]

375. Minnesota Power will coordinate with the Minnesota Department of Transportation (MnDOT) to confirm that construction of the project will not interfere with routine roadway maintenance. Temporary, infrequent localized traffic delays may occur when heavy equipment enters and exits local roadways near the project, or equipment and materials are delivered to the project construction site. To minimize traffic impacts, Minnesota Power will coordinate with local road authorities to schedule large material and or equipment deliveries to avoid periods when traffic volumes are high whenever practical. Traffic control barriers and warning devices will also be used when appropriate. Safety requirements to maintain flow of public traffic will be followed at all times and construction operations will be conducted to offer the least practical obstruction and inconvenience to public travel. Temporary access for construction of the transmission line would be along existing transmission line ROW and on Minnesota Power property. Temporary access for construction of the substation would be on Minnesota Power property or ROW. Immediate impacts to Town Road 889 may include increased use as an access road for vehicles and equipment associated with project transmission line and substation construction. Future use of the road will be determined by Minnesota Power upon completion of the project.[434]

376. Minnesota Power will coordinate any planned outages associated with the project to avoid and/or minimize disruptions to service in the area. Specific standards are required for the design and operating process of transmission lines and associated facilities. These standards and mitigation are outlined in NERC, FERC, and NESC, which aid in the compatibility of new construction with existing utilities. All existing utilities will also be identified and marked prior to construction using public and private utility locator services. Because the project will primarily be constructed on land owned by Minnesota Power and a portion follows existing electric utility ROW, no permanent impacts to utility services or other public services are anticipated. Temporary interruptions of the HVDC line will occur during the commissioning of the new HVDC converter stations, but Minnesota Power does not anticipate that its customers will observe any impacts to their utility service as a result of these efforts.[435]

377. Impacts to public services because of the project, including water and wastewater, roads, railroads, electric utilities, and air safety, are anticipated to be minimal. Impacts that do occur are anticipated to be temporary. Delivery of project materials might

[433] Ex. MP-104 at 77 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); Ex. DOC EERA-515 at 52 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[434] Ex. MP-104 at 77 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[435] Ex. MP-104 at 77 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).

cause minor traffic delays. Additionally, delays might be caused by construction worker traffic or slow-moving construction equipment.[436]

B. Effects on Public Health and Safety

378. Minn. R. 7850.4100(B) requires consideration of the project's effect on public health and safety. The evidence on the record demonstrates that health and safety issues are not anticipated during construction and operation of the facilities.

1. Construction and Operation of Facilities

379. During construction and operation of the proposed project, public safety will be a priority. Safety concerns may include slow moving construction equipment on public roads, construction equipment crossing public roads, wire pulling across public roads and near public areas, and vegetation clearing operations.[437]

380. The project will be designed and constructed in compliance with applicable electric codes. Electrical inspections will ensure proper installation of all components, and the project will undergo routine inspection. Electrical work will be completed by trained technicians. Fencing will deter public access, and signage will provide appropriate public warnings. The project will also be designed in compliance with local, state, and NESC requirements regarding clearance to ground, crossing utilities, and buildings as well as strength of materials and ROW widths. Safeguards will be implemented for construction and operation of the project transmission lines, HVDC converter station, and St. Louis County 345 kV/230 kV Substation. Construction and contract crews will comply with local, state, and NESC standards regarding installation of facilities and standard construction practices.[438]

381. Construction and operation will follow Minnesota Power's established safety procedures and industry safety procedures, including clear signage during construction activities. The proposed HVTLs would be equipped with switching devices, and the HVDC converter station will contain circuit breakers and relays at the transmission line terminations.[439]

382. The project will comply with Occupational Safety and Health Administration standards, which: (1) provide regulations for safety in the workplace; (2) regulate construction safety; and (3) require a Hazard Communication Plan to identify and inventory all hazardous materials for which material safety data sheets will be maintained.[440]

383. Impacts to public health and safety due to the project are anticipated to be minimal and the Applicant has not proposed any mitigation measures. Minnesota Power

[436] Ex. DOC EERA-515 at 54-56 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[437] Ex. MP-104 at 68 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[438] Ex. MP-104 at 66-67 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); Ex. DOC EERA-515 at 66 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[439] Ex. DOC EERA-515 at 67 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[440] Ex. DOC EERA-515 at 67 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).

will ensure that safety requirements are met during construction and operation of the transmission line and substation. During active construction, measures will be taken to ensure the safety of local residents, including, but not limited to, signage where active construction is occurring, flaggers at roads, and barriers around active construction zones. Additionally, when crossing roads during stringing operations, guard structures will be used to provide safeguards for the public.[441]

2. Electric and Magnetic Fields

384. Overall, no affects to public health and safety are anticipated as a result of the project, including affects to public health and safety from electric and magnetic fields (EMFs).[442] Potential impacts are anticipated to be negligible and are not expected to negatively affect human health. Impacts will be long-term and localized but can be minimized.[443]

385. The HVTL will be constructed to maintain proper safety clearances. The converter station and other project infrastructure will not be accessible to the public. Thus, people are not expected to get close enough to experience maximum calculated EMF levels. No additional mitigation is proposed.[444]

386. Based on the predicted EMF levels for the project, no adverse health impacts from electric or magnetic fields are anticipated for persons living or working near any of the components of the project.[445]

3. Implantable Medical Devices

387. The potential impacts of electric fields include interference with the operation of implantable medical devices such as pacemakers. Interference with implanted cardiac devices can occur if the electric field intensity is high enough to induce sufficient body currents to cause interaction. In the unlikely event a pacemaker is impacted, the effect is typically a temporary asynchronous pacing. The pacemaker would return to its normal operation when the person moves away from the source of the interference.[446]

4. Stray Voltage and Induced Voltage

388. Stray voltage is a condition that can occur on the electric service entrances to structures from distribution lines – not transmission lines. More precisely, stray voltage is a voltage that exists between the neutral wire of the service entrance and grounded

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[441] Ex. MP-104 at 66-67 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); Ex. DOC EERA-515 at 65-68 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[442] Ex. MP-104 at 60-61 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); Ex. DOC EERA-515 at 58-63 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[443] Ex. DOC EERA-515 at 61 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[444] Ex. DOC EERA-515 at 63 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[445] Ex. DOC EERA-515 at 58-63 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[446] Ex. MP-104 at 61 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); Ex. DOC EERA-515 at 63-65 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).

objects in buildings such as barns and milking parlors. This is called neutral-to-earth voltage (NEV).[447]

389. Transmission lines do not, by themselves, create stray voltage because they do not connect to businesses or residences. Transmission lines can, however, induce stray voltage on a distribution circuit that is parallel and immediately under the transmission line. The project will not parallel any distribution lines.[448]

390. The proposed HVTL does not interconnect to businesses or residences within either routing option and does not change local electrical service. It is typical practice for the interconnecting transmission owner to own the tie-line facilities. As a result, impacts to residences or farming operations from NEV are not anticipated.[449]

391. The project might induce a voltage on insulated metal objects within the final ROW; however, the Commission requires that transmission lines be constructed and operated to meet NESC standards as well as the Commission's own electric field limit of 8 kV/m reducing these impacts. Additionally, rights-of-way for either routing option will not be on public property or accessible to the public. As a result, impacts due to induced voltage are not anticipated to occur.[450]

392. The Draft Route Permit requires the project meet electrical performance standards. Thus, no additional mitigation is proposed.[451]

C. Effects on Land-Based Economies

393. Minn. R. 7850.4100(C) requires consideration of the project's effects on land-based economies, specifically agriculture, forestry, tourism, and mining.

394. Anticipated impacts to forestry, agriculture, tourism, and mining are anticipated to be negligible to minimal or are otherwise consistent with the routing criteria.[452]

1. Agriculture

395. There are no known agricultural areas or prime farmland near the project area. Project infrastructure will therefore not interfere with current farming or grazing operations. As all land for the project will be owned by Minnesota Power, the project is also not expected to interfere with future agricultural operations.[453]

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[447] Ex. MP-104 at 62 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); Ex. DOC EERA-515 at 67 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[448] Ex. MP-104 at 62 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[449] Ex. DOC EERA-515 at 68 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[450] Ex. DOC EERA-515 at 68-69 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[451] Ex. DOC EERA-515 at 69 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[452] Ex. DOC EERA-515 at 126 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[453] Ex. MP-104 at 78 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); Ex. DOC EERA-515 at 103 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).

2. Forestry

396. While much of the project study area is considered deciduous forest, active forestry operations, including commercial timber harvest, woodlots, or other forestry resources do not occur within the project area. Because Minnesota Power will own all property for construction of the project, current personal timber harvest or future commercial forestry operations are precluded. Impacts to forestry operations will not occur.[454]

3. Tourism

397. Electrical infrastructure can impact tourism if they affect visitor experiences at tourism sites, primarily through aesthetic or noise impacts, or degrade natural or human-made resources that provide tourist-type activities. There are no tourist activities or areas near or within the project area, and all land will be privately owned by Minnesota Power. Further, the project will have no impact on tourism elsewhere in the County. No mitigation is proposed.[455]

4. Mining

398. There are no existing mines in the region of influence, which is the route width.[456]

399. There are no aggregate resources in the route widths for the proposed project or the ATC alternative. There is one aggregate pit within the project study area and two within the project area.[457]

400. The DNR has underground mineral rights, but no surface mineral rights within the Minnesota Power's property for the project. The construction of the project will interfere with any possible future geophysical surveys of the project property and could require Minnesota Power to move project facilities, but the routing and facilities are to be designed to avoid impacts to existing gravel pits. Therefore, no mitigation is proposed.[458]

D. Effects on Archaeological and Historic Resources

401. Minn. R. 7850.4100(D) requires consideration of the project's effects on archeological and historical resources.

402. Archeological resources are locations where objects or other evidence of archaeological interest exist, and can include aboriginal mounds and earthworks, ancient

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[454] Ex. MP-104 at 78 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); Ex. DOC EERA-515 at 104 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[455] Ex. MP-104 at 79 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); Ex. DOC EERA-515 at 105 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[456] Ex. DOC EERA-515 at 69 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[457] *Id.*
[458] Ex. MP-104 at 79 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); Ex. DOC EERA-515 at 69-70 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).

burial grounds, prehistoric ruins, or historical remains. Sites not included in state agency datasets may include locations known to Minnesota Indian Tribes to have cultural importance. Coordination with tribal historic preservation offices prevents impacts from the project to known traditional cultural properties. Historic resources are sites, buildings, structures or other antiquities of state or national significance.[459]

403. Minnesota Power hired a third-party to conduct a Phase I Reconnaissance Survey for the project in August 2022. This review covers the parcels that were accessible within the project study area at the time because survey permission was granted by landowners. This survey acknowledged that an additional survey would be needed to cover the remainder of the project area and was included with the Combined Application. Minnesota Power submitted an updated survey to the record with the State Historic Preservation Office (SHPO) concurrence from December 2023 that included the entire project study area (*see* EA, Appendix G). The SHPO reviewed the information pursuant to the responsibilities under the Minnesota Historic Sites Act (Minn. Stat. §§ 138.665-666) and the Minnesota Field Archaeology Act (Minn. Stat. § 138.40).[460]

404. The SHPO confirmed Minnesota Power's assertion that one archaeological site, site 21SL1274, was identified during the 2022 field investigations and that this site has not been evaluated for eligibility of listing in the National Register of Historic Places (NRHP). The SHPO concurred that no additional archaeological resources were identified in the updated survey. The SHPO further requested avoidance of site 21SL1274 during all construction activity and recommended a 100-meter buffer to ensure it would not be impacted. The proposed project has designed a 150-meter buffer around the site and the ATC alternative will avoid this feature by complying with the 100-meter buffer. As such, impacts to this resource are not anticipated.[461]

405. Prudent routing can avoid impacts to archaeological and historic resources. This is the preferred mitigation. Section 5.3.14 of the Draft Route Permit addresses archeological resources. If previously unidentified archaeological sites are found during construction, the Applicant is required to stop construction and contact the SHPO to determine how best to proceed. Ground disturbing activity must stop and local law enforcement must be notified should human remains be discovered.[462]

406. As noted by the SHPO, future surveys should include a subsurface investigation component due to the potential for shallowly buried archaeological sites in forest settings that are not easily identified on the surface.[463]

407. The SHPO concluded that, based on information available to them at the time of review, there are no properties listed in the NRHP and no known or suspected archaeological properties in the area that will be affected by the project. The same

[459] Ex. DOC EERA-515 at 70 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[460] Ex. DOC EERA-515 at 71 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02); Ex. DOC EERA-516 at Appendix G (EA Appendices) (eDocket Nos. 20243-204084-01, 20242-203954-03).
[461] Ex. DOC EERA-515 at 71 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[462] Ex. DOC EERA-515 at 71 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[463] Ex. DOC EERA-515 at 72 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).

conclusion applies to the ATC alternative because it is in within the study area encompassed by the project review. Since impacts to archeological and historic resources are not anticipated, mitigation is not proposed.[464]

E. Effects on the Natural Environment

408. Minn. R. 7850.4100(E) requires consideration of the project's effects on the natural environment, including effects on air and water quality and flora and fauna.

409. The evidence on the record demonstrates that while both the project and the ATC alternative are anticipated to largely have negligible to minimal impacts to the natural environment, both the proposed project and the ATC alternative are anticipated to have moderate impacts to surface waters and vegetation.[465] Minnesota Power's proposed configuration to double-circuit the West Rocky Run Creek with a new ROW width could mitigate impacts to surface waters compared to the ATC alternative.[466]

1. Air Quality

410. Impacts to air quality are anticipated to be negligible with the use of standard construction techniques and the general conditions in the Draft Route Permit.[467]

411. Temporary and localized air quality impacts caused by construction vehicle emissions and fugitive dust from ROW clearing and construction activities are expected to occur. Exhaust emissions from diesel equipment will vary during construction but will be minimal and temporary. The magnitude of emissions is influenced heavily by weather conditions and the specific construction activity taking place. Appropriate dust control measures, including the use of wetting unpaved roads and ROW access points will be implemented to mitigate impacts.[468]

412. Both the proposed project and the ATC alternative would generally use paved roads, such as Morris Thomas Road, to access construction areas. If the existing road to the Arrowhead Substation is to be used, that road is unpaved. The ATC alternative would see increased use of this road more than the proposed project to access the construction area. Solway Road is paved and may also be used during construction of the ATC alternative. Sandberg Road is unpaved and is more likely to see increased use during construction of the proposed project to access the construction area. However, the ATC alternative may equally utilize this option to build the converter station as an access

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[464] Ex. MP-104 at 81 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); Ex. DOC EERA-515 at 70-72 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[465] Ex. DOC EERA-515 at 70-72 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[466] Ex. DOC EERA-515 at 88-89 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02); DOC-EERA Hearing Comments at 3 (Apr. 15, 2024) (eDocket Nos. 20244-205360-01, 20244-205360-02); Ex. MP-120 at 12 (McCourtney Direct) (eDocket Nos. 20242-203446-10, 20242-203446-09).
[467] Ex. MP-104 at 82 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); Ex. DOC EERA-515 at 72-75 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[468] Ex. MP-104 at 82 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); Ex. DOC EERA-515 at 73-74 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).

road is proposed there (see EA, Appendix B, Map 3). To construct the St. Louis County 345 kV/230 kV Substation, the unpaved Solway Road is likely to be used.[469]

413. The only potential air emissions from a transmission line or conductors within the substation result from corona, which may produce ozone and oxides of nitrogen. For operations and maintenance activities, the ATC alternative would involve slightly less impact than the project, but only because there would be slightly less linear infrastructure.[470]

2. Greenhouse Gases

414. The project will help to shift energy production in Minnesota and the upper Midwest toward carbon-free sources. Thus, the proposed project will be beneficial over time. Total greenhouse gas (GHG) emissions for project construction are estimated to be approximately 9,019 tons of carbon dioxide (CO_2). Operational impacts from the formation of nitrous oxide and release of sulfur hexafluoride are minimal. Potential impacts due to both construction and operational GHG emissions are anticipated to be minimal, unavoidable, and can be minimized.[471]

415. Deforestation contributes to carbon dioxide in the atmosphere, as trees and forest land act as a "carbon sink," absorbing carbon dioxide from the atmosphere and storing it. Moreover, removing forests releases stored carbon stock, either through burning or decay. Some vegetation recovery will be a part of the project after construction, but a one-for-one replacement plan is not proposed, resulting in a net loss.[472]

416. While the proposed project's total area is larger than the area required by the ATC alternative (51.09 v. 40.12 acres respectively), nearly a half-acre more area will be affected by forest clearing with the ATC alternative.[473]

417. Construction activities will result in short-term increases in GHG emissions because of the combustion of fossil fuels in construction equipment and vehicles. Sulfur hexafluoride (SF_6), a potent GHG, will be used at the HVDC converter station and St. Louis County 345 kV/230 kV Substation. SF_6 is a common gas used in high voltage circuit breakers to extinguish arcs formed when the circuit breaker opens. Small releases will occur as part of regular breaker operation and maintenance. SF_6 will be sealed during regular circumstances with no active emissions.[474]

418. The upgraded HVDC converter station must be considered as an environmental impact for both the proposed project and the ATC alternative. It was not included in ATC's construction impact estimates. Thus, the impact of GHG emissions for

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[469] Ex. DOC EERA-515 at 74 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02); Ex. DOC EERA-516, Appendix B (Map 3) (eDocket Nos. 20242-203954-03, 20242-203954-04).
[470] Ex. MP-104 at 82 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); Ex. DOC EERA-515 at 74-75 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[471] Ex. DOC EERA-515 at 75 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[472] Ex. DOC EERA-515 at 75 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[473] Ex. DOC EERA-515 at 76 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[474] Ex. DOC EERA-515 at 77 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).

ATC alternative is higher than ATC estimates claim, but still less than the proposed project.[475]

419. GHG emissions for project construction are anticipated to be an insignificant amount relative to the state's overall annual transportation emissions. Overall, compared to emissions for the state of Minnesota, potential impacts due to construction GHG emissions for the project are anticipated to be minimal.[476]

420. Once operational, the project will generate considerably less GHG emissions than construction. Operational emissions include processes such as lighting, monitoring equipment, utilized electricity, and maintenance/employee vehicle usage. Over the project's life, the amount of electricity generated by renewable sources due to the upgraded HVDC line are expected to largely outweigh the amount of electricity it consumes. Potential impacts due to operational GHG emissions are anticipated to be minimal.[477]

421. Minimizing SF_6 emissions through operational best management practices (BMPs) can reduce GHG. The Applicant monitors for SF_6 equipment leaks for reporting to the Environmental Protection Agency and prioritizes maintenance and replacement of any leaking equipment.[478]

3. Climate Change

422. Construction emissions will have a short-term negligible increase in GHG that contribute to climate change. The project's design incorporates elements that minimize impacts from the increase in extreme weather events, such as increased flooding, storms, and heat wave events, that are expected to accompany a warming climate. Impacts are expected to be minimal as the project is expected to beneficially impact climate change.[479]

423. Because this is a reliability project, it will improve the electrical transmission system, making it more resilient and reducing potential for peak overloads during heat wave events.[480]

424. Because no significant impacts to air quality are anticipated from the operation of the new or existing substations or the HVDC converter station, no mitigation is proposed with respect to operational impacts. The transmission lines and associated

[475] Ex. MP-104 at 83 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); Ex. DOC EERA-515 at 77 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[476] Ex. DOC EERA-515 at 77 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[477] Ex. MP-104 at 83 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); Ex. DOC EERA-515 at 77 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[478] Ex. MP-104 at 83 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); Ex. DOC EERA-515 at 77 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[479] Ex. DOC EERA-515 at 78 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[480] Ex. DOC EERA-515 at 78 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).

structures included in the project will be designed to remove points of potential corona concentrations to minimize potential losses.[481]

425. Construction best management practices for dust control including the use of wetting unpaved roads and ROW access points will be implemented and equipment idling will be minimized to reduce any short-term air quality impacts.[482]

426. West Rocky Run is a designated trout stream that supports wild brook trout. Increased stream temperatures are one of the greatest threats to cold water trout streams. Maintaining sufficient canopy and vegetative shading is especially important to protect cold water trout streams given that there are already multiple utility crossings of West Rocky Run to the north and south of the proposed project. For example, West Rocky Run is crossed by three utility lines near Morris Thomas Road, which is less than one-half mile north of Minnesota Power's existing Arrowhead Substation. Additional loss of shade to this trout stream is a long-term impact with potential to affect many miles of trout water downstream.[483]

427. Both the project and the ATC alternative propose to clear one additional ROW in a part of the trout stream that is already impaired and experiencing warming from previous clearing. Both routes would increase the amount of stream corridor maintained in a cleared state, resulting in a large area with no large shade trees within the riparian corridor.[484]

428. Although the ATC alternative uses much of the existing 250 kV ROW, it also requires new trout stream crossings, which are within a previously undisturbed forested area. Although no structures are planned to be placed within waterbodies, the clearance requirements for the ROW to span West Rocky Run will cause the removal of tree cover that provides shade, which could potentially increase the temperature of the water, and negatively affect trout, a cold-water fish. If trees are removed, it would take some time for trees and other vegetation to grow in again and re-shade the stream. As the HVDC line will be decommissioned/removed for both system alternatives, re-shading of this area will also take some time but may provide future minimization of warming impacts. This impact could be exacerbated from the future effects of climate change.[485]

429. Minnesota Power has proposed to double-circuit its 230 kV line between the proposed 345 kV/230 kV St. Louis County Substation and Minnesota Power's 230 kV/115 kV Arrowhead Substation to reduce the crossings of the West Rocky Run Creek from two to one for Minnesota Power's proposed configuration. This mitigative measure will allow for the eventual revegetation of the existing HVDC line's West Rocky Run Creek crossing. Specifically, this proposed configuration would allow for Minnesota

[481] Ex. MP-104 at 84 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[482] Ex. MP-104 at 84 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[483] Ex. DOC EERA-515 at 79 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[484] Ex. DOC EERA-515 at 79 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[485] Ex. DOC EERA-515 at 79 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).

Power to maintain the one crossing of the West Rocky Run Creek, as opposed to requiring two crossings.[486]

430. This proposal will also avoid the need to expand the ROW from 120 feet to 260 feet, as was contemplated in the Combined Application. Instead, the final ROW width at West Rocky Run Creek will be 130 feet to accommodate the double-circuit 230 kV transmission line. The centerline of this ROW will be north of the existing HVDC line right-of-way. This configuration and staging are necessary to ensure that the existing HVDC line is not taken out of service until the new infrastructure is ready to be placed in service. Once the new double-circuit 230 kV line is energized, the HVDC line will be removed from this crossing and the streambanks will be allowed to revegetate.[487]

431. The DOC-EERA agreed that this mitigation measure may reduce potential impacts of the project.[488] The double-circuit 230 kV crossing of West Rocky Run Creek addresses the moderate impacts as it will result in a final right-of-way approximately as wide as the existing ±250 kV transmission line after construction of the double-circuit 230 kV transmission line is complete, removal of the ±250 kV transmission line is complete, and revegetation occurs.[489]

432. The project location is outside of the 100-year floodplain and on upland areas, which minimizes susceptibility. While 500-year floods are also expected to be more common due to climate change, the project's upland location minimizes susceptibility. Slopes of variable grades are present throughout the proposed route. Project transmission towers and buildings will be designed to withstand extreme weather events, including high winds.[490]

433. Vegetation clearing that will be a part of the project is ultimately expected to be partially offset by the vegetation management required after construction. This vegetation is unlikely to store as much GHG as the forested areas otherwise would have; but will nonetheless increase the carbon storage capacity of the land.[491]

434. Heavy rainfall events could lead to increased soil erosion. The HVDC converter station will require grading and leveling for construction access and activities and, therefore, will have localized impacts on topography and drainage patterns. Ground disturbance will be minimized where practical, and disturbed ground will be restabilized after construction. Transmission line structures are typically designed for installation at existing grades. Because of this, minimal grading and leveling will be needed at structure sites unless it is necessary to provide a reasonably level area for construction access and

[486] Ex. MP-129 at 5 (McCourtney Rebuttal) (eDocket Nos. 20243-204225-08, 20243-204225-07).
[487] Ex. MP-129 at 5 (McCourtney Rebuttal) (eDocket Nos. 20243-204225-08, 20243-204225-07).
[488] DOC-EERA Hearing Comments at 2 (Apr. 15, 2024) (eDocket Nos. 20244-205360-01, 20244-205360-02).
[489] Ex. MP-120 at 12 (McCourtney Direct) (eDocket Nos. 20242-203446-10, 20242-203446-09).
[490] Ex. DOC EERA-515 at 79 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[491] Ex. DOC EERA-515 at 79 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).

activities. Construction of the transmission lines will have minimal to no impact on the topography and drainage patterns of the area.[492]

435. There are also several wetlands in the area, which serve to alleviate flooding for a heavy rainfall or flooding events. The project does not include a stormwater permit or control, so additional stormwater from increased impervious surface to account for the expected increase in precipitation will not be available, increasing runoff before discharging offsite. This impact would be larger for the ATC alternative. Efforts will assist in managing impacts from increased storm intensity and frequency, but such efforts may not fully mitigate the anticipated effects from climate change.[493]

4. Water Quality

436. Potential impacts to surface waters are anticipated to be moderate for both the project and the ATC alternative.[494] Minnesota Power has proposed double-circuiting of its 230 kV line between the proposed 345 kV/230 kV St. Louis County Substation and Minnesota Power's 230 kV/115 kV Arrowhead Substation to reduce the crossings of the West Rocky Run Creek from two to one for Minnesota Power's proposed configuration as a way to mitigate impacts of the project on surface waters.[495]

a. Surface Waters

437. The surface topography in the project area is characterized by a series of hills with multiple drainages running west to east leading water down to West Rocky Run, a designated trout stream. In the project area, the main surface water feature is West Rocky Run (AUID: 04010201-625), a tributary to the Midway River, which flows to the St. Louis River and Lake Superior. Other surface water in the project area includes a small ephemeral stream channel connecting a shallow marsh and an open pond, the pond located approximately 75 feet east of West Rocky Run and 300 feet west of Arrowhead Substation.[496]

438. Minnesota water quality standards protect lakes, rivers, streams, and wetlands by defining how much of a pollutant (bacteria, nutrients, turbidity, mercury, etc.) can be in the water before it is no longer drinkable, swimmable, fishable, or useable in other, designated ways. An impaired water fails to meet one or more water quality standards. West Rocky Run is classified by the MPCA as an impaired waterbody due to concentrations of E. coli exceeding water quality standards. A Total Maximum Daily Load plan has been approved by the U.S. Environmental Protection Agency for this impairment.[497]

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[492] Ex. DOC EERA-515 at 79-80 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[493] Ex. DOC EERA-515 at 80 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[494] Ex. DOC EERA-515 at 127-29 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[495] Ex. MP-129 at 5 (McCourtney Rebuttal) (eDocket Nos. 20243-204225-08, 20243-204225-07).
[496] Ex. DOC EERA-515 at 86-87 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[497] Ex. DOC EERA-515 at 87 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).

439. No lakes are present within the project study area. Several small ponds are present within the project study area but there are no non-wetland waterbodies of any kind within the proposed route. Pike Lake, the closest lake, is approximately six miles north of the project study area.[498]

440. Potential impacts to surface water related to the project include soil disturbance from construction, stormwater runoff, dewatering of foundation borings, and transmission lines crossing West Rocky Run, for both the proposed project and the ATC alternative. Construction equipment use, repair, and maintenance involves fluids that may leak or spill with the potential to reach surface water. If equipment crosses a watercourse or inadvertently enters a waterbody, direct impacts, for example, bottom disturbance or petroleum-based products washing into the water, would occur.[499]

441. Stormwater runoff from construction areas can cause direct impacts to surface waters by discharging sediment into the waterbody and damaging riparian vegetation along the shore. Soils will be disturbed by clearing trees and vegetation, access road construction, and site grading for project components. More site grading will be conducted for the proposed project, whereas the construction of access roads is closer to West Rocky Run for the ATC alternative (*see* EA, Appendix B, Map 3).[500]

442. If dewatering is necessary, water removed could contain sediments or pollutants that might be introduced into surface waters. Minnesota Power does not anticipate that dewatering will be necessary as plans are to use a bucket auger or bucket pile instead. Water leaking from this equipment can nevertheless cause similar impacts to surface waters. If dewatering exceeds 10,000 gallons a day, a DNR Water Appropriations Permit will be required. A construction storm water (CSW) permit will regulate water discharge regardless, especially in the case of West Rocky Run.[501]

443. Trout rely on cold-water habitat. As a result, clearing of trees along designated trout streams and their tributaries may result in adverse warming of the stream water. Shade provided by trees and shrubs is important to minimize thermal impacts to trout streams. The Applicant will work with the DNR to obtain proper licenses and approvals for public water crossings by the proposed project and to identify appropriate measures to minimize temperature-related impacts to the stream.[502]

444. Direct impacts to West Rocky Run cannot be avoided by the project, primarily derived from tree clearing for the new transmission line ROW. Potential impacts to surface waters are anticipated to be moderate for both system alternatives which will clear one additional ROW in a part of the trout stream that is already impaired and experiencing warming from previous ROW clearing.[503]

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[498] Ex. MP-104 at 86 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[499] Ex. DOC EERA-515 at 87-88 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[500] Ex. DOC EERA-515 at 88 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[501] Ex. DOC EERA-515 at 88 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[502] Ex. MP-104 at 87 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[503] Ex. DOC EERA-515 at 87 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).

445. Presently, in the project area, there are two crossings of West Rocky Run by transmission lines. Both the proposed project and the ATC alternative would be crossing near existing ROW that is cleared. The ROW for the proposed project will regrow over time, whereas the ROW will remain cleared near the ATC alternative's new crossing, which could exacerbate warming impacts.[504]

446. In its April 15, 2024 Hearing Comments, the DOC-EERA stated that it did not agree that ATC had offered a buffer of low-growing vegetation adjacent to West Rocky Run in testimony. The DOC-EERA did not agree that any vegetation buffer at the crossing under the ATC alternative would change the conclusions in the EA.[505] Therefore, the DOC-EERA concluded that the ATC alternative would present slightly higher potential for warming impacts to the West Rocky Run, as compared to the proposed project.[506]

447. There could be impacts to West Rocky Run due to causes other than crossings. Additional impacts could occur from sanitation systems associated with the new converter station and the St. Louis County 345 kV/230 kV Substation that are utilizing a septic tank. If the tank were to experience a failure or be subject to flooding, a release could increase E. coli impairments in West Rocky Run.[507]

448. Through the license approval process, Minnesota Power and the DNR will determine the appropriate mitigation or avoidance measures for public water crossings, including trout streams. Avoidance measures may include timing restrictions such as no in-water work between September 15 and June 30. In addition, special clearing setbacks may be required when working near the trout stream. Where practicable, a 75-foot vegetated buffer will be maintained adjacent to the trout stream, except for a 20-foot-wide travel path. In locations where clearing activities must take place within the 75-foot buffer, hand clearing techniques will be used to minimize impacts to soils and existing vegetation. Rootstock of woody vegetation will remain in place to minimize impacts to soils and allow existing vegetation to regrow more quickly.[508]

449. Through the National Pollutant Discharge Elimination System permitting process, the project will be required to comply with Section 23.1 of the Construction General Permit MNR100001, which includes designated trout streams within the definition of special waters. BMPs, such as redundant perimeter controls and the stabilization of exposed soils immediately upon completion of work within the 75-foot buffer, will be implemented to minimize erosion near DNR-designated trout streams.[509]

450. Minnesota Power's proposal to double-circuit its 230 kV line between the proposed St. Louis County 345 kV/230 kV Substation and Minnesota Power's 230 kV/115

[504] Ex. DOC EERA-515 at 88-89 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[505] DOC-EERA Hearing Comments at 3 (Apr. 15, 2024) (eDocket Nos. 20244-205360-01, 20244-205360-02).
[506] DOC-EERA Hearing Comments at 3 (Apr. 15, 2024) (eDocket Nos. 20244-205360-01, 20244-205360-02).
[507] Ex. DOC EERA-515 at 89 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[508] Ex. MP-104 at 87 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[509] Ex. MP-104 at 87 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).

kV Arrowhead Substation would reduce the crossings of the West Rocky Run Creek from two to one for project configuration and would, therefore, reduce impacts to the West Rocky Run Creek.[510]

451. Minnesota Power will place a minimum 50-foot natural vegetative buffer on both banks of the stream crossing to maintain habitat and bank stability. Additionally, ROW clearing within no less than 30 feet of non-DNR jurisdictional streams or wetlands will be conducted to protect all non-invasive vegetation. Lastly, brush species will be left across a majority of the ROW, except brush in the wire zone will be removed to facilitate ROW access. Low growing woody vegetation could be allowed where it is consistent with engineering design and safe operation of the line.[511]

452. Use of the wire/border zone vegetation clearing method could help to stabilize soils by allowing certain low growing woody vegetation and trees to persist along the outside edges of the ROW. This allows for different types and heights of vegetation based on whether the vegetation is directly underneath the conductor (wire zone) or elsewhere in the ROW (border zone). This type of vegetation management could be required in the Draft Route Permit as a special condition near West Rocky Run:

- Wire Zone Area directly underneath the conductors, including potential conductor sway. Vegetation in this zone consists of low-growing forbs and grasses.

- Border Zone Area that begins at the outside edge of the wire zone and extends to the edge of the right-of-way. This zone may contain additional low-growing woody plants and trees. [512]

453. The EA noted that the wire/border zone method appears consistent with the Hermantown Shoreland Ordinance (555.07206). The ordinance restricts the removal of natural vegetation to prevent erosion into public waters, to conserve nutrients in the soil, and to preserve shoreland aesthetics except when sufficient vegetation cover will remain to screen structures from the water and when natural vegetation is restored to the extent feasible. While the DOC-EERA acknowledges this is clearly not feasible at all locations within the ROW, it might be feasible within the border zone.[513]

b. Wetlands

454. Wetlands are important resources for flood abatement, wildlife habitat, and water quality. Wetlands that are hydrologically connected to the nation's navigable streams are protected under Section 404 of the federal CWA and most wetlands in Minnesota are protected under the state Wetland Conservation Act (WCA). The USFWS

[510] Ex. MP-129 at 5 (McCourtney Rebuttal) (eDocket Nos. 20243-204225-08, 20243-204225-07); DOC-EERA Hearing Comments at 2 (Apr. 15, 2024) (eDocket Nos. 20244-205360-01, 20244-205360-02).
[511] Ex. DOC EERA-515 at 89 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02); Ex. MP-123 (VMP) (eDocket Nos. 20242-203665-11, 20242-203665-12).
[512] Ex. DOC EERA-515 at 90 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[513] Ex. DOC EERA-515 at 90 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).

National Wetlands Inventory (NWI) is a publicly available GIS database that provides information regarding the potential existence of wetlands. NWI data should be used as a reference only and may be inconsistent with wetland conditions on the ground.[514]

455. A Wetlands and Waterbody Delineation Report was prepared by a third party in October 2023, which covers 276 acres of the project study area, excluding the southwest corner. Field surveys were conducted August 22-24, 2022, September 22-23, 2022, and July 31-August 2, 2023. The survey identified 29 discrete wetlands totaling 55.92 acres within the survey area.[515]

456. The proposed location for the St. Louis County 345 kV/230 kV Substation would entirely cover one 0.04-acre fresh (wet) meadow PEM wetland and might occupy small portions (<0.5-acre total) of two wetlands (mostly shrub-carr PSS, some fresh (wet) meadow PEM) on the eastern boundary. The proposed location for the HVDC converter station would cover half or more of a 4.8-acre alder thicket PSS wetland.[516]

457. For both the proposed project and ATC alternative, transmission lines and their new rights-of-way would mostly span wetlands and would not require wetland vegetation clearing. When a wetland cannot be avoided, construction must occur within the wetland under permit by the USACE, which may include mitigation ratios as a condition. Minnesota Power will site structures outside of wetlands.[517]

458. Overall, the wetland impact for the ATC alternative and the proposed project are similar. Permanent impacts would involve structure placement or other project-related fill material being placed within a wetland for the life of the project. Minnesota Power estimates the current design would permanently impact 7.04 acres, whereas the ATC alternative would likely impact 6.6 acres. The upgraded HVDC converter station and permanently converted wetland must be included in environmental impact estimates for both system alternatives.[518]

459. A summary of permanent fill, permanent conversion, and temporary impacts to wetlands for both system alternatives is presented in Table 7, Figure 3, and

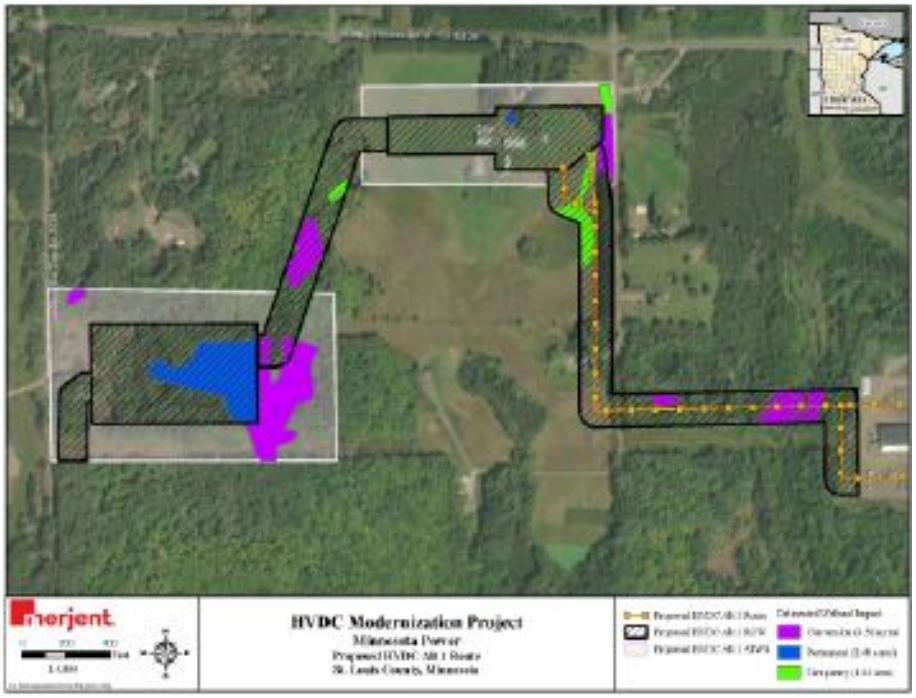
[514] Ex. MP-104 at 88 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); Ex. DOC EERA-515 at 115 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[515] Ex. DOC EERA-515 at 116 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02); Ex. MP-125 (Wetland and Waterbody Delineation Report) (eDocket Nos. 20242-203663-09, 20242-203663-07, 20242-203663-05, 20242-203663-03, 20242-203663-01, 20242-203661-18, 20242-203661-16, 20242-203661-14, 20242-203661-12, 20242-203661-10, 20242-203661-08, 20242-203661-06, 20242-203661-04, 20242-203661-02, 20242-203663-10, 20242-203663-08, 20242-203663-06, 20242-203663-04, 20242-203663-02, 20242-203661-17, 20242-203661-15, 20242-203661-13, 20242-203661-11, 20242-203661-09, 20242-203661-07, 20242-203661-05, 20242-203661-03, 20242-203661-01).
[516] Ex. DOC EERA-515 at 116 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[517] Ex. MP-104 at 88 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); Ex. DOC EERA-515 at 117 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[518] Ex. MP-104 at 88 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); Ex. DOC EERA-515 at 117 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).

460. Figure 4 below. These estimates include data for the HVDC converter station for both options, include all construction designs, and are based on Minnesota Power's most recent wetland delineation.

Table 7. Project Wetland Impacts[519]

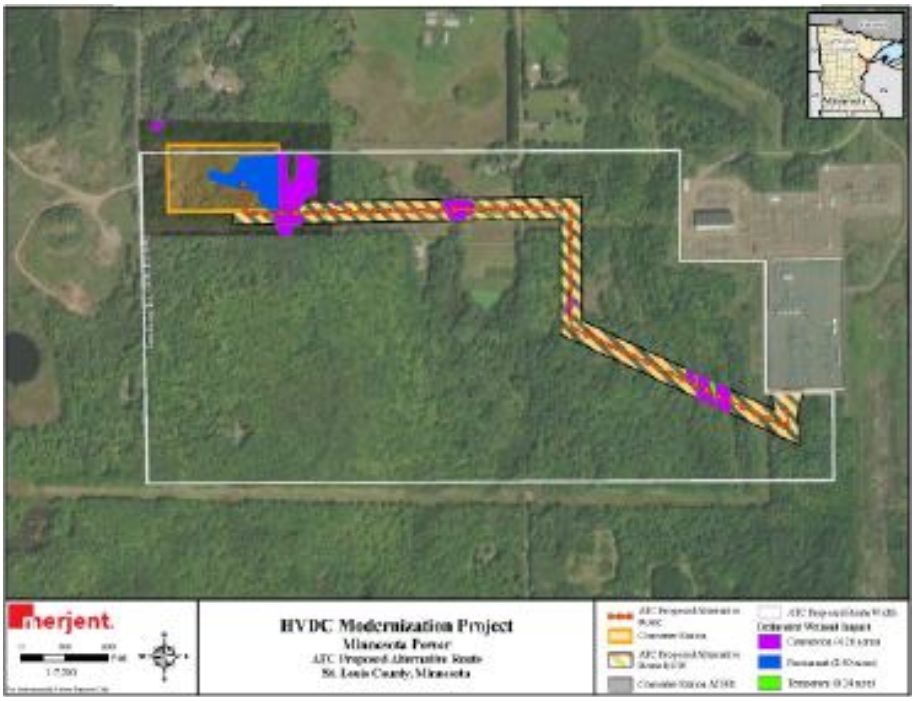
Impact Type	Proposed Project	ATC Alternative
TOTAL Fill (Permanent Impact) *Includes building footprints*	**2.48 acres**	**2.40 acres**
TOTAL Conversion (Permanent Impact)	**4.56 acres**	**4.20 acres**
Conversion: ROW with wetland clearing	*2.06 acres*	*2.30 acres*
Conversion: building construction extents	*2.5 acres*	*1.9 acres*
TOTAL Temporary Impact	**1.04 acres**	**0.24 acres**
Temporary: construction in ROW	*0.9 acres*	*0.24 acres*
Temporary: building construction extents	*0.14 acres*	*NA*

Figure 3. Delineated Wetland Covered by the Proposed Project[520]



[519] Ex. DOC EERA-515 at 117 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[520] Ex. DOC EERA-515 at 118 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).

Figure 4. Delineated Wetland Covered by the ATC Alternative[521]



461. The ATC alternative is estimated to convert 4.2 acres of forested wetland, whereas the proposed project is estimated to convert 4.56 acres. This was determined by taking construction extents into account, as can be seen on Figure 3 and

462. Figure 4. During construction, spoil could fall back into the wetland if appropriate precautions are not taken. Commission route permits require that all spoil be removed from the wetland.[522]

463. Temporary impacts based on the proposed project's updated design could amount to 1.04 acres of impacted area. These impacts would include temporary fill via construction matting placement along access routes, structure work areas, and wire pull sites.[523]

464. Based on the results of delineation and wetlands identified, mitigation would be required in accordance with the federal Clean Water Act, DNR Public Waters and Wetlands Work Permit, and WCA requirements. Mitigation developed on the route and final ROW will include wetland replacement as necessary for long-term impacts and location-specific wetland avoidance measures. Minnesota Power believes that the project

[521] Ex. DOC EERA-515 at 118 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[522] Ex. DOC EERA-515 at 119 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[523] Ex. DOC EERA-515 at 119 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).

will qualify for the utility exemption from preparing a Wetland Replacement Plan under the WCA.[524]

465. For both the proposed project and ATC alternative, promptly restoring areas after construction where ground disturbance occurs and revegetating with noxious/invasive species-free seed will be expected conditions in the Vegetation Management Plan. Minnesota Power stated in its draft Vegetation Management Plan that heavy equipment passage through wetlands will be limited to only when necessary to complete the O&M activity. Other than typical CSW Permit conditions, the Applicant committed to the following in the route permit application:

- Applicant will work with the USACE to determine mitigation ratios, if necessary. Mitigation typically occurs in the form of wetland replacement credits for permanent impacts to wetland areas.

- Transmission lines and their new rights-of-way would mostly span wetlands and not require wetland vegetation clearing.

- Structures will be sited outside of wetlands.[525]

466. Other than typical CSW Permit conditions, ATC has committed to the following to minimize impacts to wetlands:

- Transmission lines and their new rights-of-way would mostly span wetlands and would not require wetland vegetation clearing. Wetland boundaries will be factored into final engineering to avoid impacts to the extent practical.

- Developing access routes to minimize crossing wetlands, where possible.[526]

467. Commission route permits require permittees to avoid or minimize wetland impacts. This includes requiring winter construction to the extent possible and requiring that soil excavated from wetland areas not be placed back into the wetland. Standard conditions in Section 5.3.9 of the Draft Route Permit directs the Applicant to:

- avoid impacts to wetlands to the extent possible;

- construct in wetland areas during frozen ground conditions where practicable; when construction during winter is not possible, to utilize wooden or composite mats to protect wetland vegetation; and

[524] Ex. DOC EERA-515 at 119 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[525] Ex. MP-104 at 89 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); Ex. DOC EERA-515 at 120 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02); Ex. MP-123 (VMP) (eDocket Nos. 20242-203665-11, 20242-203665-12).
[526] Ex. DOC EERA-515 at 120 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).

- contain soil excavated from the wetlands and riparian areas.[527]

c. Floodplains

468. The project is within an upland area outside of Federal Emergency Management Agency (FEMA) mapped 100-year floodplains. Therefore, impacts to mapped floodplains will not occur. The project does span a trout stream within a designated Natural Environment Shoreland Overlay Zone. A minimum 50-foot natural vegetative buffer will be maintained on both banks of the stream crossing to maintain habitat and bank stability, alleviating impacts associated with the stream's floodplain. Thus, transmission structures for the project are not anticipated to impact flood heights or course.[528]

d. Groundwater

469. The DNR divides the State of Minnesota into six groundwater provinces, which are based on bedrock, glacial geology, and unique combinations of sources and availability for drinking water, industry, and agriculture. The project study area is located within the Central Province, which is characterized by a thick glacial sediment; however, sand and gravel aquifers are common. The deeper, fractured crystalline bedrock is characterized by poor aquifer properties and is of limited use as an aquifer.[529]

470. The Minnesota Department of Health (MDH) maintains the Minnesota Well Index (MWI), which provides basic information (e.g., location, depth, geology, construction, and static water level) for wells and borings drilled in Minnesota. The MWI identifies four domestic wells within the proposed route, all of which will be owned and abandoned (sealed) by the Applicant in compliance with MDH regulations. Thus, private wells in the route width will not be impacted. Additionally, there are no wellhead protection or drinking water supply management areas in the route width.[530]

471. Minnesota Power will not need to connect to city water for the project but will need to install a domestic sized well for sanitary facilities at the HVDC converter station and St. Louis County 345 kV/230 kV Substation. This type of well is not expected to appropriate more water than a typical residence and would need to comply with applicable MDH permitting regulations. Thus, water appropriation for the project is not expected to affect wells in the area outside of the route width and may decrease water use in the area.[531]

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[527] Ex. DOC EERA-515 at 120-21 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02); Ex. DOC EERA-516 (EA Appendix C, Draft Route Permit) (eDocket Nos. 20242-203954-03, 20242-203954-04).
[528] Ex. MP-104 at 85-86 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); Ex. DOC EERA-515 at 104 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02); Ex. MP-123 (VMP) (eDocket Nos. 20242-203665-11, 20242-203665-12).
[529] Ex. MP-104 at 84 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); Ex. DOC EERA-515 at 80 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[530] Ex. DOC EERA-515 at 81 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[531] Ex. DOC EERA-515 at 81 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).

472. Transmission pole foundations that will be imbedded into the ground may be up to 60 feet deep for either routing option and range down to 25 feet. All foundation materials will be non-hazardous, preventing leaching into groundwater. Structures might come into direct contact with groundwater because portions of the project area have a depth to groundwater that is less than 60 feet. Prior to construction, geotechnical investigations will be completed to help identify shallow depth to groundwater resource areas, which may require special foundation designs and, ultimately, is expected to minimize impacts.[532]

473. Because of the shallow depth to groundwater in some areas of the project, dewatering may be required during construction. If dewatering exceeds 10,000 gallons of water per day, a DNR water appropriation permit will be required. Proposed project structures will generally be a suitable distance from areas of sloping which are near large drainage features. Although subsurface activity might disturb shallow groundwater resources, the disturbance area would be above well-depth used for potable water.[533]

474. Minnesota Power has largely avoided wetlands in the project design; however, wetlands are still nearby within the project's route width. The proposed project will reduce the land's ability to filter runoff from increased impervious surfaces. However, the impact is minimal as the small amount of increased impervious surface is not expected to change drainage patterns much.[534]

475. Potential impacts to domestic water supplies are not expected, because all documented wells within the route width will be owned by Minnesota Power and sealed for the project. There are no wellhead protection or drinking water supply management areas in the route width. Subsurface activity would likely penetrate shallow water tables; however, subsurface disturbance is expected to be above well-depth used for potable water. Potential impacts for both system alternatives are anticipated to be minimal. Impacts will be short, localized, and can be mitigated in part.[535]

476. Prior to construction, geotechnical investigations will be completed to help identify shallow depth to groundwater resource areas, which may require special foundation designs. Minnesota Power will continue to work with landowners to identify springs and wells near the proposed route.[536]

5. Soils and Topography

477. Soils in the project area are predominantly derived from the rocky, red tills of the Superior glacial lobe. These soils mainly consist of Aldenlake complex or sandy loam. 43 percent of the survey area has steep slopes of eight percent or more, which

[532] Ex. MP-104 at 85 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); Ex. DOC EERA-515 at 81 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[533] Ex. DOC EERA-515 at 81 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[534] Ex. DOC EERA-515 at 82 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[535] Ex. DOC EERA-515 at 80-82 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[536] Ex. MP-104 at 85 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).

increases potential for erosion impacts. One hundred percent of the project study area is classified as the Dusler-Duluth (s3677) soil association.[537]

478. Construction of the proposed project will not have significant impacts on the overall soil profile of the area except where side slopes may be excavated to provide a flat construction surface. Such areas will be identified during the detailed design process prior to construction. Potential impacts during construction may include the compaction of soil and the exposure of soil to wind and water during construction activities. These impacts should be short-term in nature and minimal during and after construction activities. There should be no long-term impacts to the soil profile because of the project. Overall, potential impacts will be short-term, localized, and minimal.[538]

479. Common soil impacts include rutting, compaction, and erosion during construction. Potential impacts will be short-term, localized, and minimal. Construction may have erosion impacts where steep side slopes are excavated to provide a flat construction surface. Minnesota Power stated in its draft Vegetation Management Plan that excavating in steeply sloped areas will be avoided to the extent practicable. Approximately 44 acres of the 176-acre proposed route will be impacted by construction activities. Approximately 13 acres of soil may have permanent impacts from the proposed construction of the HVDC converter station and St. Louis County 345 kV/230 kV Substation – five acres of those contain slopes of greater than eight percent. Those potentially erosion prone soils comprise about 11 percent of the total acres to be impacted from construction.[539]

480. Steep slopes include a hillside in the southwest portion of the proposed route and a streambank associated with West Rocky Run Creek. Impacts to the stream banks will largely be avoided because the proposed 230 kV lines will span the creek for both system alternatives. Steep slopes in the southwest part of the proposed route will be avoided to the extent possible, but portions may be excavated and flattened to accommodate an even construction surface for the HVDC converter station. Minnesota Power is still in the preliminary design phase and can provide more detailed design information in the future. Future project designs and grading plans should identify steep areas so that impacts can be minimized. Minnesota Power stated in its draft Vegetation Management Plan that routine maintenance would clear steep slopes and slopes leading to water bodies by hand, leaving adequate herbaceous or low shrub cover to avoid erosion.[540]

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[537] Ex. MP-104 at 99 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); Ex. DOC EERA-515 at 83 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[538] Ex. MP-104 at 99 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); Ex. DOC EERA-515 at 83 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[539] Ex. MP-104 at 99-100 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); Ex. DOC EERA-515 at 84 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02); Ex. MP-123 (VMP) (eDocket Nos. 20242-203665-11, 20242-203665-12).
[540] Ex. DOC EERA-515 at 84 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02); Ex. MP-123 (VMP) (eDocket Nos. 20242-203665-11, 20242-203665-12).

481. Minimal impacts to topography, such as the creation of abrupt elevation changes or modifications to natural drainage patterns, may occur due to those five acres of potentially steep slopes with erosion prone soils for the converter station and St. Louis County 345 kV/230 kV Substation. The converter station will be one, continuous graded pad with a maximum grade of two-percent slope within the fenced area to accommodate runoff. All designs will follow current American Society of Civil Engineers standards and any other applicable rules or regulations. Minnesota Power added a 50-foot buffer on all sides of the building to accommodate an elevation change on the west side. This buffer is around the graded pad and provided for any required civil work that may come out of future designs specifications. It will, however, be greater than a two-percent slope.[541]

482. Minnesota Power will also use rip-rap or a similar material to stabilize slopes to ensure the existing drainage pattern remains after construction, minimizing impacts from topography and impacts to soil/erosion that could indirectly impact other resources, such as the trout stream.[542]

483. Best management practices and erosion control methods will be implemented during all construction activities to protect soils and minimize and control erosion and sedimentation. Groundcover protecting soils will be left undisturbed whenever practical. Minnesota Power's construction stormwater SWPPP will be developed prior to construction and will designate soil erosion and sedimentation control and management methods and temporary soil storage locations. Disturbed groundcover will be re-stabilized as soon as practical after construction activities cease in accordance with the Vegetation Management Plan.[543]

6. Geology

484. The project study area has thin glacial drift over the entire subsection and large areas of exposed bedrock near the surface. There are no mapped karst features in the land control area and the project is outside of areas prone to surface karst development. Construction of the project will not alter geology because construction methods will not cause significant bedrock and geologic structure modification. Impacts to geology are not expected to occur.[544]

7. Flora

485. Pre-European settlement vegetation consisted mainly of fire-dependent forests, such as aspen-birch forest with white pine-red pine forest, mixed hardwood-pine

[541] Ex. DOC EERA-515 at 85 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[542] Ex. DOC EERA-515 at 85 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[543] Ex. MP-104 at 100 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); Ex. DOC EERA-515 at 85-86 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02); Ex. MP-123 (VMP) (eDocket Nos. 20242-203665-11, 20242-203665-12).
[544] Ex. MP-104 at 98-99 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); Ex. DOC EERA-515 at 85 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).

forest, and conifer bogs and swamps. After extensive logging, white and red pine forests were replaced by quaking aspen and paper birch.[545]

486. Vegetation communities in the project area currently include agricultural land, deciduous forest, and residential lawns.[546]

487. The project area is not in or within an area identified as part of the DNR's Wildlife Action Network. There are no DNR Wildlife Management Areas, Scientific and Natural Areas, native plant communities or prairies, Reinvest in Minnesota Reserve areas, wetland banking easements, Migratory Waterfowl Feeding and Resting Areas, or National Audubon Society Important Bird Areas within the local vicinity of either routing option.[547]

488. During construction of the project, vegetation currently present in the area would be removed to accommodate the new electrical facilities and stage-associated materials and equipment. Vegetation clearing for new and extended ROW will widen existing corridors to 260 additional feet for the proposed project configuration. (110 additional feet for the ATC alternative.) Estimated acreage of vegetation removed is summarized in Table 8, below.[548]

Table 8. Vegetation Removed Between Projects

Project Name	Forested Area Cleared for Construction	Non-forested Area Cleared for Construction	Total Forested/Non-forested Area Cleared
Proposed Project	34.25 acres	16.84 acres	51.09 acres
ATC Alternative	34.72 acres	5.4 acres	40.12 acres

489. Potential impacts, such as clearing, compacting, or otherwise disturbing vegetation, are expected to be moderate for both the project and the ATC alternative. Tree clearing impacts to construct the proposed project and the ATC alternative are similar at 34.25 acres and 34.72 acres, respectively. Invasive species might establish. Potential impacts will be both short- and long-term. Impacts are localized, but unavoidable.[549]

490. Long-term impacts include removal of woody vegetation within the ROW, which will result in conversion to low-stature vegetation (shrubs and grasses) throughout its length. Minnesota Power will routinely clear woody vegetation from the ROW to ensure it does not interfere with the safe operation of the HVTL. Removal of woody vegetation will widen existing corridors through wooded areas or remove wooded areas from the

[545] Ex. MP-104 at 89 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); Ex. DOC EERA-515 at 91 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[546] Ex. MP-104 at 89 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); Ex. DOC EERA-515 at 91 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[547] Ex. DOC EERA-515 at 91 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[548] Ex. DOC EERA-515 at 92 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[549] Ex. DOC EERA-515 at 121 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).

landscape. Conversion of wooded landscapes to open landscapes could indirectly affect native vegetation by increasing potential for spread of invasive and non-native species. Construction of the HVDC converter station will permanently remove approximately 21.65 acres of vegetation [550]

491. Potential impacts due to invasive species and noxious weeds can be mitigated by:

- revegetating disturbed areas using weed-free seed mixes and using weed-free straw and hay for erosion control;
- removal of invasive species/noxious weeds via herbicide and manual means; and
- cleaning and inspecting construction vehicles to remove dirt, mud, plant, and debris from vehicles prior to arriving at and leaving construction sites.[551]

492. Minnesota Power prepared a draft Vegetation Management Plan for the project. The draft plan includes various measures to mitigate the introduction of invasive species and noxious weeds in the proposed route.[552]

8. Fauna

493. Wildlife species in St. Louis County include bald eagles, woodcock, ruffed grouse, wild turkeys, white-tailed deer, black bear, beaver, muskrat, river otter, grey wolf, rabbits, squirrels, red and gray fox, raccoon, migratory waterfowl (geese, ducks, trumpeter swans, herons, raptors), and various other birds (meadowlarks, sparrows, thrushes, woodpeckers, shore birds). Several of these species are likely to be present within the project study area.[553]

494. In addition, the USFWS identifies Birds of Conservation Concern of migratory birds that are a conservation priority to the USFWS but are not listed as having status protected by law. The project area is in the Boreal Hardwood Transition bird conservation region, and the following species were identified as having potential to be present in the project area:

- black-billed cuckoo
- bobolink
- Canada warbler

[550] Ex. DOC EERA-515 at 121-22 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[551] Ex. MP-104 at 90 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[552] Ex. MP-123 (VMP) (eDocket Nos. 20242-203665-11, 20242-203665-12).
[553] Ex. MP-104 at 90 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); Ex. DOC EERA-515 at 91-92 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).

- evening grosbeak
- golden-winged warbler
- olive-sided flycatcher
- wood thrush[554]

495. The National Audubon Society works to identify, monitor, and protect habitat for bird species throughout the United States, in part by designating sites as Important Bird Areas. No Important Bird Areas are near the project area, although several are in St. Louis County.[555]

496. During construction, wildlife in the project area may be displaced due to equipment noise, increased human activity, and other disturbance of habitat. The distance animals are displaced depends on the species and the tolerance level of each animal. Most wildlife would likely return to the area after construction; however, others might be permanently displaced. Because other suitable habitat is available in and near the project area, potential temporary impacts to wildlife are not expected to cause permanent changes to local populations. Although streams will be spanned, and no structures will be placed directly in the trout stream, the increased vegetation clearing for new ROW will directly impact cold-water fish and their habitat along this stretch.[556]

497. Potential impacts to avian species include those described above. Additionally, birds — especially large-bodied birds — are susceptible to electrocution from, and collision with, HVTLs during operation. Potential impacts to avian species are expected to be minimal but might impact unique resources. These short- and long-term, localized impacts can be minimized.[557]

498. Impacts to terrestrial species will be intermittent, temporary, and localized during construction. While direct significant impacts might occur to individuals, population level impacts are not anticipated. These short-term, localized impacts can be minimized. In addition, minimal operational impacts are expected from maintenance of the ROW.[558]

499. Impacts to habitat are primarily associated with creating new transmission line corridors. These long-term impacts are unavoidable. Overall, potential impacts to wildlife and habitat are expected to be minimal for both the proposed project and the ATC alternative.[559]

500. Bird diverters are placed on top of the shield wire and could reduce impacts because of the natural tendency for birds to avoid obstacles in flight by increasing altitude.

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[554] Ex. DOC EERA-515 at 92 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[555] Ex. DOC EERA-515 at 92 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[556] Ex. MP-104 at 91 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); Ex. EERA-515 at 93 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[557] Ex. DOC EERA-515 at 91 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[558] Ex. DOC EERA-515 at 91 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[559] Ex. DOC EERA-515 at 91 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).

Minnesota Power states that because the water features in the area are too small or narrow, and habitat conditions would not concentrate waterfowl in the area, bird flight diverters are not being considered on the HVTLs at this time.[560]

F. Effects on Rare and Unique Natural Resources

501. Minn. R. 7850.4100(F) requires consideration of the project's effects on rare and unique natural resources.

502. One state listed species of special concern, the northern goshawk, has the potential to occur in the project area based on the Natural Heritage Information System. Minnesota Power will schedule the project's tree clearing activities to occur during the northern goshawk's inactive season, thus, the potential to adversely affect nesting species, such as the northern goshawk and bats within the project area, is minimal.[561]

503. Rare and unique resources include assemblages of species or habitat that are designated for special care and conservation by state and federal agencies because loss of habitat, and small or shrinking population is cause for concern. At the state level, the evaluation and protection of Minnesota's rare and unique resources are overseen by the DNR Division of Ecological and Water Resources, while rare and unique resources at the federal level are typically evaluated and protected by the USFWS or USACE.[562] Minnesota Power submitted a request to the USFWS Information for Planning and Conservation (IPaC) website, as well as the DNR's National Heritage Information System (NHIS), for documented occurrences of federally-listed species, state-listed species, and designated critical habitat. The results of these submissions are summarized in Table 9, below.

Table 9. Potentially Occurring Rare and Unique Resources[563]

Species/Resource	Protection Classification
Northern Long-eared Bat (*Myotis septentrionalis*)	Federal endangered, State Species of Special Concern
Whooping crane (*Grus americana*)	Federal non-essential experimental population
Bald and Golden Eagle (*Haliaeetus leucocephalus*, *Aquila chrysaetos*)	Bald and Golden Eagle Protection Act
Canada Lynx (*Lynx canadensis*)	Federal threatened
Gray Wolf (*Canis lupus*)	Federal threatened

[560] Ex. DOC EERA-515 at 95 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[561] Ex. DOC EERA-515 at 95 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[562] Ex. DOC EERA-515 at 95–96 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[563] Ex. DOC EERA-515 at 96-97 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).

Species/Resource	Protection Classification
Piping Plover (*Charadrius melodus*)	Federal endangered
Tricolored Bat (*Perimyotis subflavus*)	Federal proposed endangered
Monarch Butterfly (*Danaus plexippus*)	Federal candidate
Northern Goshawk (*Accipiter gentilis*)	State Species of Special Concern
Sites of Biodiversity Significance	Varies, depending on resources present, but does not occur in the project area

504. Power lines can impact rare and unique resources during construction and operation. Adverse impacts include the taking or displacement of individual plants or animals, invasive species introduction, habitat loss, reduced community size, and, for avian species, collision with conductors or electrocution. Impacts to rare and unique resources are not necessarily adverse. In some limited cases, power line rights-of-way can be managed to provide habitat. For example, nesting platforms can be built on top of transmission structures for use by rare avian species.[564]

505. Overall, the determination of impact hinges on tree clearing for the project. Minnesota Power states that tree clearing will occur based on consultation with USFWS. Thus, the potential to adversely affect nesting species, such as the northern goshawk and bats within the project area, is minimal.[565]

1. Rare Species

506. ***Northern Goshawk***: There is one state-listed species of special concern, the northern goshawk, with the potential to occur in the area because they have been observed nesting within the project boundary. Because suitable habitat remains in the area, undocumented nests may be present within the project impact area. It is the largest of the three accipiters (forest hawks adapted to fast flight) found in Minnesota and year-round in the Laurentian Mixed Forest Province of the state. These birds prefer contiguous areas of mature and older forest for nesting and foraging. The northern goshawk's diet consists of a variety of moderately sized mammals and birds: red squirrels, snowshoe hares, eastern chipmunks, ruffed grouse, and American crows. Impacts to the northern goshawk can be minimized by removing trees outside of the nesting season

[564] Ex. DOC EERA-515 at 99 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[565] Ex. DOC EERA-515 at 99 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02); Ex. MP-104 at 97 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).

(approximately February through August), and properly managing food and trash during construction to not attract the northern goshawk's prey to the area.[566]

507. Regarding the federally protected species, Minnesota Power will require a federal permit from the USACE to disturb wetlands during construction of the project. This permit process includes a consultation between the USACE and the USFWS regarding the potential for protected species to occur in the area being disturbed. The USFWS will determine the actions to be implemented to protect those species. The federally-protected species are discussed below, with a general discussion of typical protective measures; however, Minnesota Power will be subject to the mitigation measures resulting from the wetlands permitting process.[567]

508. Rare and unique features were identified in the project area. The EA does not map federal- or state- listed species found in the NHIS database, because the DNR requires that public display of NHIS data mask the identity or location of rare features due to the vulnerability of some species to exploitation. Moreover, the NHIS database masks the occurrence of rare species by randomly incorporating their location into a larger polygon. Nonetheless, the DNR has stated that the northern goshawk has been observed nesting within the project boundary.[568]

509. As follow up to its USFWS determination, Minnesota Power will require an individual wetland permit and will be subject to Section 7 Consultation through the USACE process. Prior to plan and profile review, Minnesota Power will provide documentation of the determination reached through the Section 7 Consultation to share what was agreed upon between USFWS and the USACE, such as tree clearing restrictions, proposed surveys, etc. This review must be complete before construction can be initiated. These requirements are also addressed in Section 5.3.8 of the Draft Route Permit Template. While specific language around plan and profile construction specifications are not outlined in entirety in the permit conditions, they must identify necessary impact avoidance and minimization measures for wetlands, as well as threatened and endangered species. Those avoidance and minimization measures should be the result of consultation with the USFWS and the USACE.[569]

510. Minnesota Power has committed to schedule the project's tree clearing activities to occur during the northern goshawk's inactive season, which should avoid direct impacts to the birds or their eggs due to tree clearing.[570]

511. ***Northern Long-eared Bat and Tricolored Bat***: The range of the northern long-eared bat stretches across much of the eastern and midwestern United States. All seven of Minnesota's bats can be found throughout Minnesota. Tree removal can negatively impact bats by destroying roosting habitat, especially during the pup rearing season when females are forming maternity roosting colonies and the pups cannot yet

[566] Ex. DOC EERA-515 at 97 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[567] Ex. DOC EERA-515 at 97 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[568] Ex. DOC EERA-515 at 99 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[569] Ex. DOC EERA-515 at 100-01 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[570] Ex. DOC EERA-515 at 101 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).

fly. During summer, the bats roost alone or in colonies under bark, in cavities, and in crevices of both live and dead trees, or in cooler places, such as caves and mines. In winter, northern long-eared bats use caves and mines as hibernacula. Typical protective measures for northern long-eared bat are to conduct tree removal outside of the bat's active season, which is May through September.[571]

512. The tricolored bat is one of the smallest bats species native to North America. Ranging from the eastern and central United States, into portions of southern Canada, Mexico, and into Central America. The species overwinters in caves, mines, roadside culverts, tree cavities, and abandoned water wells. During the active season, the species may be found roosting among leaf clusters on living or recently dead deciduous hardwood trees. Typical protective measures for the tricolored bat are to conduct tree removal outside of the bat's active season, which is April through October.[572]

513. Under the USFWS Final 4(d) Rule for the northern long-eared bat, purposeful taking of the species is prohibited with limited exception. Incidental take from tree removal is also prohibited if it occurs within one-quarter mile of a known hibernacula, or if there are cuts or destroys to known occupied maternity roost trees, or any other trees within a 150-foot radius from a known maternity tree during the pup season (June 1 and July 31). These prohibitions focus on protecting the bat's sensitive life stages (that is, hibernation and raising young) in areas affected by white nose-syndrome. No hibernacula or maternity roost trees are identified in the NHIS database within the project area.[573]

514. To mitigate impacts, any tree removal should avoid the active season (April 1-September 30) for the northern long-eared bat. Ensuring construction and operation are consistent with USFWS guidance will minimize impacts to this species. The tricolored bat could be considered for federal listing as a threatened or endangered species under the Endangered Species Act by the time construction commences. Minnesota Power will schedule the project's tree clearing activities to occur during the northern goshawk's inactive season (approximately beginning of September to the end of February), which will overlap with avoiding impacts to the northern long-eared bat. The proposed project (and the ATC alternative) must comply with USFWS conservation measures, set forth as follows:

- The project must not disturb or disrupt hibernating northern long-eared bat in a known hibernaculum during hibernation.
- The project must not alter the entrance or interior environment of a known hibernaculum at any time of year.
- The project must not remove any trees within 0.25 miles of a known northern long-eared bat hibernaculum at any time of the year. The 0.25-mile

[571] Ex. DOC EERA-515 at 97-98 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02); Ex. MP-104 at 94 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[572] Ex. DOC EERA-515 at 98 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02); Ex. MP-104 at 95 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[573] Ex. DOC EERA-515 at 100 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).

tree clearing buffer serves multiple purposes, including protecting hibernating bats from disturbance, protecting the hibernaculum's microclimate roosting habitat around the hibernacula, and providing some roosting and foraging protection during spring staging and fall swarming.

- The project must not cut or destroy known occupied maternity roost trees, or any other trees within a 150-foot radius from the maternity roost tree, from June 1 – July 31.[574]

515. ***Bald and Golden Eagle***: Bald eagles live near rivers, lakes, and marshes where they can find fish. Their habitat includes estuaries, large lakes, reservoirs, rivers, and some seacoasts. In winter, the birds congregate near open water in tall trees for spotting prey and night roosts for sheltering. Bald eagles usually choose the tops of large trees to build nests.[575]

516. The range of golden eagles is widespread, and can be found from the tundra, through grasslands, forested habitat and woodland-brushlands, and south to arid deserts. They are aerial predators and eat small to mid-sized reptiles, birds, and mammals up to the size of mule deer fawns and coyote pups. Golden eagles build nests on cliffs or in the largest trees of forested stands that often afford an unobstructed view of the surrounding habitat. Golden eagles typically do not nest in Minnesota.[576]

517. Typical protective measures for bald and golden eagles are to avoid tree clearing during nesting season, which occurs from December to August.[577]

518. ***Canada Lynx***: Canada lynx are most likely to occur in Minnesota after populations of snowshoe hare decline significantly in Canada, which is a cyclical occurrence. Lynx are primarily found in boreal forests. In Minnesota, this habitat is dominated by spruce, fir, and pine. Lynx may also use transitional zones where boreal forest gives way to northern hardwood forest where hardwood species, including birch, aspen, and willow, are interspersed among conifers. The Canada lynx could be present in the region, if snowshoe hare populations decline in Canada and local forested habitat is intact.[578]

519. Minnesota Power will support the lead federal agency, in consultation with the USFWS, to develop necessary avoidance and mitigation measures for this species.[579]

520. ***Gray Wolf***: A habitat generalist, the gray wolf originally occupied most habitat types in North America. They show no preference for one cover type over another, and successfully utilize alpine, forest, grassland, shrubland, and woodland habitats

[574] Ex. DOC EERA-515 at 101 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02); Ex. MP-104 at 97-96 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[575] Ex. DOC EERA-515 at 98 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[576] Ex. DOC EERA-515 at 98 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[577] Ex. DOC EERA-515 at 98 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[578] Ex. DOC EERA-515 at 98 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02); Ex. MP-104 at 94 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[579] Ex. MP-104 at 96 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).

across their range. Once thought to require wilderness areas with little to no human disturbance, recent range expansions have demonstrated the species' ability to tolerate higher rates of anthropogenic development than previously thought. Given abundant prey and low rates of human-caused mortality, wolves can survive in proximity to human-dominated environments. The gray wolf was removed from Minnesota species of special concern status in 2013 and is being considered for delisting at the federal level.[580]

521. Minnesota Power will support the lead federal agency, in consultation with the USFWS, to develop necessary avoidance and mitigation measures for this species.[581]

522. ***Piping Plover***: The Great Lakes population of piping plovers is migratory, and nests along sandy gravel shorelines of large lakes and rivers in the upper Midwest, including the shores of Lake Superior near Duluth. The species can also be found in sand and gravel mine sandpits, lake shore housing developments, and reservoir shorelines. There has not been successful nesting of piping plovers in Minnesota in over 25 years.[582]

523. Suitable habitat for the piping plover is not present within the project study area. Therefore, impacts are not anticipated, and no mitigation is proposed.[583]

524. ***Monarch Butterfly***: The monarch butterfly is a large butterfly with an approximate three-to-four-inch wingspan. The monarch butterfly is characterized by bright orange coloring on the wings, with distinctive black borders and veining. The species can be found in a wide variety of habitats, including prairies, grasslands, urban gardens, road ditches, and agricultural fields, provided a supply of nectaring plants are available for adult foraging and milkweed plants are available for both laying eggs and as a food source for caterpillars. Potential impacts to monarch butterflies could be reduced by minimizing the removal of flowering plants.[584]

525. Suitable habitat for monarchs may be present within the project study area. If the USFWS determines the species should be listed and protections for the species will coincide with project planning, permitting, and/or construction, Minnesota Power will review project activities for potential impacts to the species, develop appropriate avoidance and mitigation measures, and consult with the USFWS as appropriate.[585]

2. Rare Ecological Communities

526. There are no DNR wildlife management areas (WMA) or DNR scientific and natural areas (SNA) in the project study area. Additionally, there are no DNR Minnesota Biological Survey areas of Biological Significance (SOBS) located within the project study

[580] Ex. DOC EERA-515 at 98-99 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02); Ex. MP-104 at 94 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[581] Ex. MP-104 at 96 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[582] Ex. DOC EERA-515 at 99 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02); Ex. MP-104 at 94 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[583] Ex. MP-104 at 96 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[584] Ex. DOC EERA-515 at 99 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02); Ex. MP-104 at 95 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[585] Ex. MP-104 at 97 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).

area. The nearest SOBS, Midway Peatland, is approximately 1.6 miles south of the project study area. The nearest WMA, Canosia WMA, is located approximately 8.5 miles north of the project study area. The nearest SNA, Hemlock Ravine, is located approximately seven miles south of the project study area.[586]

527. The DNR's Natural Heritage Review Request (2022-0070) automatically generated letter indicated that no ecologically significant areas have been documented within the vicinity of the project.[587]

G. Application of Design Options

528. Minn. R. 7850.4100(G) requires consideration of whether the applied design options maximize energy efficiencies, mitigate adverse environmental effects, and could accommodate expansion of transmission or generating capacity.

529. The project's flexible design options allow for future expansion and additional renewable energy transfer capability, leveraging the unique attributes of HVDC technology, the most efficient way to transfer power over long distances.[588]

530. Given the long-term significance of the HVDC line for Minnesota Power and the region, design options to accommodate future expansion are a major consideration for the project. The new VSC HVDC converter stations will be designed with a flexible, scalable approach that will enable their future expansion to accommodate bulk regional transfers of renewable energy. Minnesota Power is working with the HVDC supplier to procure the most current capacity and technology for the new VSC converter stations, as well as additional expandability features to enable staged development of additional HVDC capacity to meet future regional needs.[589]

531. The 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 in conjunction with increasing capacity and utilization of the HVDC line. The new substation will also include space to accommodate a second 345 kV/230 kV transformer to facilitate expanded delivery of power to the local transmission system in northeastern Minnesota. New 345 kV and 230 kV transmission lines constructed for the project will be designed with sufficient capacity to accommodate reasonably foreseeable long-term needs, and Minnesota Power will consider making new transmission structures double-circuit-capable where appropriate.[590]

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[586] Ex. MP-104 at 97 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[587] Ex. MP-104 at 97, Appendix J (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04, 20236-196333-09, 20236-196333-10).
[588] Ex. MP-104 at 2 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[589] Ex. MP-104 at 11 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[590] Ex. MP-104 at 11 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).

532. The EA assumes that all system alternatives maximize energy efficiencies and accommodate expansion of transmission capacity, and that all system alternatives are electrically reliable.[591]

H. Use or Paralleling of Existing Right-of-Way, Survey Lines, Natural Division Lines, and Agricultural Field Boundaries

533. Minn. R. 7850.4100(H) requires consideration of the use or paralleling of existing rights-of-way, survey lines, natural division lines, and agricultural field boundaries.

534. Minnesota Power used a comprehensive siting and vetting process to identify route options for the project, and developed the proposed route considering existing rights-of-way and utility corridors, jurisdictional boundaries, and the availability of land for permanent ownership by Minnesota Power.[592]

535. The project area includes existing transmission line infrastructure rights-of-way. to the extent possible, the project will not require traditional transmission line easements for rights-of-way, as the project will primarily be constructed on land owned by Minnesota Power.[593]

I. Use of Existing Transportation, Pipeline, and Electrical Transmission System Rights-of-Way

536. Minn. R. 7850.4100(J) requires consideration of use or paralleling of existing transportation, pipeline, and electrical transmission system rights-of-way.

537. The proposed route parallels the existing HVDC lines and the project area includes existing transmission line infrastructure rights-of-way. The proposed route will be constructed primarily on land owned by Minnesota Power and, to the extent possible, will not require traditional transmission line easements or acquisition of additional rights-of-way.[594]

J. Electrical System Reliability

538. Minn. R. 7850.4100(K) requires consideration of electrical system reliability when selecting a route for a high-voltage transmission line.

539. The project is needed to modernize aging HVDC assets, continue to position the grid for the clean energy transition, and improve reliability of the regional transmission system. The existing HVDC terminal has operated for 45 years — 15 years beyond its 30-year design life. Due to increased HVDC outages and equipment failure,

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[591] Ex. DOC EERA-515 at 125 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[592] Ex. MP-104 at 51 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[593] Ex. MP-104 at 48 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); Ex. DOC EERA-515 at 30, 41 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[594] Ex. MP-104 at 48 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04); Ex. DOC EERA-515 at 30, 41 (EA) (eDocket Nos. 20242-203954-04, 20243-204084-02).

the orderly replacement of the HVDC terminal equipment is prudent to ensure continuous efficient delivery and expansion of Minnesota Power's renewable energy resources into the future. In addition to the existing HVDC terminal replacement, the new HVDC technology would be designed to provide key reliability attributes, including voltage regulation, frequency response, blackstart capability, and bi-directional power transfer capability.[595]

540. In recent years, HVDC terminal outages have occurred due to HVDC converter station component failures, which have been increasing since 2009 and appear to be accelerating. The most common outages in the HVDC converter stations have been the result of failures in the thyristors (power electronics), converter transformers, control and protection system components, and filters, among other things. Based on experience with other electric system components, the failure rate is expected to increase. Procuring spare parts for the converter stations has become increasingly difficult, as the original technology is becoming obsolete. Modernizing the HVDC converter stations by replacing the original equipment with modern equipment will greatly reduce the likelihood of an extended outage due to component failures in the HVDC converter stations.[596]

541. In addition to addressing the fundamental age and condition issues discussed above, upgrading to VSC technology addresses several other significant needs related to reliability and grid support, renewable integration, and long-term flexibility. These attributes of VSC HVDC technology will make positive contributions to grid reliability as the clean energy transition continues, as HVDC converters are better suited to operations in weaker and less predictable system conditions associated with higher penetrations of renewable energy. In addition, the VSC HVDC converters to be implemented as part of the project will provide flexibility and scalability to support both the near-term and long-term needs of Minnesota Power's customers and the electric grid.[597]

542. The Arrowhead 230 kV/115 kV Substation is an important hub for Minnesota Power's local transmission system resulting from its location near the Duluth-Superior load center and its long-standing interconnection to the HVDC system. The Minnesota Power Arrowhead 230 kV/115 kV Substation already provides reliability support to a weaker northern and central Wisconsin transmission system in addition to serving local needs in northeastern Minnesota.[598]

543. The implementation of VSC HVDC technology and continued delivery of power from the HVDC System directly to Minnesota Power's Arrowhead 230 kV/115 kV

[595] Ex. DOC EERA-515 at 132 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02); *see also* Ex. MP-104 at Chapter 3 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[596] Ex. MP-121 at 8–9 (Winter Direct) (eDocket Nos. 20242-203446-08, 20242-203446-07).
[597] Ex. MP-121 at 9–10 (Winter Direct) (eDocket Nos. 20242-203446-08, 20242-203446-07).
[598] Ex. MP-121 at 34–35 (Winter Direct) (eDocket Nos. 20242-203446-08, 20242-203446-07); *see also* Ex. MP-104 at Chapter 3 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).

Substation are essential to ensure the continued reliability of the transmission system in northeastern Minnesota as Minnesota Power navigates the clean energy transition.[599]

K. Costs of Constructing, Operating, and Maintaining the Facility

544. Minn. R. 7850.4100(L) requires consideration of the cost to construct proposed routes and the cost of O&M.

545. The estimated cost to construct the HVDC modernization project is between $660 and $940 million (in 2022 dollars). This estimate includes land and ROW costs, in addition to construction, engineering, materials, permitting, and design costs for the new St. Louis County 345 kV/230 kV Substation, converter station, and the associated HVTLs. The St. Louis County 345 kV/230 kV Substation and HVDC converter station cost estimates do not change based on the route selected. Table 10 below provides current project construction cost estimates.[600]

Table 10. Estimated Construction Costs

Project Component	Lower-Range (2022$) ($Millions)	Mid-Range (2022$) ($Millions)	Upper-Range (2022$) ($Millions)
HVDC Converter Stations	$590	$705	$815
Minnesota Interconnection Facilities	$40	$55	$70
North Dakota Interconnection Facilities	$30	$40	$55

546. Table 11 below provides the comparison of construction costs for the Minnesota portion of the HVDC modernization project using either Minnesota Power's proposed configuration or the ATC alternative. As these costs are equal, the ATC alternative does not provide a more cost-effective system alternative for the HVDC modernization project in Minnesota.

[599] Ex. MP-121 at 35 (Winter Direct) (eDocket Nos. 20242-203446-08, 20242-203446-07); *see also* Ex. MP-104 at Chapter 3 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[600] Ex. DOC EERA-515 at 32 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02); *see also* Ex. MP-104 at 12–13 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).

Table 11. Comparison of Minnesota System Alternatives[601]

	Minnesota Power Proposed Configuration (millions $)	ATC Arrowhead Alternative (millions $)
Minnesota Land Acquisition[602]	$10	$10
HVDC Line Entrance	$2	$2
HVDC – St Louis County 345 kV Line	$3.3	-
St. Louis County 345 kV/230 kV Substation	$31.1	-
St. Louis County – Minnesota Power Arrowhead 230 kV Lines	$3.3	-
Minnesota Power Arrowhead Line Entrances	$5	-
HVDC 345 kV Line Entrance for Circuit #2	-	$3.1
HVDC – ATC Arrowhead 345 kV Double-Circuit Line	-	$8.7
ATC Arrowhead – Stone Lake 345 kV Line Reconfiguration	-	Included elsewhere in estimate
ATC Arrowhead Substation Expansion	-	$27.7
Minnesota Power Arrowhead 230 kV Bus Reconfigurations	-	-[603]
Tax Gross-Up (12.668%)[604]	-	$3.5
Rounding	$0.3	-
Total	**$55**	**$55[605]**

[601] Ex. MP-130 at Rebuttal Schedule 21 (Winter Rebuttal) (eDocket Nos. 20243-204225-12, 20243-204225-11); Ex. MP-131 at Rebuttal Schedule 21(Winter Rebuttal) (Trade Secret) (eDocket Nos. 20243-204225-10, 20243-204225-09); Ex. ATC-265 at 2 (Corrections to Johanek Testimonies) (eDocket No. 20243-204506-02); Evid. Hrg. Tr. at 138:12-140:2 (Johanek).

[602] Costs associated with properties that have already been acquired by Minnesota Power, so are applied equally to both system alternatives. Ex. MP-120 at 6-7 (McCourtney Direct) (eDocket Nos. 20242-203446-10, 20242-203446-09).

[603] This work has been identified by Minnesota Power as necessary to implement the ATC alternative, but this work was not identified in ATC's estimates for the ATC alternative. Minnesota Power estimates this work will cost approximately $4.9 million. Ex. MP-130 at Rebuttal Schedule 21 (Winter Rebuttal) (eDocket Nos. 20243-204225-12, 20243-204225-11).

[604] This applies only to the portions to be constructed and owned by ATC. Approximately $27.7 million of the $51.5 million estimate for the ATC alternative would be constructed, owned, and operated by ATC. Therefore, applying the 12.668 percent tax gross-up to that portion of the estimate results in a revised estimate of $55 million ($51.5 + ($27.7*0.12668)).

[605] Using the third-party estimates for both system alternative configurations for the Minnesota interconnection facilities results in an estimate of $65 million for the Minnesota Power proposed configuration and $65.5 million for the ATC alternative. Ex. MP-130 at Rebuttal Schedule 24 (Winter Rebuttal) (eDocket Nos. 20243-204225-12, 20243-204225-11); Ex. ATC-265 (Corrections to Johanek

547. Once constructed, O&M costs associated with the new transmission lines will be minimal for several years since vegetation maintenance on the route corridor will occur prior to construction. The specific O&M costs for an individual transmission line varies based on the location of the line, the number of trees located along the ROW, the age and condition of the line, the voltage of the line, and other factors.[606]

548. Minnesota Power's O&M costs typically range from $50,000 to $100,000 annually. The Converter Station O&M costs are anticipated to be approximately $1 million annually. ROW maintenance, including inspections, are anticipated to be $1,100 per mile.[607]

L. Adverse Human and Natural Environmental Effects that cannot be Avoided

549. Minn. R. 7850.4100(M) requires consideration of unavoidable human and environmental impacts.

550. Transmission lines are infrastructure projects that have unavoidable adverse human and environmental impacts. Where feasible, the EA suggests mitigation measures to be incorporated into the planning, design, and construction of the proposed project to substantially eliminate the adverse impacts. In other areas of consideration, adverse impacts can be reduced but not eliminated and are, therefore, determined to be unavoidable.[608]

551. Unavoidable impacts related to project construction would include:

- possible traffic delays near the project area and fugitive dust on roadways;
- visual and noise disturbances;
- potential for soil compaction and erosion;
- vegetative clearing and removal or changes to wetland type and function;
- disturbance to, and displacement of, some wildlife;

Testimonies) (eDocket No. 20243-204506-02). $35.8 million for the ATC Arrowhead 345 kV/230 kV Substation reconfiguration multiplied by a proposed current tax gross-up of 12.668 percent, results in a tax gross-up increase of $4.5 million. Adding this amount to the estimate provided from the independent third party results in a total ATC alternative estimated cost of $65.5 million. The independent third-party estimates the Minnesota Power proposed configuration at $65 million, which is within the original range of costs provided in the Application.

[606] Ex. MP-104 at 13 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).

[607] Ex. DOC EERA-515 at 32 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02); *see also* Ex. MP-104 at 13–14 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).

[608] Ex. DOC EERA-515 at 101 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).

- minor amounts of habitat loss;
- converting the underlying land use to an industrial use; and
- GHG emissions.[609]

552. Unavoidable impacts related to project operation would include:

- visual impact of various structures associated with the project;
- change in landscape character and potential subsequent impacts to cultural values;
- loss of land use for other purposes;
- potential hazards for certain avian species;
- interference with AM radio signals;
- potential decrease to property values;
- continued maintenance of vegetation;
- GHG emissions; and
- increased EMF on the landscape (although potential impacts from EMF are minimal and are not expected to impact human health).[610]

M. Irreversible and Irretrievable Commitments of Resources

553. Minn. R. 7850.4100(N) requires consideration of the irreversible and irretrievable commitments of resources that are necessary for the project.

554. Resource commitments are irreversible when it is impossible or very difficult to redirect that resource to a different future use. An irretrievable commitment of resources means the resource is not recoverable for later use by future generations.[611]

555. The project will require only minimal commitments of resources that are irreversible and irretrievable.[612]

556. Irreversible impacts include the land required to construct the transmission line. While it is possible that the structures, conductors, and buildings could be removed

[609] Ex. DOC EERA-515 at 102 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[610] Ex. DOC EERA-515 at 102 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[611] Ex. DOC EERA-515 at 102 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02); Ex. MP-104 at 101 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[612] Ex. DOC EERA-515 at 102 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02); Ex. MP-104 at 101 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).

and the ROW restored to previous conditions, this is unlikely to happen in the reasonably foreseeable future (approximately 50 years). The loss of wetlands is considered irreversible because replacing these wetlands would take a significant amount of time. Additionally, certain land uses within the right-of-way will no longer be able to occur, especially at the converter station and St. Louis County 345 kV/230 kV Substation.[613]

557. Irretrievable commitments of resources are primarily related to project construction, including the use of water, aggregate, hydrocarbons, steel, concrete, wood, and other consumable resources. Concrete and steel at the existing facility will be recycled to the greatest extent practicable in the event existing foundations are removed. The commitment of labor and fiscal resources is also considered irretrievable.[614]

N. Cumulative Potential Impacts

558. The EA considered potential cumulative impacts that could potentially result from incremental effects of the project, in addition to other projects in the environmentally relevant area.[615] "Cumulative potential effects" is defined, in part, as the "effect on the environment that results from the incremental effects of a project in addition to other projects in the environmentally relevant area that might reasonably be expected to affect the same environmental resources, including future projects . . . regardless of what person undertakes the other projects or what jurisdictions have authority over the project."[616] The "environmentally relevant area" includes locations where the potential effects of the project coincide with the potential effects of other projects to impact the elements studied in the EA. Generally, this area includes the region of influence for the different resource elements.[617]

559. DOC-EERA staff analyzed what projects are "reasonably likely to occur." The DOC EERA stated that it is not aware of any planned, privately sponsored projects in the project area. This is based on information from the Applicant, such as responses it received from other state, county, township, and local agencies as stated in the Combined Application, as well as a review of other public projects within the county or from MnDOT. Additionally, no relevant projects were found on the Environmental Quality Board's interactive project database. Information was checked for the South St. Louis Soil and Water Conservation District, St. Louis County Planning, and the City of Hermantown Planning, the last of which showed an expansion of the Munger State Trail.[618]

560. The EA reported certain current and foreseeable future projects in the area:

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[613] Ex. DOC EERA-515 at 102 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02); Ex. MP-104 at 101 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[614] Ex. DOC EERA-515 at 102 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02); Ex. MP-104 at 101 (Combined Application) (eDocket Nos. 20236-196333-03, 20236-196333-04).
[615] Ex. DOC EERA-515 at 105-108 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[616] Minn. R. 4410.0200, subp. 11a.
[617] Ex. DOC EERA-515 at 105 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[618] Ex. DOC EERA-515 at 105 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).

- Highway 2 resurfacing through Midway Township (construction timeframe May-August 2026);

- Replacing aging box culverts along Highway 2 at West Rocky Run Creek, Midway River, and Kingsbury Creek (construction timeframe in 2025); and

- Haines Road and Piedmont Avenue construction (construction timeframe June 5 to September 1, 2024).[619]

561. Regarding the construction and operation of the project for the purposes of this cumulative potential effects analysis, the assumption that the HVDC converter station and St. Louis County 345 kV/230 kV Substation will not be decommissioned and removed at the end of the project's useful life, was used.

562. The EA noted the following cumulative impacts and mitigation:

- ***Human Settlement***: Cumulative potential effects on human settlements during construction are anticipated to be minimal. Future projects will result in long-term aesthetic impacts. Most will occur in developed areas, for example, in cities and along existing roads and highways. These impacts are anticipated to be both positive, for example, Highway 2 resurfacing, and negative, such as with the proposed project. Increased recreational opportunities will occur from the Munger State Trail system expansion project supported within the Applicant's existing right-of-way. These projects are also expected to benefit local economies. The proposed project might negatively affect property values, and cause additional impacts to aesthetics and rural character.[620]

- ***Public Health and Safety***: Cumulative potential effects to public health and safety are expected to be positive. Several of the projects considered here are road and highway related. They are undertaken to maintain and improve local roads to ensure their safe operation and the public's health and safety. The proposed project would make the electrical grid more reliable and is expected to add to background EMF levels. However, impacts are anticipated to be negligible.

  Construction activities along with maintenance of electrical equipment have inherent risks. These risks are minimal to trained personal. Potential impacts can be mitigated through worker training, safety equipment, etc. The overall impact intensity level is anticipated to remain minimal. [621]

- ***Land-based Economies***: Cumulative potential effects on land-based economies are anticipated to be minimal. Most projects are in cities or along

[619] Ex. DOC EERA-515 at 105-06 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[620] Ex. DOC EERA-515 at 106-07 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[621] Ex. DOC EERA-515 at 107 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).

existing roadways. Increased traffic might cause minor traffic delays along local roads, which could impact emergency response vehicles. Minor electrical outages, up to five days, are associated with construction of the HVDC converter station. Potential impacts can be mitigated. The overall impact intensity level is anticipated to remain minimal.[622]

- ***Archaeological and Historical Resources***: Because only one archaeological resource has been identified in the project study area, and both routing options would avoid it with a 100-meter buffer, impacts are not expected. Cumulative potential effects from reasonably foreseeable future projects are also not expected as the projects will not be occurring within the project study area. The overall impact intensity level is expected to remain minimal.[623]

- ***Natural Resources***: Cumulative potential effects on the natural environment are anticipated to be minimal. Most projects are in well-developed areas in cities or along roadways. Impacts are limited along roadways by using existing infrastructure right-of-way. Wildlife might be inadvertently harmed or killed during construction. Long term impacts include a greater risk of bird electrocution or collision due to increased electrical equipment on the landscape. Potential impacts can be mitigated. The overall impact intensity level is expected to remain minimal.

  Soils within the footprint of the HVDC converter station and some construction projects, such as in the area of Haines Road and Piedmont Avenue, will be permanently compacted, and may experience rutting from movement of construction vehicles. The overall impact intensity level is expected to remain minimal.

  Air quality impacts associated with construction vehicles for the proposed project and reasonably foreseeable future projects will occur over the short term (e.g., emissions and fugitive dust). HVTLs will produce ozone and nitrous oxide through the corona effect. Impacts would be long term, permanent, and negligible. The overall impact intensity level is expected to remain minimal.[624]

- ***Rare and Unique Resources***: Cumulative potential effects on rare and unique natural resources are anticipated to be minimal. Certain projects might impact rare and unique resources during construction and operation, however, others, like the Munger State Trail system expansion, might benefit rare and unique resources.[625]

[622] Ex. DOC EERA-515 at 107 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[623] Ex. DOC EERA-515 at 107 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[624] Ex. DOC EERA-515 at 107-08 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).
[625] Ex. DOC EERA-515 at 108 (EA) (eDocket Nos. 20242-203954-01, 20242-203954-02).

O. DOC-EERA Recommended Route Permit Conditions

563. In its April 15, 2024 Hearing Comments, the DOC-EERA recommended the following special conditions put forth by Minnesota Power and DNR, which it stated would mitigate potential impacts of the project as discussed in the EA.[626] The Judge recommends that the following be incorporated into the route permit:

- ***Vegetation Retention***: The Permittee may disturb or clear vegetation on the site only to the extent necessary to assure suitable access for construction, and for safe operation and maintenance of the project. The existing vegetative buffer specifically between the St. Louis County 345 kV/230 kV Substation and Morris Thomas Road must be retained during construction of the project and for the life of the project.

- ***HVDC Converter Station Aesthetics***: The Permittee must color its HVDC converter station to blend in with the natural landscape with a neutral color such as a shade of brown or green, or a combination thereof.

- ***Noise Study***: The Permittee must file a pre-construction noise study at least 14 days prior to the pre-construction meeting. The pre-construction noise study must include assumptions made, baseline noise conditions in the area, modeled noise levels, planned minimization and mitigation efforts, and equipment studied. The study must compare modeled noise levels with the State of Minnesota's noise standards (Minn. R. 7030.0040).

- ***Right-of-Way Restoration Near Trout Streams***: The Permittee must restore the right-of-way, forested habitat along existing rights-of-ways, and any rights-of-ways to be decommissioned affected by construction of the transmission facility. Restoration within the right-of-way near trout streams must be coordinated with DNR fisheries staff to ensure that restoration in these areas provide adequate resource protection.

- ***Steep Slopes***: To avoid indirect impacts to surface waters from steep slopes, increased impervious surfaces, erosion, and altered drainage patterns, the Permittee must use rip rap or a similar material to stabilize steep slopes after construction to ensure the existing drainage pattern remains. The Permittee must maintain a well-vegetated buffer between West Rocky Run Creek and graded areas. The Permittee must keep records of compliance with this section and provide them upon the request of Department of Commerce or Commission staff.

- ***Facility Lighting***: To reduce harm to birds, insects, and other animals, the Permittee must utilize downlit and shielded lighting at all project facilities. Lighting must minimize blue hue. The Permittee must keep records of

[626] DOC-EERA Hearing Comments at 4-8 (Apr. 15, 2024) (eDocket Nos. 20244-205360-01, 20244-205360-02).

compliance with this section and provide them upon the request of Department of Commerce or Commission staff.

- ***Dust Control***: To protect plants and wildlife from chloride products that do not break down in the environment, the Permittee is prohibited from using dust control products containing calcium chloride or magnesium chloride during construction and operation. The Permittee must keep records of compliance with this section and provide them upon the request of Department of Commerce or Commission staff.

- ***Wildlife-Friendly Erosion Control***: The Permittee must use only "bio-netting" or "natural netting" types and mulch products without synthetic (plastic) fiber additives.

- ***Vegetation Management Plan***: The Permittee must develop and use a vegetation management plan (VMP), in coordination with the Vegetation Management Plan Working Group (VMPWG), using best management practices established by the DNR and BWSR. The Permittee must file the VMP and documentation of the coordination efforts between the Permittee and the coordinating agencies with the Commission at least 14 days prior to the plan and profile required under this Route Permit. The Permittee must provide all landowners along the route with copies of the VMP. The Permittee must file an affidavit of its distribution of the VMP to landowners with the Commission at least 14 days prior to the plan and profile. The VMP must include, at a minimum, the following:

  a) management objectives addressing short term (year 0-5, seeding and establishment) and long term (year 5 through the life of the Project) goals;

  b) a description of planned restoration and vegetation activities, including how the route will be prepared, timing of activities, and how seeding will occur (broadcast, drilling, etc.), and the types of seed mixes to be used;

  c) A description of tree removal/planting activities and the timing of such activities;

  d) a description of how the route will be monitored and evaluated to meet management goals;

  e) a description of management tools used to maintain vegetation (e.g., mowing, spot spraying, hand removal, etc.), including timing/frequency of maintenance activities;

f) identification of any third-party (e.g., consultant, contractor, site manager, etc.) contracted for restoration, monitoring, and long-term vegetation management of the site;

g) identification of on-site noxious weeds and invasive species (native and non-native) and the monitoring and management practices to be utilized; and

h) a plan showing how the route will be revegetated and corresponding seed mixes.

Best management practices should be followed concerning seed mixes, seeding rates, and cover crops.

- ***Independent Third-Party Monitoring***: Prior to any construction, the Permittee must propose a scope of work and identify an independent third-party monitor to conduct Transmission Facility construction monitoring on behalf of Commerce. The scope of work must be developed in consultation with and approved by Commerce. This third-party monitor will report directly to and will be under the control of Commerce with costs borne by the Permittee.

  The Permittee must file with the Commission the scope of work and the name, address, email, and telephone number of the third party-monitor at least 30 days prior to commencing any construction or right-of-way preparation and upon any change in the scope of work or contact information that may occur during construction of the Project and restoration of the right-of-way.

XII. Consideration of Issues Presented by State Agencies and Local Units of Government

564. Minn. Stat. § 216E.03, subd. 7(12) requires the Commission to examine, when appropriate, issues presented by federal and state agencies and local units of government. The majority of the issues presented by federal, state, and local units of government are addressed as part of the analysis of the Commission's routing factors in Section **Error! Reference source not found.**. The issues that have not previously been addressed are discussed below.[627]

565. The DNR submitted written comments regarding water resources and fisheries, wildlife friendly erosion control, vegetation management plan, water appropriation, and West Rocky Run. In addition to issues previously addressed, the DNR noted:

[627] Several of the recommendations of the MnDNR were discussed in Section **Error! Reference source not found.** of these Findings of Fact, Conclusions of Law, and Recommendation.

- Public Water Works Permit: "[I]f work is planned below the ordinary high water level not covered by a DNR Lands and Minerals license to cross public waters" that a public waters works permit will be required for the HVDC Modernization Project and recommended that the Permittee consult with the Area Hydrologist for more information.

- Minnesota Power Proposed Configuration West Rocky Run Crossing: The DNR supports the double-circuit 230 kV transmission line crossing of West Rocky Run.[628]

XIII. The Judge Recommends that the Applicant Follow these DNR Recommendations to the Extent Not Already Required By Conditions in the Standard Route Permit Template Summary of Certificate of Need Recommendations

566. The record demonstrates that the HVDC modernization project satisfies the certificate of need factors in Minn. Stat. § 216B.243, subd. 3 and Minn. R. 7849.0120.

567. ATC has not proven by a preponderance of the evidence that the ATC alternative is a more prudent and reasonable system alternative than Minnesota Power's proposed configuration for the HVDC modernization project.

XIV. Summary of Route Recommendations

568. The record demonstrates that Minnesota Power's proposed configuration satisfies the routing factors in Minn. Stat. § 216E.03, subd. 7 and Minn. R. 7850.4000 and Minn. R. 7850.4100.

569. The record demonstrates that Minnesota Power's proposed configuration appropriately balances the routing standards and criteria.

570. The conditions identified by the DOC-EERA and proposed revisions to the draft Route Permit should be incorporated into the Route Permit for the HVDC modernization project.[629]

XV. Notice

571. Minnesota statutes and rules require an applicant for a Certificate of Need and Route Permit to provide certain notice to the public as well as to local governments before and during the Combined Application for a Certificate of Need and Route Permit process.[630]

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[628] MnDNR Comments on the EA (Mar. 28, 2024) (eDocket No. 20243-204708-1).
[629] DOC-EERA Hearing Comments (eDocket Nos. 20244-205360-01, 20244-205360-02, 20244-205360-03, 20244-205360-04).
[630] Minn. Stat. § 216E.04, subd. 4, Minn. R. 7829.2500, subp. 5, Minn. R. 7829.2550, subp. 3, Minn. R. 7849.2550, and Minn. R. 7850.3300. The requirements under Minn. R. 7829 and 7849 can be modified by Minn. R. 7849.0200, subp. 6 via the filing of an exemption request. Minnesota Power filed such a request

572. The Applicant provided notice to the public and to local governments in satisfaction of Minnesota statutory and rule requirements.

573. Minnesota statutes and rules also require the DOC-EERA and the Commission to provide certain notice to the public throughout the Route Permit process. The DOC-EERA and the Commission provided the notice in satisfaction of Minnesota statutes and rules.[631]

574. Any of the findings of fact more properly considered conclusions of law are adopted as such.

Based on these findings of fact, the judge makes the following:

CONCLUSIONS OF LAW

1. The Commission and the Administrative Law Judge have jurisdiction to consider the Applicant's Combined Certificate of Need and Route Permit Application pursuant to Minn. Stat. §§ 216B.243, 216E.02, and 14.57-.62 (2022).

2. The Commission determined that the Combined Application was substantially complete, accepted the Combined Application, and ordered joint review on August 8, 2023.

3. The DOC-EERA has conducted an appropriate environmental analysis and environmental review for the project for purposes of this Certificate of Need and Route Permit proceeding and the EA satisfies Minn. R. 7849.1900, subp. 1 and Minn. R. 7850.3700.

4. Minnesota Power gave notice as required by Minn. Stat. § 216E.04, subd. 4; Minn. R. 7829.2500, subp. 5; Minn. R. 7829.2550, subp. 3; Minn. R. 7849.2550; and Minn. R. 7850.3300.

5. The DOC-EERA gave notice as required by Minn. Stat. §§ 216E.03, subd. 6; 216E.04, subd. 6; Minn. R. 7850.2300, subp. 2; and Minn. R. 7850.2500, subps. 2, 3, and 6.

6. Public hearings were conducted in the communities near the proposed transmission line route. The Applicant and the Commission gave proper notice of the public hearings, and the public was given the opportunity to appear at the hearings or submit written comments.

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for certain exemptions from Minn. R. 7849.0270, Minn. R. 7849.0280, Minn. R. 7849.0290, and Minn. R. 7849.0300 on November 30, 2022. The Commission granted the requested exemptions to Minnesota Power via order on February 1, 2023.

[631] Minn. Stat. §§ 216E.03, subd. 6, 216E.04, subd. 6; Minn. R. 7850.2300, subp. 2; Minn. R. 7850.3700, subps. 2, 3, and 6.

7. All procedural requirements for processing the Certificate of Need and Route Permit have been met.

8. The record evidence demonstrates that the Minnesota Power proposed configuration (including the HVDC converter stations) of the HVDC modernization project satisfies the certificate of need criteria set forth in Minn. Stat. § 216B.243, subd. 3, and Minn. R. 7849.0120, based on the factors in Minn. Stat. § 216E.03, subd. 7 and Minn. R. 7850.4000.

9. The record evidence demonstrates that Minnesota Power's proposed configuration of the HVDC modernization project satisfies the route permit criteria set forth in Minn. Stat. § 216E.03, subd. 7(a) and Minn. R. 7849.0120, based on the factors set forth in Minn. R. 7849.0110.

10. No party has demonstrated by a preponderance of the evidence that there is a more reasonable and prudent system alternative to Minnesota Power's proposed configuration of the HVDC modernization project.

11. The record evidence demonstrates that constructing Minnesota Power's proposed configuration of the HVDC modernization project does not present a potential for significant adverse environmental effects pursuant to the Minnesota Environmental Rights Act, Minn. Stat. §§ 116B.01-116B.13, and the Minnesota Environmental Policy Act, Minn. Stat. §§ 116D.01-116D.11.

12. The Applicant's request for a route width of approximately 0.5 miles wide, 0.7 miles long, parallel to the existing HVDC line, and immediately west of Minnesota Power's Arrowhead 230 kV/115 kV Substation, is reasonable and appropriate for the project.

13. The Applicant's request for a right-of-way of up to 150 feet for O&M of the DC and AC transmission lines, including additional right-of-way width beyond 150 feet to accommodate final design requirements, is reasonable and appropriate.

14. Any conclusions of law which are more properly designated findings of fact are adopted as such.

Therefore, based upon these conclusions of law, the judge makes the following:

RECOMMENDATION

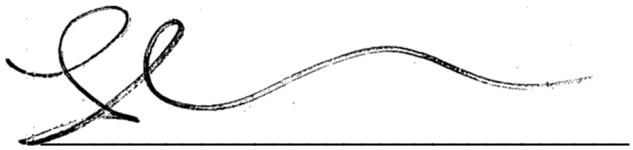
1. Because the Judge concludes that all relevant statutory and rule criteria necessary to certify Minnesota Power's proposed configuration of the HVDC modernization project have been satisfied, and there are no statutory or other requirements that preclude the Commission from certifying the HVDC modernization project on the record, the Commission should approve the Certificate of Need for the project.

2. Because the Judge concludes that all relevant statutory and rule criteria necessary to obtain a Route Permit for Minnesota Power's proposed configuration of the HVDC modernization project have been satisfied, and because there are no statutory or other requirements that preclude the Commission from granting a Route Permit based on the record, the Commission should grant a Route Permit for Minnesota Power's proposed configuration of the HVDC modernization project.

3. The Commission's Standard Route Permit Conditions should be incorporated into the Route Permit, unless modified herein.

4. The Commission should require the Applicant to take those actions necessary to implement the Commission's orders in this proceeding.

Dated: June 21, 2024



JIM MORTENSON
Administrative Law Judge

MINNESOTA
OFFICE OF
ADMINISTRATIVE
HEARINGS

PO Box 64620
Saint Paul, MN 55164-0620
mn.gov/oah

PH (651) 361-7900

June 21, 2024

See Attached Service List

Re: ***In the Matter of the Application of Minnesota Power for a Certificate of Need for the HVDC Modernization Project in Hermantown, Saint Louis County;***

In the Matter of the Application of Minnesota Power for a Certificate of Need and for a Route Permit for a High Voltage Transmission Line for the HVDC Modernization Project in Hermantown, Saint Louis County

OAH 5-2500-39600
MPUC E-015/CN-22-607
MPUC E-015/TL-22-611

To All Persons on the Attached Service List:

Enclosed and served upon you is the Administrative Law Judge's **FINDINGS OF FACT, CONCLUSIONS OF LAW, AND RECOMMENDATION** in the above-entitled matter.

If you have any questions, please contact me at (651) 361-7874, michelle.severson@state.mn.us, or via facsimile at (651) 539-0310.

Sincerely,

Michelle Severson

MICHELLE SEVERSON
Legal Assistant

Enclosure
cc: Docket Coordinator

STATE OF MINNESOTA
OFFICE OF ADMINISTRATIVE HEARINGS
PO BOX 64620
600 NORTH ROBERT STREET
ST. PAUL, MINNESOTA 55164

CERTIFICATE OF SERVICE

In the Matter of the Application of Minnesota Power for a Certificate of Need for the HVDC Modernization Project in Hermantown, Saint Louis County; In the Matter of the Application of Minnesota Power for a Certificate of Need and for a Route Permit for a High Voltage Transmission Line for the HVDC Modernization Project in Hermantown, Saint Louis County	OAH Docket No.: 5-2500-39600 MPUC E-015/CN-22-607 MPUC E-015/TL-22-611

On June 21, 2024, a true and correct copy of the **FINDINGS OF FACT, CONCLUSIONS OF LAW, AND RECOMMENDATION** was served by eService, and United States mail, (in the manner indicated below) to the following individuals:

First Name	Last Name	Email	Company Name
Jay	Anderson	jaya@cmpas.org	CMPAS
Sarah	Beimers	sarah.beimers@state.mn.us	Department of Administration - State Historic Preservation Office
Katherine	Arnold	katherine.arnold@ag.state.mn.us	Office of the Attorney General-DOC
David	Bell	david.bell@state.mn.us	Department of Health
James J.	Bertrand	james.bertrand@stinson.com	STINSON LLP
Michelle F.	Bissonnette	michelle.bissonnette@hdrinc.com	HDR Engineering, Inc.
B. Andrew	Brown	brown.andrew@dorsey.com	Dorsey & Whitney LLP
Christina	Brusven	cbrusven@fredlaw.com	Fredrikson Byron
PUC	CAO	consumer.puc@state.mn.us	Public Utilities Commission
Christopher J.	Cerny	ccerny@winthrop.com	Winthrop & Weinstine, P.A.
Generic Notice	Commerce Attorneys	commerce.attorneys@ag.state.mn.us	Office of the Attorney General-DOC
Bill	Cook	bcook@rpu.org	Rochester Public Utilities
John	Crane	johncranefishing@gmail.com	Fishing
George	Crocker	gwillc@nawo.org	North American Water Office
Thomas	Davis	atdavis1972@outlook.com	-
Randall	Doneen	randall.doneen@state.mn.us	Department of Natural Resources

John	Drawz	jdrawz@fredlaw.com	Fredrikson & Byron, P.A.
Adam	Duininck	aduininck@ncsrcc.org	North Central States Regional Council of Carpenters
Cory	Dutcher	cory.dutcher@ge.com	GE Power and Water
Kristen	Eide Tollefson	healingsystems69@gmail.com	R-CURE
Kate	Fairman	kate.frantz@state.mn.us	Department of Natural Resources
Annie	Felix Gerth	annie.felix-gerth@state.mn.us	
Sharon	Ferguson	sharon.ferguson@state.mn.us	Department of Commerce
Lucas	Franco	lfranco@liunagroc.com	LIUNA
Karen A	Gebhardt	kageb1@gvtel.com	
Todd	Green	Todd.A.Green@state.mn.us	Minnesota Department of Labor & Industry
Valerie	Herring	vherring@taftlaw.com	Taft Stettinius & Hollister LLP
Kari	Howe	kari.howe@state.mn.us	DEED
Scott	Johnson	Scott.Johnson@ci.medina.mn.us	City of Medina
Tom	Karas	tomskaras@gmail.com	
Bruce	King	Brenda@ranww.org	Realtors, Association of Northwestern WI
Chad	Konickson	chad.konickson@usace.army.mil	U.S.Army Corps of Engineers
Stacy	Kotch Egstad	Stacy.Kotch@state.mn.us	MINNESOTA DEPARTMENT OF TRANSPORTATION
Amber	Lee	amber.lee@stoel.com	Stoel Rives LLP
Peter E.	Madsen	pmadsen@taftlaw.com	Taft Stettinius & Hollister LLP
Dawn S	Marsh	dawn_marsh@fws.gov	U.S. Fish & Wildlife Service
Dan	McCourtney	dmccourtney@mnpower.com	Minnesota Power
Greg	Merz	greg.merz@ag.state.mn.us	Office of the Attorney General-DOC
David	Moeller	dmoeller@allete.com	Minnesota Power
Andrew	Moratzka	andrew.moratzka@stoel.com	Stoel Rives LLP
James	Mortenson	james.mortenson@state.mn.us	Office of Administrative Hearings
Dan	Nelson	Dan.Nelson@ISGinc.com	I&S Group
Kevin	Peterson	kjp@ibew160.org	IBEW Local 160
Angela	Piner	angela.piner@hdrinc.com	HDR, Inc.
Larry	Rebman	larryemls@hotmail.com	EMLS, Inc
Generic Notice	Residential Utilities Division	residential.utilities@ag.state.mn.us	Office of the Attorney General-RUD
Margaret	Rheude	Margaret_Rheude@fws.gov	U.S. Fish and Wildlife Service
Stephan	Roos	stephan.roos@state.mn.us	MN Department of Agriculture
Nathaniel	Runke	nrunke@local49.org	International Union of Operating Engineers Local 49
Elizabeth	Schmiesing	eschmiesing@winthrop.com	Winthrop & Weinstine, P.A.
Christine	Schwartz	Regulatory.records@xcelenergy.com	Xcel Energy
Will	Seuffert	Will.Seuffert@state.mn.us	Public Utilities Commission
Janet	Shaddix Elling	jshaddix@janetshaddix.com	Shaddix And Associates
Tom	Slukich	tom@nationalconductor.com	National Conductor Constructors

Adam	Sokolski	adam.sokolski@edf-re.com	EDF Renewable Energy
Mark	Strohfus	mstrohfus@grenergy.com	Great River Energy
Carl	Strohm	cjsmg@sbcglobal.net	SBC Global
Charles	Sutton	charles@suttonconsultingllc.com	Charles
Tom	Swafford	tswafford@umsi.us	Utility Mapping Services, Inc
Eric	Swanson	eswanson@winthrop.com	Winthrop & Weinstine
Todd	Tadych	ttadych@atcllc.com	American Transmission Company LLC
Jayme	Trusty	execdir@swrdc.org	SWRDC
Jen	Tyler	tyler.jennifer@epa.gov	US Environmental Protection Agency
Kodi	Verhalen	kverhalen@taftlaw.com	Taft Stettinius & Hollister LLP
Cynthia	Warzecha	cynthia.warzecha@state.mn.us	Minnesota Department of Natural Resources
Elizabeth	Wefel	eawefel@flaherty-hood.com	Flaherty & Hood, P.A.
Alan	Whipple	sa.property@state.mn.us	Minnesota Department Of Revenue
Deanna	White	mncwa@cleanwater.org	Clean Water Action & Water Fund of MN
Rachel	Wiedewitsch	wiedewitsch@fresh-energy.org	Fresh Energy
Jonathan	Wolfgram	Jonathan.Wolfgram@state.mn.us	Office of Pipeline Safety
David	Zoppo	david.zoppo@huschblackwell.com	American Transmission Company LLC